Exploring Standardisation in Reusable Packaging for FMCGs:

A Triangular Perspective on Technical Requirements, Market Differentiation and Sustainability

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Exploring Standardisation in Reusable Packaging for FMCGs: A Triangular Perspective on Technical Requirements, Market Differentiation and Sustainability

Master (MSc) assignment

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SUPZERO
SWAP SINGLE USE PLASTIC FOR ZERO WASTE

PREFACE

During my study of Industrial Design Engineering, I found my interest for brand management, graphic design, packaging design and sustainability. I was searching for a master assignment that combined these elements, not knowing whether this was possible. Many packaging companies did not have any assigments covering all these elements, but when I heard about the design of standardised, reusable packaging, I new that this would be something that I would love to work on.

When I started my assignment, in September 2023, I thought that this research would be quite straight forward. However, truth be told, it wasn't all smooth sailing. It felt more like a wild ride, where what seemed straightforward at first turned out to be far more complex upon closer examination. Fortunately, I had people by my side who helped me navigate through this process. Therefore, I would like to express my gratitude to everyone who helped me throughout this project.

First I want to thank my supervisor Maaike. I really enjoyed our meetings together where we brainstormed about ideas for the research. Your positivity and enthusiasm about this subject is really contagious, which I believe made me enjoy this master thesis even more. I also want to thank you for reminding me that I can sometimes be more confident in my decisions regarding this research, as this is something that I tend to forget. I will take this with me for the future. Lastly, the fact that you took the time to help me, even after your injury is something that I do not take for granted.

Then I would like to thank Hilde, for making it possible for to do this research at SUPZero. I want to thank you for the time that you took to brainstorm, provide feedback or just chat on how things are going, even though I know that you had more things on your mind. Your expertise in pioneering and your overall 'people-knowlegde' really helped me in this research.

I also would like to thank Jörg for your support with setting up the consumer study and stepping in when Maaike was unavailable.

Thank you mom for re-reading my thesis over and over again, thank you Ferlin for being my brainstorm buddy even though you did not understand anything of the subject. To everyone who contributed, big or small, to this project: thank you. Every contribution helped me in writing this thesis and enjoying the journey from beginning until the end.

While it'll take some time to get reuse up and running in the world of FMCGs, I hope my research can at least be a small stepping stone towards making reuse a reality.

Linh Ho-dac

1 May 2024

SUMMARY

The world is in the process of transitioning towards a more sustainable way of life, a circular economy. One promising strategy to extend the life of materials and lower the environmental impact of packaging is 'Reuse'. This research follows the framework of the Ellen MacArthur Foundation by focusing on the 'return' segments. A pool system where multiple brands share their packaging is set as a scope. Prior research indicates that for this reuse system to work effectively, packaging must be standardised. However, brands utilise packaging as a means of identification and differentiation, they create unique packaging that reflects their values and persuades consumers. There is a conflict identified in the design of reusable packaging between standardisation and differentiation.

This research investigates how reusable, standardised packaging can be designed to facilitate a circular economy, while maintaining market differentiation.

To answer this question, a balance was to be found between standardisation, differentiation and sustainability. Two research questions were formulated that take all three perspectives into account. These probe into technical requirements for reusable packaging to be scalable and how market differentiation can be maintained when standardisation is a primary goal.

To answer these questions, the research involved a combination of quantitative and qualitative methodologies, including a literature review, case study, consumer study, and interviews with premium brands.

The literature review suggests that while standardisation is key to scalability, it must be designed in a way that allows brands to maintain a unique identity and customers to make informed choices. Following this, the case study investigated what standardisation would look like for tomato products. The consumer studies delve into how standardised packaging affects brand perception, willingness to buy and perceived quality. Interviews with industry experts contribute additional perspectives, highlighting the practical challenges and opportunities in standardising reusable packaging.

The findings from these studies indicate that reusable packaging can be designed in a way that balances standardisation and differentiation. However, achieving this requires a focus on visual and verbal branding elements to compensate for the loss of structural differentiation. The research also underscores the importance of lifecycle assessments to ensure that standardised reusable packaging meets sustainability goals. All findings led to the development of a list of requirements for the design of reusable packaging. This is used to envision what reusable packaging would look like for the product jam, presenting the ideal balance in the design space. In addition, short- and long-term solutions were given for the presentation of reusable packaging in store to educate and persuade consumers and for brands to stand out more.

In terms of recommendations, the thesis suggests that future studies should create and iterate on the designs with the objectives: optimisation for durability, performing LCAs, testing the real-world efficacy, investigation of innovative materials and testing the usability and acceptance with consumers. In addition, recommendations are given to select product categories for reuse. Lastly, it is recommended that industry stakeholders collaborate to establish common standards and pool resources to make reusable packaging more efficient and cost-effective and to investigate additional factors of differentiation and standardisation.

In conclusion, this research proposes how to design reusable packaging for a reuse pool in the Netherlands, where there is a balance between sustainability, standardisation and differentiation. It offers practical insights for industry professionals and policymakers, aiming to drive the transition from single-use to reusable packaging in FMCGs.

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DEFINITIONS

Reusable packaging

Reusable packaging has been given different definitions over de years. In this thesis, the definition as proposed by the European Union (Directive 94/62/EC) is used: “packaging which has been conceived, designed and marketed to carry out multiple trips in its lifetime by being refilled or reused for the same purpose for which it was conceived”. In the reuse ecosystem set as a scope for this thesis, the packaging will be used by different brands and for different products.

Fast-Moving Consumer Goods

Fast-Moving Consumer Goods (FMCGs) are repeatedly purchased, packed products that are designed for convenient and short use (Zeeuw van der Laan & Aurisicchio, 2019). The user is satisfied for a short period of time, after which the product is discarded, and a new purchase needs to take place (hence fast-moving).

1. INTRODUCTION

1.1 RESEARCH AIM

Nowadays, in the supermarket one can find all sorts of products from around the world. Partly due to the innovations in single-use packaging, it is possible to preserve different types of products and food for a long period of time. Besides preservation and protection, packaging also has a major role in a brand's marketing strategy. Therefore, brands try to stand out with their own distinctive packaging. This differentiation in packaging by using different materials, ink, shapes, and sizes, causes an expand in the amount of different packaging (figure 1). On the other hand, the world is trying to move towards a more sustainable way of life. The European Union aims to move to a sustainable model known as the circular economy which reduces waste by extending the life cycle of products through sharing, leasing, repairing, refurbishing, recycling, and reusing existing materials and products (European Parliament, 2023). Reuse is a promising waste management strategy to move towards a circular economy. On March 4, 2024, the European Parliament and the Council of the European Union announced to have reached a provisional agreement on a revision of the Packaging and Packaging Waste Directive and binding reuse targets were set for 2030 (European Parliament, 2024). The transition from single-use to reuse has begun.

For the reuse system to work, prior research shows that packaging should become standardised (Brown et al., 2022; Coelho et al., 2020; Global Plastics Policy Centre, 2023; World Economic Forum, 2021; Zero Waste Europe & Reloop, 2020). Packaging standardisation means harmonising packaging design to meet common requirements. While the reuse system requires standardisation, brands push their packaging towards differentiation as they use distinctive packaging to differentiate themselves from the competition and shape consumer perceptions (Agariya et al., 2012; Chen et al., 2020; Hassan et al., 2012; Keller, 2013; Pantin-Sohier, 2009; Poslon et al., 2021; Schoormans & Robben, 1997; Velasco et al., 2014; Vladić et al., 2015). Furthermore, the design of reusable packaging should be sustainable to fit the perspective of a circular economy, which makes sustainability another factor in this design question. A balance has to be found in the conflict between standardisation and differentiation while securing the lowest possible environmental impact of the reusable packaging.

A variety of reusable packaging systems and initiatives are present around the world, these exist primarily in business-to-business (B2B) settings, while research on primary (FMCG) packaging in business-to-consumer (B2C) retail systems is limited (De Koeijer et al., 2022). Prior research looked into the design of the reuse ecosystems and gives considerations and requirements for the design of reusable packaging. However, research on the effect of standardisation on branding and consumer perspective or actual reusable packaging designs is missing. Therefore, this research aims to answer the following question.

How to design standardised, reusable packaging to build towards a circular economy while maintaining market differentiation?

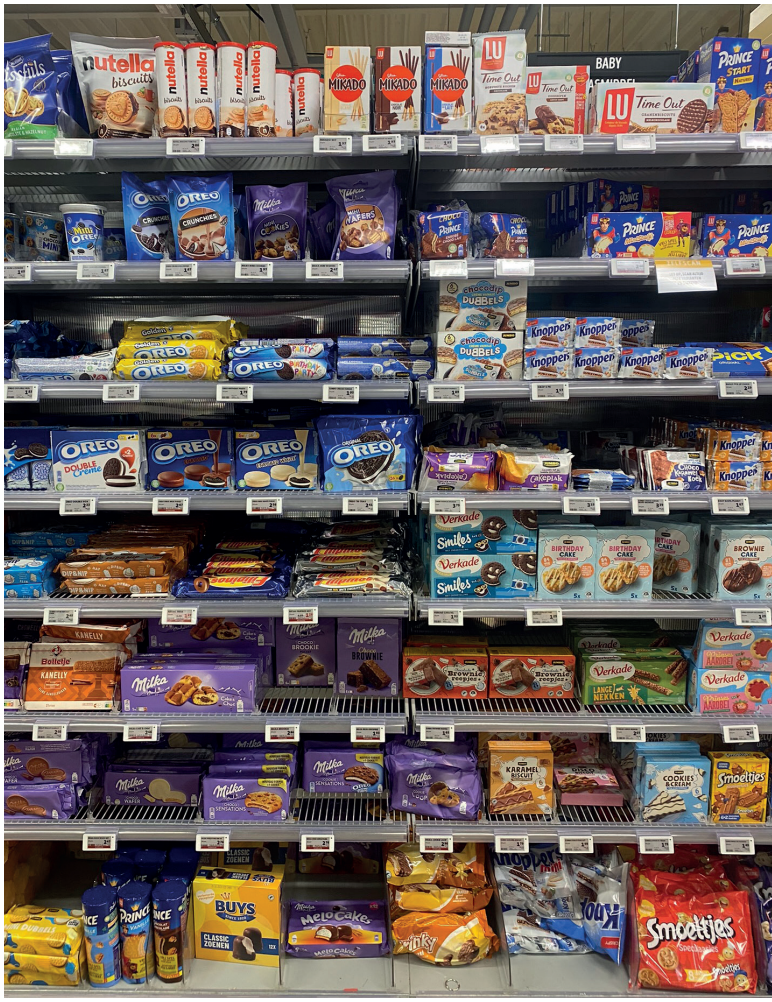


Figure 1: Dutch supermarket shelves with diverse packaging designs for cookies.

1.2 SUPZERO

This thesis project was mentored by SUPZero (figure 2). SUPZero stands for the transition from single use plastic to zero waste. It is run by Hilde Beugelink, a marketing and Zero Waste specialist with experience in leading large, multi-stakeholder projects and setting up innovative campaigns. Hilde's personal commitment to zero-waste living and her knowledge from interactions with global-zero-waste entrepreneurs gives her a unique position to help clients create packaging-free shopping experiences. SUPZero helps businesses to look for zero- or low-waste concepts for companies and entrepreneurs.

Figure 2: SUPZero logo.

1.2.1 Roadmap Reuse 2030

SUPZero is working on the Roadmap Reuse 2030 project as commissioned from the Dutch Ministry of Infrastructure and Water. The goal of this project is to develop industry-wide vision on reuse at supermarkets towards 2030 and to gather input from retail for legislation around reducing packaging materials by the government. The first phase of this project resulted in a joint vision on how reuse should be approached from an industry-wide perspective. This vision was drawn down in the so-called 'Super ecosystem for reusable supermarket packaging' by Kuks (2023). SUPZero wanted further information on the design of standardised packaging. This research was set up to support this project. The initial assignment by SUPZero was: Exploring and further developing the **optimal matches between product types and standardised packaging** in the **most suitable materials** that can be **reused** in a **managed pool system** in **supermarkets** and by **producers i**n high-traffic environments.

This initial assignment focusses mainly on the first sub question; the technical aspects of standardisation while this thesis is about finding the balance between the technical aspects, marketing differentiation and sustainability.

1.3 SCOPE

This research specifically targets the primary packaging of fast-moving consumer good (FMCGs) in the Netherlands, this includes both food and non-food. Furthermore, reuse has been classified into four business-to-consumer (B2C) reuse models (figure 3). This research focusses on return on the go and return from home. This focus was set by the company in their initial assignment. The return models differ from the refill models in the way that consumers buy their product. With refill, consumers have to fill the packaging themselves. Whereas, in return systems, customers buy pre-filled packaging and only have to return the empty packaging. A well-known example of return on the go is the current deposit system for tin cans, PET and beer bottles in the Netherlands. Consumers buy a filled bottle and return an empty one in supermarkets. An example of a Dutch return from home system is Pieter Pot, the difference with return on the go is that customers do not have to go to the supermarket, but the empty packaging is picked up by a company.

In addition, this research focusses on the conflict between standardisation and differentiation for the packaging design. Therefore, the packaging design is the main focus of this research, not the design of the reuse ecosystem. However, the packaging and the reuse ecosystem are interdependent (Global Plastics Policy Centre, 2023; World Economic Forum, 2021a). Elements such as the type of material, closures and dimensions determine the cleaning and filling systems and vice versa. Since no national reuse ecosystem exists yet for the FMCGs, the 'Super ecosystem for reusable supermarket packaging' by Kuks (2023) was set as a scope for this research. This system is further explained in chapter 2.2.

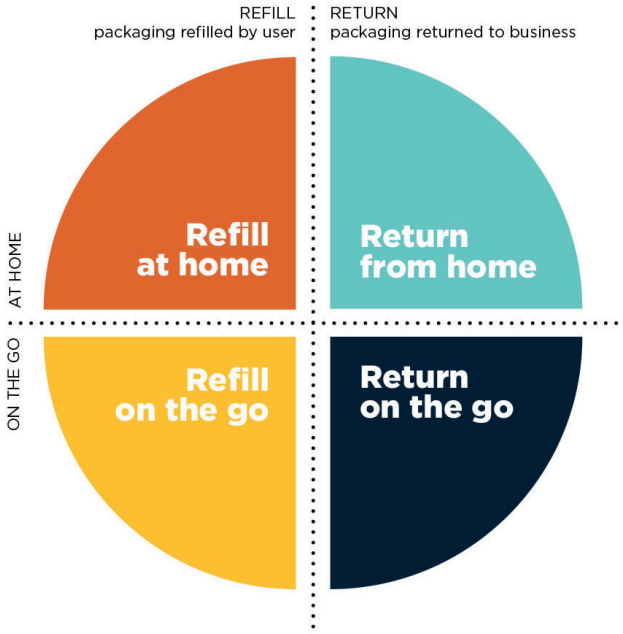


Figure 3: Reuse models (Ellen MacArthur Foundation, 2019).

1.5 THESIS OUTLINE

For the design of standardised packaging, a balance has to be found in the conflict between standardisation and differentiation while securing the lowest possible environmental impact of the reusable packaging. Therefore, this research is positioned in a triangular design space of standardisation, differentiation and sustainability (figure 4).

Two sub questions were formed to guide the research. The first question focusses on the technical aspects of standardisation and the sustainability while the second question focusses on the balance between standardisation and differentiation.

1. What is the most scalable, reusable packaging for a managed pool system in the Netherlands?

2. How to design standardised packaging with regards to market differentiation?

To address all factors of the design space, this thesis switches between the three perspectives. Some chapters or sections focus on standardisation while other focus on differentiation. This outline gives an overview of what chapter focusses on what factor and what is discussed.

The first chapter gives background information on all three perspectives of the design space by explaining the circular economy, the reuse ecosystem set as a scope and the basics of brand management.

Thereafter, a literature review dives deeper into existing knowledge with regards to the three perspectives. It is discussed how packaging design elements can be used to create associations, lessons that can be learned from the state of the art and the requirements for reusable packaging based on the reuse ecosystem. From this literature review, goals are set for the rest of the research.

The following three chapters show separate studies (case study, consumer study and interviews). The case study focusses on the standardisation of tomato products, the consumer study on the effects of standardisation on brand perception, perceived quality and willingness to buy and the interviews with brand owners provide a perspective from all three factors of the design space .

Chapter seven proposes solutions to the main research question that lead to a balance within the design space. This chapter translates all findings of the research into a final list of requirements and recommendations for the design of reusable packaging. The first section shows the final list of requirements and a design of standardised, reusable packaging for jams. The second section proposes and discusses two scenario's, on how reusable packaging can be placed in supermarkets to allow for differentiation and nudge consumers to buy reusable packaging.

Finally, a discussion and conclusion wrap up this thesis with an overview of findings, limitations and recommendations for future developments.

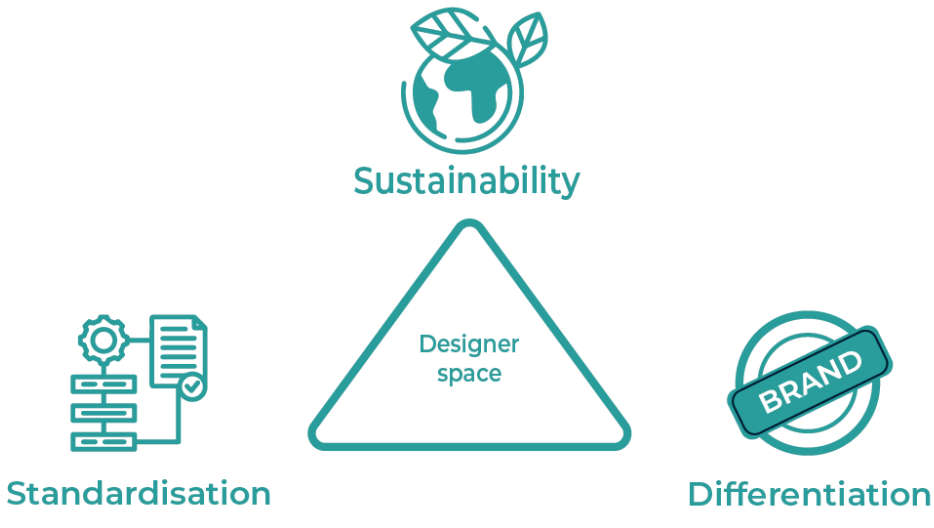


Figure 4: The design space for this research.

2. BACKGROUND

This chapter explains the background of the three factors in the design space (sustainability, standardisation, and differentiation) based on existing literature and presents the reuse ecosystem set as a scope for this research.

2.1 A CIRCULAR ECONOMY

In 2021, the EU found that each European resident generated 189 kilos of packaging waste which was an increase of 20% over ten years (Eurostat [env_waspac], 2024). In total, the EU generated 84.3 million tonnes of packaging waste in 2021 of which 40.3% was paper and cardboard, 19% plastic, 18.5% glass, 17.1% wood and 4.9% metal (figure 5).

The EU aims to move to a circular economy. Creating a circular economy moves us away from the linear economic model which uses many single-use products made from inexpensive, easily accessible materials and energy. The FMCG industry is one of the most competitive industries; brands promote their products using different marketing techniques to get consumers' attention and to build brand equity. The combination of quick turnover at low cost and the pressure on brands to distinguish themselves in the product category makes this industry very wasteful (Charnley et al., 2015). A circular economy reduces the waste production and consequent environmental impact. Existing measures in the European Union are mainly focused on waste treatment such as recycling, energy recovery and correct disposal, but less on waste prevention such as reuse. This section discusses the latest legislation on packaging waste and explains the different waste management strategies.

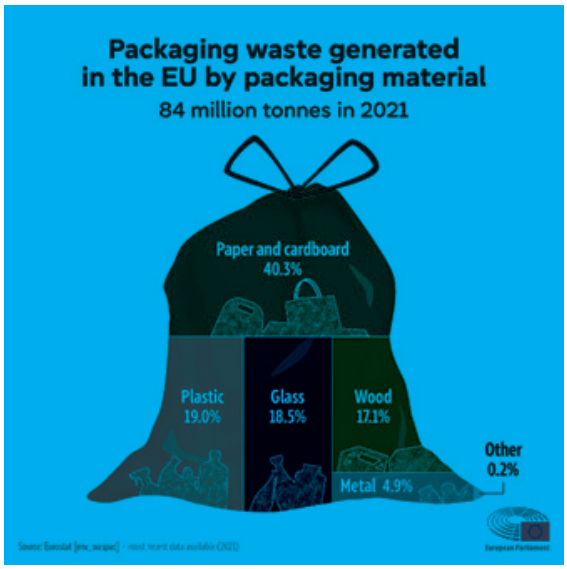


Figure 5: Packaging waste in the EU (Eurostat [env_waspac], 2024)

2.1.1 Legislation

The Packaging and Packaging Waste Directive (PPWR) (European Commission, 1994) is a proposed European Union regulation to reduce packaging pollution. In this directive, targets are set to reduce packaging waste and specific requirements are set to make packaging more sustainable (recycling rates, recycled content, reuse, material reduction et cetera.). On November 30, 2022, the European Commission published a proposal for new regulations and on November 22, 2023, the European Parliament voted on its overall position on the PPWR. While the PPWR passed the parliament and waste prevention targets were preserved, the reuse targets were derogated. On March 4, 2024, the European Parliament and the Council of the European Union announced to have reached a provisional agreement and binding reuse targets were set for 2030 (European Parliament, 2024). First, at least 10% of alcoholic and non-alcoholic beverages (except milk, wine, aromatised wine, spirits) must be in reusable packaging. Secondly, final distributors of take-away are obliged to offer customers the possibility of bringing their own containers and they need to offer 10% of products in reusable packaging. Lastly, member states are required to incentivize restaurants, cafés et cetera to use reusable or refillable packaging. There has been critique on the derogation of the reuse targets by environmental organizations and civil societies, due to the many exemptions and the focus on recycling instead of reuse (Rethink Plastic Alliance, 2024; Zero Waste Europe, 2023, 2024). Nevertheless, these are steps towards a circular economy and therefore still important and valuable.

2.1.1 Consumer

Besides legislation, businesses are pressured by consumers to be more sustainable as consumers are increasingly concerned and aware about the environmental impact of purchases and packaging in specific (Jain & Hudnurkar, 2022; Nguyen et al., 2020). This shift in consumer behaviour causes a demand for sustainable packaging.

2.1.2 Waste management strategies

The Netherlands Institute for Sustainable Packaging (KIDV) has developed a framework for waste management strategies (R-strategies) specifically for packaging waste. The R-ladder (figure 6) presents waste management strategies in a hierarchical order with the top of the ladder as the ideal situation. The top of the ladder (R1) is refuse and rethink; this means elimination of packaging (like most of the fruits and vegetables are not packed) or changing the product drastically (toothpaste mints instead of paste or tablets for soaps or detergents to minimize the weight that needs to be transported). These strategies are not always possible. The next option on the ladder is Reduce (R2) which entails minimizing the raw materials necessary to produce the packaging. An example is using thin plastic foils instead of rigid plastic lids on plastic containers. Reuse (R3) is next on the R-ladder, which is the strategy that this thesis focusses on. With reuse, the packaging's lifetime is extended by refilling the packaging. This can be done by the consumer (refill-models) or by the brands (return-models). Reuse is followed by R4 which includes Repair, Refurbish, Remanufacture and Repurpose. An example of R4-strategies is that some companies provide repair services, so instead of buying an entirely new product customers can get it repaired, elongating the life of the product. R5 is Recycling. This is widely applied in Europe but is at the bottom of the R-ladder, just above the final step Recover (R6) which entails burning materials with energy recovery. In a circular economy, the minimum amount of materials should end up at this step (Rijksdienst voor Ondernemend Nederland, 2020).

The Circular Value Hill Model

Metabolic (2021) has developed a model on the R-ladder that is related to the supply chain and the amount of energy needed to maintain products or materials in the loop. This Circular Value Hill Model (figure 7) conceptualizes ways to preserve the quality of raw materials by keeping “products for as long as possible at their highest value on the Value Hill” (Metabolic, 2021). The product’s path on the Value Hill can be divided into three phases. The first phase is the pre-use phase, where the product is given the maximum possible value through manufacturing, assembly and retailing. The second phase is the in-use phase, during which the product retains its highest value and is used by the customer. The final phase is the post-use phase, during which the product loses value as it declines the hill. The Circular Value Hill model visualises the effect and moment of application of different R-strategies more clearly than the R-ladder, which can make it easier to understand when and why certain strategies are more desired.

By implementing the R-strategies, one can return the product to the use-phase and increase its value, elongating the product’s life. Figure 7 illustrates the effects of various strategies, and in which phase they apply. Lower strategies, such as recycling and repurposing are applied when the product has lost most of its value and cause the product to lose more value compared to higher R-strategies such as reusing or repairing it. Redesign, refuse, rethink and reduce are strategies that are applied before use-phase and are more focussed on innovation in packaging design and reducing material usage. Reuse, repair, refurbish and remanufacture are applied after the use-phase and have the goal to add value to the used packaging.

This model demonstrates the significance of prioritising higher-level strategies as these maintain higher value. The higher R-strategies (Refuse, Rethink and Reduce) are more desired but in some cases not feasible due to the need for product protection or preservation. Therefore, the Reuse strategy is a promising alternative to minimise the environmental impact of packaging. Prior research has delved into the design of a reuse ecosystem for FMCGs in the Netherlands (Kuks, 2023). The next section explains this reuse ecosystem, which was set as a scope for this research.

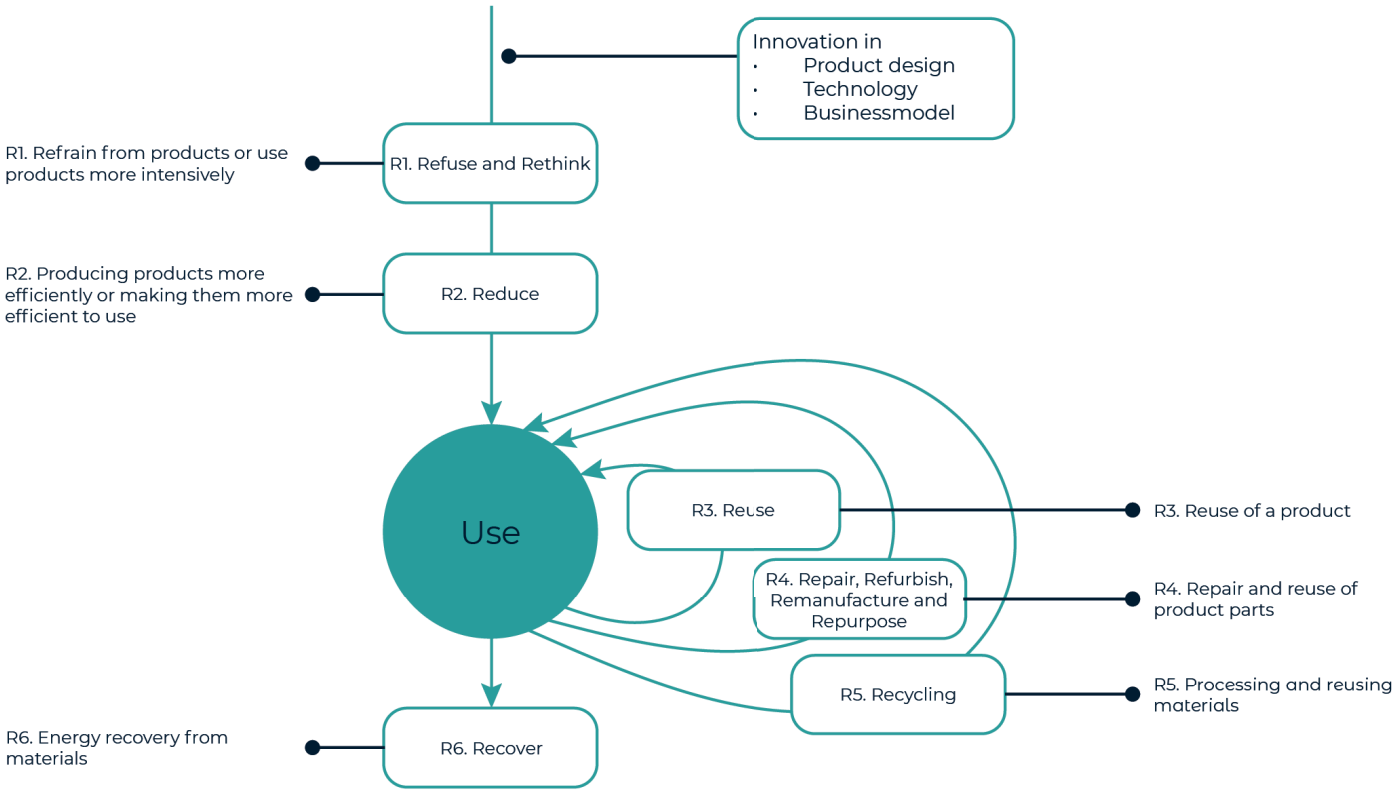


Figure 6: R-strategies (modified version of Rijksdienst voor Ondernemend Nederland, 2020).

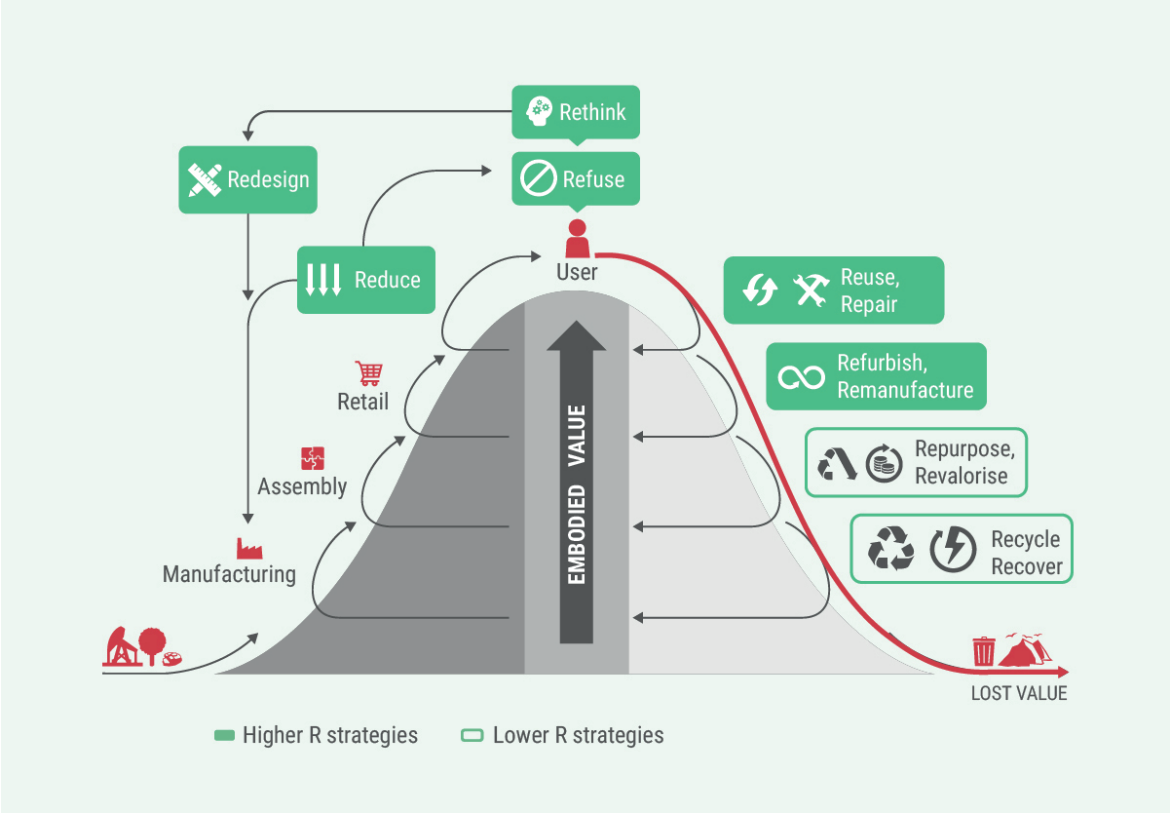


Figure 7: Circular Value Hill model (Metabolic, 2021).

2.2 THE REUSE ECOSYSTEM

Since no national reuse ecosystem for FMCGs exists yet, the 'Super ecosystem for reusable supermarket packaging' by Kuks (2023) was set as an assumption for this research (figure 8). This section explains the system into more detail.

2.2.1 Presumptions

This ecosystem was developed with certain presumptions: pooling, standardisation and equal customer perspective. These presumptions are further explained below.

Pooling

For the system to be scalable to a national level, many organisations and companies need to cooperate. Creating a so-called managed pool system on a national scale means that a group of companies collectively uses the same packaging; this improves efficiency, reduces costs and individual risks for companies, while smaller enterprises can more easily enter compared to setting up individual systems (Ellen MacArthur Foundation, 2023; Global Plastics Policy Centre, 2023; Packback, 2020; Van Velzen & Brouwer, 2022). Moreover, the system improves the opportunities to upscale reuse within a short timeframe (Simon & Schneider, 2022).

Standardisation

Standardisation entails that there is standardised, reusable packaging circulating in the system that is used by the collective. This type of packaging is necessary for the system to work.

Equal customer perspective

To minimise the behavioural change from customers, the action perspective for the customer does not change in this ecosystem. Hence, customers buy pre-filled packaging in physical and online stores.

2.2.2 Pool management

The pool system is managed by a pool manager. This is a company or organisation that regulates elements of the system. This entails the procurement of reusables, deposits, quality control, the outflow of packaging and end of life. The allocation of this role is out of scope of this thesis.

2.2.3 Collection

The Super ecosystem is a combination of the 'return on the go' and 'return from home' model. Within this system, consumers buy a product at an (online) supermarket where they must pay a deposit for the packaging, and after consumption return the empty packaging. The empty reusable packaging can be collected in two ways: (1) the consumer brings the packaging to a deposit machine or (2) the packaging is collected from home. These deposit machines are nowadays found in supermarkets, but it is assumed that these will be placed at more high-traffic locations in the future and that consumers can hand in their packaging at any deposit machine, independent of the supermarket. When the packaging is handed in, it is checked whether it is reusable. If so, the packaging gets sorted per type and material and the consumer receives their deposit back. If the packaging is damaged in a way that it is not reusable, their deposit is not refunded and the packaging is recycled. It is assumed that a machine will be developed that could automatically sort the different packaging. However in some cases manual sorting will still need to be applied. It is left out of the scope in what form the consumer receives their deposit.

2.2.4 Cleaning

After the packaging is sorted, it needs to be cleaned. It should be noted that the same packaging in its next cycle, can be used for a different product and brand. This emphasises the importance of the cleaning process. The cleaning is regulated by the pool manager, but it can be outsourced to a third party specialized in this field. Further details on the cleaning process are out of the scope.

2.2.5 (Re)filling

The packaging is cleaned and dried and ready to be refilled, either with the same product or something new. The refilling is either done by a repacker or brought to a producer that refills it.

2.2.6 Tracking and quality control

The packaging needs to be tracked for logistics and waste management in the pool. There are several quality checks throughout the system where there is a possible outflow of packaging (elements) which affects the logistics and refilling.

Standardisation is crucial for this system to work, therefore a deepening the design of standardised, reusable packaging is essential.

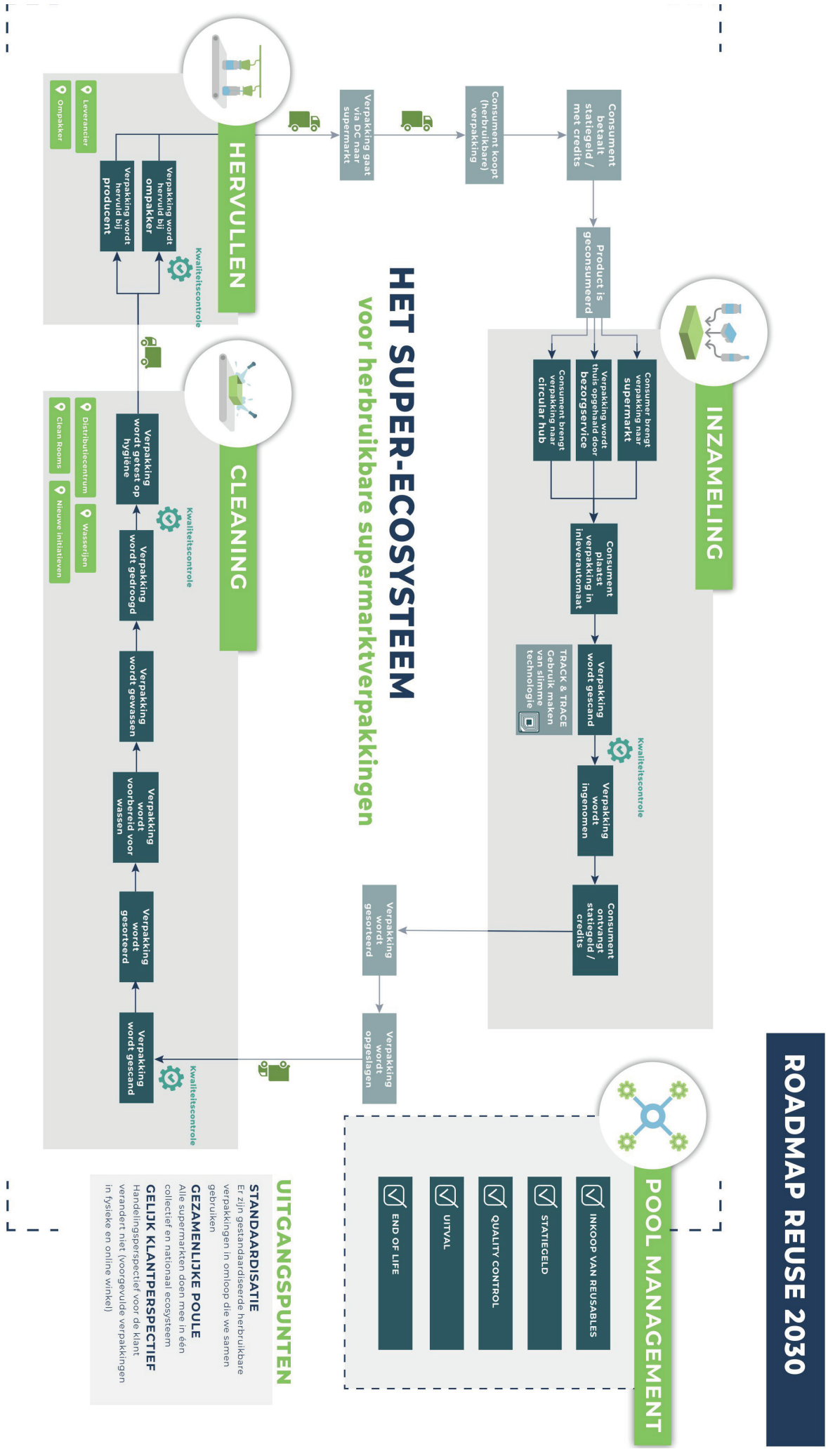


Figure 8: The Roadmap Reuse 2030 'Super-Ecosystem for reusable supermarket packaging'.

2.3 STANDARISATION AND POOLING

Many researchers state that for the reuse system to work, packaging should be standardised (Brown et al., 2022; Coelho et al., 2020; Global Plastics Policy Centre, 2023; World Economic Forum, 2021a; Zero Waste Europe & Reloop, 2020). However, what does standardisation mean and what are the challenges and benefits? This section aims to answer these questions.

2.3.1 What is standardisation?

Packaging standardisation means harmonising packaging design to meet common requirements. One can standardise on different levels depending on the amount of harmonisation (figure 9). In present time, standardisation is widely applied as there are standard pallets and crates that push harmonisation of the outer dimensions and packaging elements such as neck size of bottles or complete designs like drink cans or food tins have been standardised. These shared standards are used to optimise the supply chain (Ellen MacArthur Foundation, 2023).

A different level of standardisation is when a company decides to standardise and pool the packaging within a brand portfolio or category. For example, in 2018 The Coca Cola Company (2020) designed reusable PET bottles ('Universal bottles') which were standardised across their brands; Fanta, Coca Cola and Sprite only differed in their label design (figure 10). This model replaced 200 million single-use bottles per year in Brazil (The Coca Cola Company, 2020). Lastly, one could standardise and pool packaging within a market, this is the system set as a scope for this research. Within this pool system, packaging is owned by the collective which means that packaging can be filled by different companies, for every cycle and a high level of harmonisation is applied. This way of standardising and pooling generates many opportunities and benefits, mainly in the sorting, cleaning and transport phases. The Ellen MacArthur Foundation (2023) has researched the effect of applying pooling and standardisation on a large scale. They found several opportunities, benefits and challenges.

Figure 10: Reusable PET bottles by Coca Cola (2018)

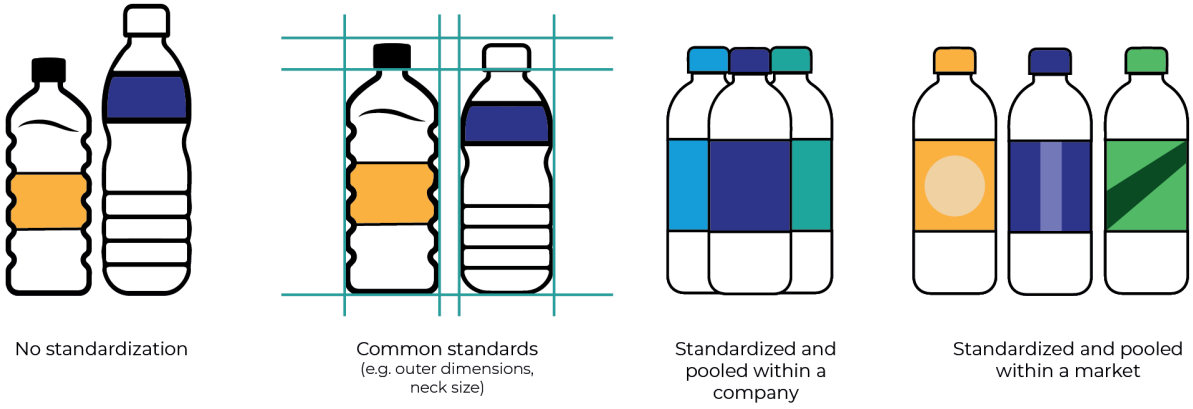


Figure 9: Levels of standardisation and pooling (based on Ellen MacArthur Foundation, 2023)..

2.3.2 Opportunities and benefits with standardisation and pooling

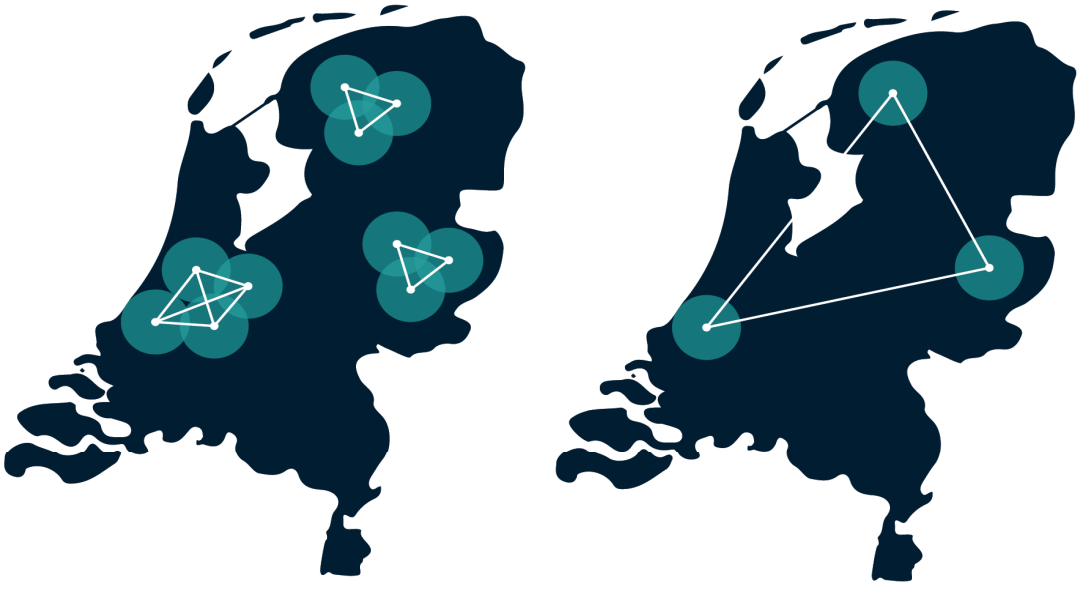
Having a managed pool system with highly standardised reusable packaging designs has both economic and environmental benefits.

1 The Ellen MacArthur Foundation (2023) found that sufficient volumes are reached quicker to start the cleaning process or transport. Therefore, packaging has to be stored for a shorter period of time compared to a system with differentiated designs. This improves efficiency and therefore can reduce costs.

2 If the standard design is optimised for cleaning, it would be possible to use one cleaning line for multiple packaging designs, which naturally reduces costs as compared to having to develop all different types of cleaning lines. In addition, the design can be optimized to increase easy and fast cleaning.

3 Pooling decreases the individual risk for companies and smaller companies can more easily enter compared to setting up individual systems (Ellen MacArthur Foundation, 2023; Global Plastics Policy Centre, 2023; Packback, 2020; Van Velzen & Brouwer, 2022). Moreover, there is a higher chance of upscaling reuse within a short timeframe with this system(Simon & Schneider, 2022).

4 As packaging is shared, everything happens under common rules and can be operated by many organizations. In addition, as volumes are reached quicker, more cleaning and sorting locations will be necessary, decreasing the transport distances between sorting, cleaning and filling sites (figure 11). The Ellen MacArthur Foundation (2023) modelled the average transport distances for pooled packaging and non-pooled packaging in France. They showed that there was a significant decrease in transport distance for pooled packaging. RESOLVE-PR3 (2022) states that transport emissions represent the greater part of the environmental impact per use cycle compared to single use packaging. Optimising transport is therefore a key way to reduce environmental impact and increase the performance of the reuse ecosystem. However, the impact depends on several factors. It depends per type of product since products with a higher degree of specialisation such as personal care have less filling sites, compared to beverage manufactures, increasing the transport distance. Moreover, the effectiveness of the transport distance is related to the scale and number of sorting and cleaning centres across the land. In the Netherlands, transport distances are relatively short, presumingly decreasing the effectiveness of standardisation and pooling.



Common system with more local sorting and cleaning centres, creating shorter transport distances

Fragmented systems cause longer transport distances.

Figure 11: Levels of standardisation and pooling (based on Ellen MacArthur Foundation, 2023)..

2.3.3 Challenges in standardisation and pooling

Standardisation and large-scale managed pool systems also raise new challenges and concerns. These include high investment costs, product quality and safety, collaboration and brand diversity.

1 Creating this entire new system will come with high investment costs. Design choices can make the reuse ecosystem more efficient to improve economic and environmental outcomes. For instance, the investment costs depend on the differences between the current and proposed reusable packaging and the amount of changes needed to the production lines. Two types of packaging exist: the first is single-use packaging that can be used as is in reuse ecosystems or with limited alterations. Products such as bottles can be 'quick-wins' because they require limited transition costs to be usable in the reuse ecosystem and can outperform the single-use variant quickly (Ellen MacArthur Foundation, 2023). The second group is single-use packaging that require significant design changes, for example moving from flexible plastics to reusable rigid containers. Most of the existing infrastructure needs to be changed, with high transition costs as a result (Ellen MacArthur Foundation, 2023). The Ellen MacArthur Foundation (2023) mentions however, that brands are used to adapting their supply chains and production processes every 2-10 years because of branding, legislative or innovation reasons to some extent. They emphasize that the investments of the reuse ecosystem will not be added to their routine investments. Standardisation and pooling reduce overall costs in the long-term, but the early investment costs can be an obstacle to start the transition to reuse.

2 Product safety and quality are at higher risk when using reusable packaging. Within the managed pool system, one packaging might contain different products every cycle. In case of food products this poses challenges to ensure no cross-allergen contamination. Therefore, there should be health and safety standards across the pool.

3 A managed pool system with standardised packaging can only work at a large scale when there is a high level of collaboration. All stakeholders need to work together to create the standards, design the packaging and establish governance systems. This requires an open mindset to changes, creativity from all stakeholders and intrinsic motivation, which can be a challenge.

4 In some cases product or brand specific requirements are present such as pumps that contain pre-defined doses that make sure of accurate dispensing or patented packaging elements. One could understand that brands would not be eager to lose these attributes, therefore creating a barrier for brands to cooperate in the reuse ecosystem. In addition, standardised, pooled packaging means that the packaging shape can no longer be used as a differentiator, as multiple brands use the same packaging. This could have a negative effect, for example research on tobacco packaging standardisation has shown that removing brand information from cigarette packs is likely to reduce positive brand image associations among adolescents (Germain et al., 2010; Hammond, 2010). This lack of differentiation can have negative consequences for brands as it has an important role in the marketing mix, creating another barrier for brands to cooperate. Why brands want to differentiate their packaging is described in the next section.

2.4 BRAND MANAGEMENT

The previous section has explained the reasoning for standardisation, however this section highlights the other side of the conflict, why do brands want to differentiate their packaging?

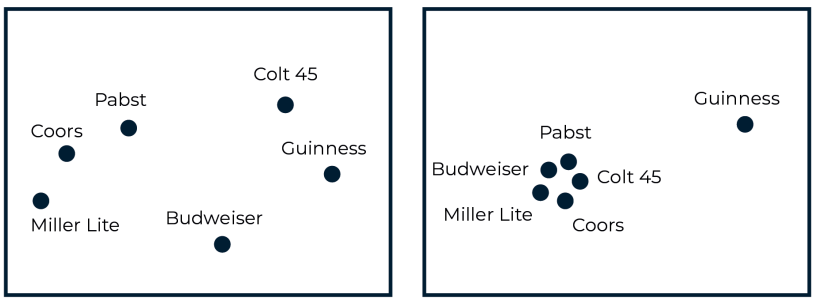
2.4.1 A strong brand

The importance of differentiation becomes clear in the definition of a brand by the American Marketing Association (n.d.): “a name, term, sign, symbol, or design, or a combination of them, intended to identify the goods and services of one seller or group of sellers and to differentiate them from those of competition”. Differentiation is undoubted an important factor for brands. The ultimate goal of brand owners is to create a strong brand. This can improve sales as new customers are more easily acquired, because strong brands’ products are perceived having less risk, higher quality and better performance (Keller, 2013). Furthermore, a strong brand makes customers more loyal which creates a larger barrier to competitive entry. Lastly, strong brands can change consumers’ experience below their conscious awareness. A well-known example is that the taste perception of beer differs when customers know the brand that they are drinking (Allison & Uhl, 1964). Figure 12 shows a graphic representation of the results of Allison and Uhl’s study. One could wonder whether these results could still be derived with standardised packaging.

To become strong, a brand has to build brand equity. This concept is an umbrella term for understanding the effect of marketing strategies and to assess the value of a brand. The concept of brand equity has been widely discussed in literature and different definitions were given. Brand equity can be conceptualised from the perspective of the consumer, this is called the consumer-based brand equity (CBBE). Keller (1993) defined CBBE as “the differential effect that brand knowledge has on consumer response to the marketing of the brand”. This entails consumers’ reactions to elements of the marketing mix to the branded product in comparison with their reactions on the same marketing elements attributed to unnamed or fictitious versions of the same product or service. Hence, brand owners want consumers to react more favourably to their branded version than the non-branded or fictious brand. This effect can be achieved by steering what and how much customers know about the brand (Keller, 1993). These 'what' and 'how much' are explained through brand image and brand awareness.

Brand awareness

Brand awareness is about brand recognition and recall: can consumers confirm prior exposure to the brand or retrieve the brand from memory when given a cue (Keller, 2013)? This cue can be for example a shape of a packaging, slogan or the logo. Brand awareness may even be enough to create favourable consumers response in low-involvement decisions, such as stores which emphasizes its importance. With standardisation, it could be possible that the new packaging design is significantly different from the brands' original packaging, which could decrease the brand awareness and therefore this favourable response.



Taste perceptions of six beer brands when the drinker knows what he is drinking

Taste perceptions of six beer brands when the drinker does NOT know what he is drinking

Figure 12: Taste perceptions of beer brands (based on Allison and Uhl, 1964).

Brand image

Brand image is consumers' perceptions and associations with the brand held in memory. Brand image can be created through linking strong, favourable, and unique associations to the brand in memory. The associative network memory model (figure 13) is a model that explains how brands are memorized; it argues that the human mind is a network of nodes and links (Anderson, 1983). Nodes store information or concepts and links represent the strength between the nodes. The extent of retrieval in memory is determined by the 'spreading activation' process from node to node. The strength of the association between the nodes determines the extent of this spreading activation. For example, a consumer fancies a quick meal and thinks of the brand McDonald's because of the strong association with the product category. When thinking of McDonald's, other nodes are activated through strong links resulting in the consumer thinking of its meals, products, colours, past experiences, or recent advertising. Figure 16 shows an example of an associative network memory model.

2.4.2 Brand elements

Brand owners want to create favourable, unique and strong associations in consumers' minds to create brand image and awareness. This can be done through the use of brand elements; logo, name, URLs, symbols, slogans, jingles and packaging design. Generally, there are six criteria for brand elements; they must be memorable, meaningful, likeable, transferable, adaptable and protectable (Keller, 2013). These criteria push for differentiation. With standardisation, it might be harder to make the packaging fulfil these six criteria as the brands will have less freedom in the design of the packaging. Furthermore, factors such as personal relevance, consistence or direct comparison with competitors can influence the strength, favourability, and uniqueness of the associations (Keller, 2013).

With the standardisation of packaging, there is the possibility that it is harder to create these desired associations. The direct comparison with competitors would change as the differences between two packaging will be smaller, adjusting the packaging design to the target audience will be harder and there might be a risk that the reusable packaging is not consistent with the brand's portfolio. Hence, there are multiple challenges with designing standardised, reusable packaging with regards to market differentiation.

The next chapter dives deeper in the actual packaging design and how specific design cues can be used to shape customer expectations and perceptions. This literature review then identifies more challenges in the design of standardised packaging.

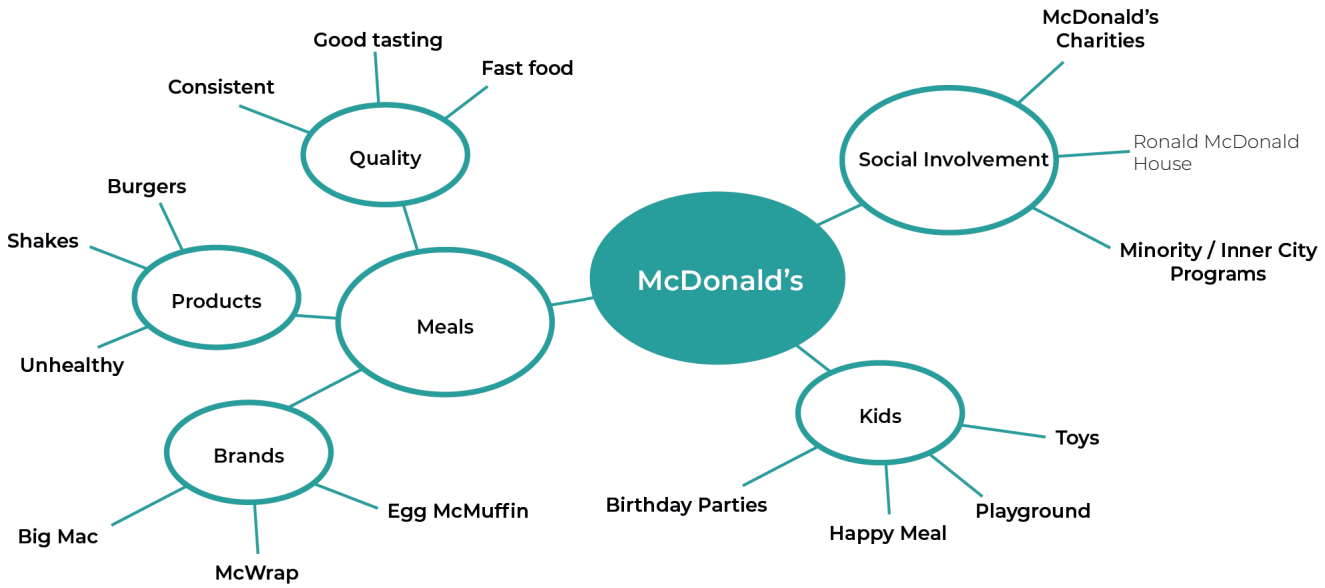


Figure 13: Associative network memory model for McDonalds, modified version of Smith & French (2010).

3. LITERATURE REVIEW

This chapter looks at the design of standardised, reusable packaging from all three perspectives of the design space. The first section discusses how packaging design elements can be used on different levels (structural, visual, verbal) to create associations and reinforce brand and product perception. It also presents more challenges in the conflict between standardisation and differentiation. The second section discusses what one can learn from the state of the art. The final section discusses the requirements for reusable packaging, based on existing literature. This chapter results in a conclusion and reasoning for the studies performed in this research.

3.1 PACKAGING AS A MARKETING TOOL

Section 2.4 explained why brands want to differentiate, it is one of the important aspects to create a strong brand. This can be done by forming strong, unique and favourable associations in consumers' minds. Packaging design is one of the brand elements that can be used to create these associations, however how do brands translate abstract associations intro tangible design features? This section discusses how packaging design can communicate meaning to the consumer to create or reinforce brand associations.

3.1.1 Consumer decision-making process

The packaging of a product is the first interaction potential buyers have with a brand and can be described as the silent salesman as proposed by Pilditch (1961). In earlier days, packaging existed to protect the product that was sold, while today packaging design evolved into a key tool for selling and distinguishing products in the competitive market. According to Farmer (2012), the product and packaging can become one and the same to the consumer. Farmer (2012) argues that packaging can even become more important than the product in some cases. For example, if the packaging provides a specific usability benefit, this can be considered more important than the product. This could result in consumers choosing one brand over the other because of their packaging.

As consumers walk through the supermarkets which are full of numerous brands and products, they are confronted with a lot of information but have a limited cognitive capacity. Wells et al. (2007) found that over 73% of consumers rely on packaging to aid their decision-making process for their purchase. This is also caused by consumer's product attention in store which is maximum 7 seconds (Farmer, 2012). Standing out on the shelves with your packaging is therefore very important. Purchase situations include multiple visual stimuli and non-conscious buying decisions (Simonson, 1990). Instead of well-thought choices, consumers tend to make fast choices, based on simple visual elements as they require limited cognitive effort and make decision making easier and quicker. Choosing the 'right' visual elements is therefore crucial. This highlights the importance of this research as packaging has such an influence on the decision making process of consumers in stores. How can brands still aid consumers (or persuade them) in their decision making process when using standardised packaging? To understand this, one must first look at how packaging is currently being used to create meaning.

3.1.2 Cues in packaging design

The design of a product holds symbolic meanings (Mulder-Nijkamp et al., 2021) which are created by the experience with all the design cues of a product. These separate design cues create an image which will evoke certain associations (Mulder-Nijkamp & Eggink, 2013) that often refer to the brand values of the company, these cues can be explicit or implicit. Explicit cues are design features that should be immediately recognized and perceived (Karjalainen, 2007), for example, the shape of a Coca Cola bottle and its logo. Implicit cues are harder to identify as they can be embedded in different design features. Implicit cues refer to the core values of the brand and can be characteristics such as safety, high quality or luxury.

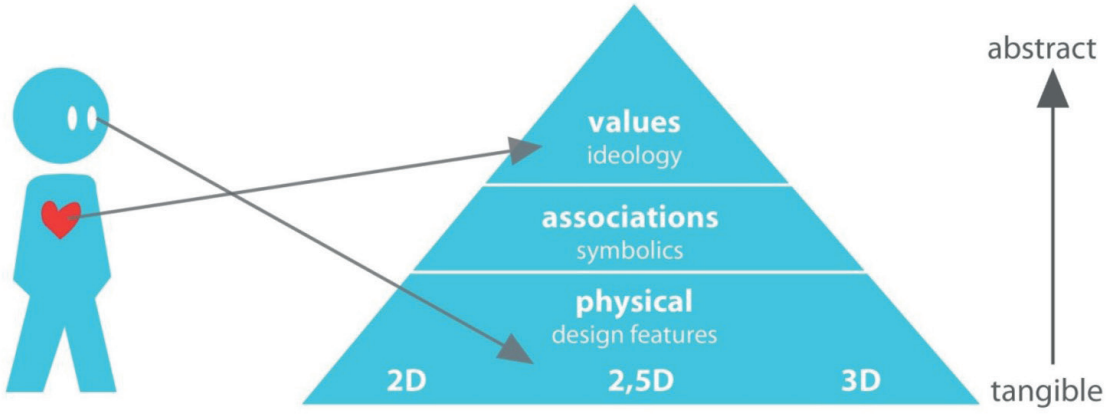


Figure 14: Packaging with unique shapes (Coca Cola, Heinz Ketchup and Andrélon).

It could be a challenge to create implicit cues that resonate with all brands with standardised packaging as values and associations are brand specific. Furthermore, the design cues, implicit and explicit, are used across a brand's portfolio, which creates a certain consistency. However, with standardisation there is a challenge to make this new packaging fit in the brand's portfolio. Too much variety reduces the brand acceptability (Dutta Roy & Mishra, 2021). Another parameter of the packaging design is typicality versus novelty, which refers to the similarity or difference of products with respect to competition. This is very important with respect to standardisation as the difference within a category will become less. If products become too typical, it makes it hard for the brand to stand out from the competition, while too much novelty can create low acceptability (Dutta Roy & Mishra, 2021). A challenge with standardisation would be for brands to stand out, while being presented in a typical design. Explicit and implicit design cues could be strategically used to achieve this goal.

The process of translating abstract and implicit values into explicit cues is described by the semantic transformation method (Karjalainen& Snelders, 2010; Karjalainen 2004). The 'Brand Translation Prism' (Mulder-Nijkamp & Eggink, 2013) is a model to support designers and clearly shows how to translate the brand identity into design features (Figure 14). The Brand Translation Prism is divided into three levels. Level 1 are the physical design features which are the explicit cues in either 2D, 3D and everything in between (2.5), such as em-/debossing. Level 2 are the implicit associations which are created through the design features and level 3 are the values which present the ideology of the brand. Whereas the values are very abstract, designers have the challenge to translate these into tangible design features. This can be done on different levels.

3.1.3 Packaging design levels

Packaging consists of several elements. For example, a soda bottle consists of a plastic bottle, a label and a cap. However, when focussing on the design of the packaging, one can divide the packaging into different elements to see how they can be used as implicit or explicit design cues. Mulder-Nijkamp et al. (2022) identified three main levels: structural (shape and form), visual (colours, icons, typography etc.) and verbal (text and brand name) (figure 15). Brands can differentiate their packaging by focussing on one or more of these levels. Some brands focus on the structural level by having unique shapes or forms while others have archetypical shapes and differentiate through visual or verbal elements. Every element and its effect on the brand and product perception will be discussed in more detail in the following sections.

Figure 15: Heinz Ketchup bottle in structural, visual and verbal packaging levels. (Mulder-Nijkamp et al., 2022)

Structural

Packaging shape is one of the most impactful attributes influencing purchase intention, as highlighted by Hassan et al. (2012). Brands that use shape differentiation include Coca cola, Heinz Ketchup and Andrélon (figure 16). Mulder-Nijkamp et al. (2022) showed that iconic packaging are mainly recognised by their unique shape and shape aspects (structural design), emphasizing the importance of this level and showing that standardisation could negatively influence this effect. Deviating from conventional shapes creates a higher level of attention and allows companies to distinguish themselves from competitors (Schoormans & Robben, 1997; Agariya et al., 2012). However, too much deviation may lead to a design that fails to align with the product category, resulting in an unacceptable packaging for consumers (Schoormans & Robben, 1997). Thus, it is important to find a balance between distinctive shape and category fit, a concept explained by Loewy's MAYA principle (Most advanced, yet acceptable) where he explains that the consumer is attracted to the new but has resistance to the unfamiliar (Loewy, 1951).

Packaging shape triggers emotions, influences buying behaviour, and it can make packaging more attractive as it creates expectations in consumers' minds and influences their perception (Hassan et al., 2012). For example, research suggests that round shapes evoke perceptions of sweetness, while angular shapes imply sourness (Velasco et al., 2014). Furthermore, complex shapes in coffee packaging are associated with stronger flavour expectations (Poslon et al., 2021). Moreover, Vladić et al. (2015) found that shape influences the brand perception as complex or creative shapes were perceived as expensive compared to simpler designs. In addition, Pantin-Sohier (2009) an Chen et al. (2020) both found that tall, elongated, slender shaped packaging were perceived as sophisticated and expensive brands while the small and wide packaging were considered sporty and practical brands. By using certain shapes, sizes, sharp corners or curves, certain associations can be evoked. However, what if the standardised packaging will be tall and slender, will all brands then be categorized as having a high brand status? More so, not all brands want to be perceived as luxurious which could create incongruence with their brand values. This effect is unknown, however crucial to consider with the design of standardised packaging.

For consumers, the packaging has become part of the product and therefore the expectations and perceptions that are caused by the shape should be congruent with the product's attributes and the brand. Darke et al. (2010) showed that when expectations and product attributes are not congruent (e.g. a round shaped bottle contains a sour product), consumers will be dissatisfied with the product and this in turn will decrease the likelihood of repurchase. If the expectation that standardised packaging shape creates does not correspond with the product of certain brands, this could have great negative effects for these brands. Therefore, this aspect is a great challenge when designing standardised packaging. Furthermore, what will happen with the perception of shapes when all different brands use the same packaging? Will the results of the aforementioned studies still apply, or contradict one another? The effect of changing the shape and limiting the differentiation should be researched to avoid unintended consequences.

Figure 16: Packaging with unique shapes (Coca Cola, Heinz Ketchup and Andrélon).

Visual

Some brands do not rely on shape, but instead emphasise visual elements such as colour, typefaces, 2D shapes or images and icons. With standardisation, one could expect that brands would have some design freedom on the visual level, it might even become more important as constraints are put on the structural level.

Similarly, to shape, typefaces can influence the brand and product perception as they contain information (Childers & Jass, 2002; Bottomley & Doyle, 2006). Childers and Jass (2002) demonstrated the interaction between typefaces and ad components and their influence on brand perception under both high and low involvement processing. Their findings indicate that typefaces can convey unique associations, making them valuable from a marketing perspective in communicating product benefits and thereby creating a competitive advantage. The use of colour is also a highly studied visual design feature on packaging. Research has explored what associations colours evoke, which can vary depending on geography and culture. Colour can be associated with flavour, brands, healthiness, luxury, and other attributes (Piqueras-Fiszman & Spence, 2012; Schuldt, 2013). For instance, pinkish-red is associated with sweetness while blue and white connote saltiness (Spence, 2015). In addition, colour is used for product categorization; in the Netherlands for instance, buttermilk is red, yoghurt green and milk blue (figure 17). This allows consumers to easily locate the desired product when standing in front of the dairy shelves. With standardisation, consumers should still be able to distinguish different products from one another. Therefore, the effect of standardisation of the visual level also has to be carefully considered.

Furthermore, in a study conducted by van Rompay et al. (2019), participants' taste experience and quality perception of coffee were tested. The authors found that a poster with vertical stripes, as opposed to horizontal stripes, gave different results. Participants rated the coffee as having a more powerful taste when presented with vertical stripes, as the vertical orientation may evoke perceptions of power. Researchers explored additional indicators of verticality, such as the positioning of images or other elements on packaging. Fenko et al. (2018) found that the placement of an image of a lion on coffee bean packaging affected flavour perception and purchase intention. When the image was placed at the bottom of the packaging, the coffee was perceived as stronger. Similarly, when an image of a food item is placed at the bottom of the packaging, it is perceived to be heavier (Deng & Kahn, 2009; Togawa et al., 2019 Wang & Basso, 2021;). This perception of weight influences consumers' healthy eating decisions as heaviness is associated with unhealthy foods. Visual cues can give meaning to packaging, therefore it is crucial to research how standardised packaging can be designed for optimal harmonisation while leaving room for brands to create their own associations, such as 'healthy', 'powerful', or 'high quality' through the use of stripes or images.

Overall, research has revealed multiple meanings associated with visual elements, which can be combined to optimize packaging design to convey specific meaning or capture customer's attention. Spence & Van Doorn (2022) underscore that companies should read into the meaning of these visual elements as wrong combinations can have a negative effect on brand perception and sales. This should also be considered when designing standardised packaging, however it could be a very difficult task because every brand has their own identity and values. How does one create a standard design that matches all brands?

Figure 17: Categorisation through colours in a Dutch supermarket. Red is buttermilk, blue is normal milk.

Verbal

The verbal level refers to all textual information, including product details, nutritional information, slogans and the brand name. Research has shown a correlation between purchase decisions and the information provided on packaging (Silayoi & Speece, 2004). Verbal elements are most effective for high involvement products or when there is no time pressure at the point of sale, as they require a higher level of cognitive effort (Mueller et al., 2010). Most FMCGs are low involvement products; consumers do not think a lot about their purchase. When consumers have limited time, they tend to prefer visual elements in packaging for their purchase decision as it makes the decision-making process easier. However, when there is no time pressure, clear verbal elements are desired (Silayoi and Speece, 2004). Even though this research focusses on FMCGs and therefore low involvement decisions, it is still useful to look how verbal elements can create meaning and brand associations. This is because it is not yet clear what the standardised packaging will look like and therefore to what extent the structural and visual level can be used to differentiate. Maybe the verbal level will become more important with the standardised packaging.

A brand name is one of the first important choices of as a verbal brand element; it is a very short communication that captures the key associations of a product (Keller, 2013). Consumers can extract implicit and explicit associations from a brand name; these can be performance-related or more abstract. Keller (2013) explains that a descriptive brand name makes it easier to link attributes or benefits; consumers are more likely to believe a laundry detergent to “add fresh sent” to clothes if it is called “Blossom” than if it is called something neutral like “Circle” (Lee & Ang, 2003). However, descriptive brand names can also make it harder to reposition later.

Another verbal brand element is a slogan; these are short phrases that communicate information about the brand (Keller, 2013). They are often used in advertising and on packaging. Examples of slogans are “Just Do It”, “The Best a Man Can Get”, and “Think Different”. These slogans are meant to build brand equity and function as a hook to help consumers understand the meaning of the brand (Dimofte & Yalch, 2007).

Lastly, the verbal level is often used nowadays for greenwashing to persuade consumers (Consumentenbond, 2023). Brands mention recycled content of their packaging or responsible sourcing, to create associations with regards to sustainability.

Upfront is a brand that uses verbal cues in a unique way. They do not rely on the shape, size, or colours of their packaging to stand out. The packaging of Upfront products only displays information about the ingredients, nutritional values, and other relevant details on the front side (hence their brand name Upfront) (figure 18). This aligns with their brand's focus on transparency and honesty, which is also reflected in their slogan 'Wat oprecht is wint' (translated as 'what is sincere

Figure 18: Upfront products.

names for their product, which also resonates with their other brand elements and their brand values. Their way of brand management and how they design their packaging is quite unique. This also suggests that even though Upfront's packaging looks standard, they are the only ones using this identity which makes the packaging design different from competitors; hence this is not standardised packaging. What would happen if more brands would use standard packaging with only the necessary information? This would probably mean that brands have to find unique elements on the verbal level, through their brand name or slogan for example. Another consequence could be that brands will use other sources than packaging to create a unique experience; they might create in store experiences or digital interaction through augmented reality (AR) or virtual reality (VR).

3.1.4 Differentiation per category

To see how brands currently apply differentiation through the three packaging design levels, various products in a Dutch supermarket were observed. Upon examining the existing packaging designs, the degree of harmonisation differs per product category; some categories already have a quite standard packaging while in other product categories the common seems to be to differentiate. This observation may suggest that standardisation has little impact on brand and product perception within certain categories or materials. For example, soda is primarily sold in three types of packaging: glass bottles, plastic bottles, and tin cans. Plastic bottles come in a wide variety of shapes, they are generally atypical, indicating a lack of standardisation. For glass bottles, however, there is already a high degree of standardisation in the B2B, and for tin cans, there are mainly two types of cans in use. It is interesting why the standardisation differs per material type; why do brands have uniquely shaped packaging in glass and plastic format but not when using tin cans? Furthermore, in the Netherlands, hagelslag is most often sold in cardboard boxes (figure 19), peanut butter is mainly sold in similarly looking glass containers, while cookies and jams are available in many more shapes and sizes (figure 20). This variation in standardisation and differentiation per product (category) and material is interesting as it can give away the effects of standardisation. However, no research was found on why these differences exist or what effect the standardisation might be in FMCGs.

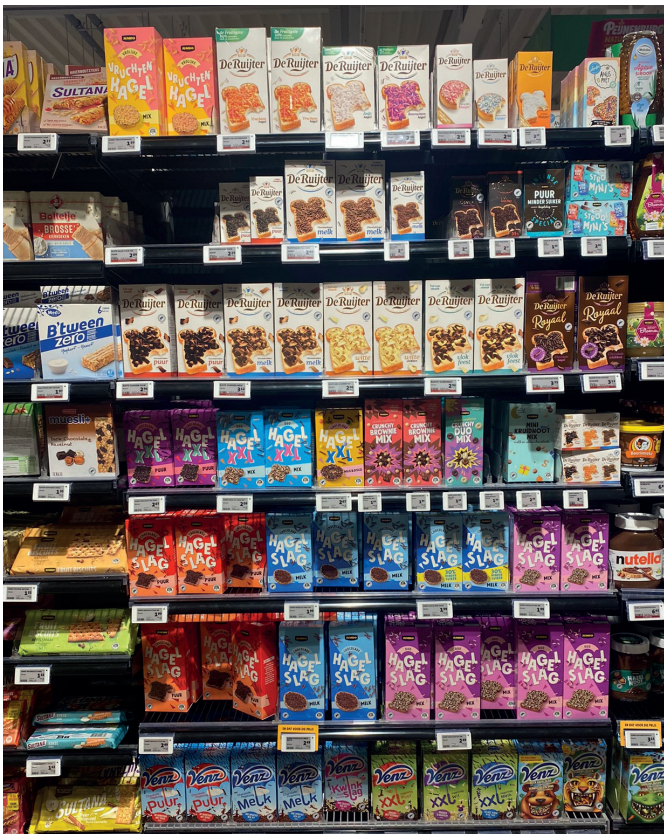


Figure 19: Hagelslag packaging, high level of standardisation.

Figure 20: Cookies packaging, low level of standardisation.

3.1.5 Key takeaways

From this literature review, one can create a list of recommendations and considerations from the marketing perspective for the design of standardised, reusable packaging. This includes the balance between typicality and novelty, the focus on the visual level, allow for categorisation, exploring other media or marketing strategies, a ranking of ease of implementation and a recommendation for future research. They are explained in more detail below.

As design features on all levels (visual, verbal and structural) hold information and create associations in consumers' minds, it is recommended that the standardised design creates expectations that are in line with the product. It will be too hard to create a standard design that resonates with all brands' values, however the standard **design should fit within the typicality of the product category** to reinforce acceptance from the consumers and prevent wrong product expectations.

Furthermore, with standardisation it is probable that differentiation on the structural level will be (nearly) impossible while there is more freedom on the visual and verbal level. It is recommended that the **differentiation should be focussed on the visual and verbal level**. This is also necessary for **categorisation** as customers use colours to identify different products. The different colours that are attributed to various flavours or products should still apply with the standardised packaging. Even though visual cues are more effective than verbal cues in low-involvement situations (e.g. supermarkets), the verbal level can get more attention with standardised designs.

Differentiation through visual cues is possible to a certain extent. Creating a customer experience can also be done through the environment; AR, VR or perhaps other media can be used to improve the customer experience. Therefore it is recommended that **other media or marketing strategies** are explored.

The level of standardisation differs per product, which could suggest that the products with high harmonisation will be easier to design the reusable packaging for, at least from the marketing and consumer perspective. This could help create a **ranking of ease of implementation based on the level of differentiation of the existing packaging**.

Lastly, the **consequences of standardisation on brand and product perception** should be researched. The packaging will look more alike, so do the existing theories still apply? No literature exists on this subject yet while it is a very important aspect in the transition from single-use to reuse.

3.2 STATE OF THE ART

This section discusses the latest developments in the field of reusable packaging systems, drawing insights from the initiatives to learn from past mistakes and successful practices. There are many return initiatives that could be discussed, this chapter discusses a selection of initiatives. The key takeaways can be found at the end of this chapter.

The **Bruine, Nederlandse Retourfles (BNR)** by the Nederlandse Brouwers (Dutch Brewers) is a reusable beer bottle that cycles in a pool system which originates from the 1980s (Nederlandse Brouwers, n.d.). The Nederlandse Brouwers is an association whose fourteen members (companies) represent 95% of the beer production in the Netherlands. In the 1980s the association wanted to create a single bottle pool that could be used by all brewers in the Netherlands. The BNR is made of 1.4mm thick brown glass, 207mm high and holds 30 or 50cl. It was realised that a standard bottle was necessary to reduce costs and to make it easier for consumers to return the bottles. Consumers can return the bottle to any supermarket that sells BNR bottles. The breweries receive empty bottles with their own and other brands' labels. At the brewery, the bottles are washed and refilled. The Nederlandse Brouwers claim that the BNR can be used up to 40 cycles. To make this system work and maintain quality, the Nederlandse Brouwers established strict requirements and regulations. This system is still successfully maintained and therefore one the best examples of return systems in the Netherlands. However, there are brewers that use both the BNR and unique bottles or brewers who stepped out of the pool, because marketing kept pushing the design of iconic bottles. Grolsch for example, has their iconic Swingtop bottle that they did not want to lose. In addition, they stepped out of the pool for their pilsner and designed their own green coloured, 33cL bottle with embossing bottle, and other brewers such as Heineken also stepped away from the pool over the years. Now, they only pack their craft beers in the BNR. This again illustrates the trade off between standardisation and differentiation.

Dizzie is a company that has an online store with a return from home system (Dizzie, 2022). They provide the entire return system (cleaning, tracking, delivery and return) and the packaging. Their initial model faced challenges as they closed their online shop and continued to sell their product through larger retailers. In addition, they changed their packaging design from cylindrical containers, made of bio-polypropylene (bio-PP) and wood fibre to squared shaped, injection moulded PP containers (Dizzie, 2022; Patten, 2023). With this alteration, they also were able to pack liquids, which was not possible with the bio-PP/wood fibre material (Patten, 2023).

Figure 21: The BNR (Nederlandse Brouwers, 2020). Grolsch Swing-top bottle and Dizzie packaging.

LOOP provides an entire pool system and manages the entire supply chain (LOOP, n.d.). It is one of the largest initiatives in reuse ecosystems as they are active in the United States, France, Japan and working on bringing it to Australia. LOOP has partnered with large brands and retailers to provide customers with reusable packaging both in online and physical store shopping. Brands can choose out of three types of packaging: a standard packaging from LOOP's stock, a custom designed packaging and in some cases, the existing packaging of the brand can be used. The brand owners are responsible for the design of the packaging but they must be approved by LOOP. The packaging is often made of glass or stainless steel. It seems that the stock packaging by LOOP is not often used, instead brands seem to design their own unique packaging. From a trial with loop in the supermarket Tesco, it was found that consumers do not yet view reusables as equal environmental impact to recyclable packaging, so increasing public awareness of reusables' positive impact is necessary to make reuse a success (Tesco, 2022). They also stress the need for collaboration and support of policy-makers to create an environment for reuse to scale as "one company cannot create a successful and scalable reuse proposition in isolation" (Tesco, 2022).

Pieter pot's online store showed the potential of reusable glass packaging for several products (Pieter Pot, n.d.). They had weck jars and glass bottles which they used to pack many different types of products. However, financial and supply chain management issues led to insolvency. Nevertheless, due to a successful crowd funding, they are planning to relaunch in 2024 with outsourced supply chain management (Schoemaker, 2024).

Returnr (n.d.) has a subscription-based packaging system, targeting both household and workplaces. Their household range is an online supermarket with reusable, stainless steel packaging. The products are delivered at home, picked up, and washed. Returnr cooperates with a few large brands, but mainly local and small businesses. Secondly, for their workplace range they set up a small pool within a company so the packaging circulates within only that specific company. Returnr covers the cleaning and transport of their packaging and customers do not need to pay deposits, because of their subscription system.

Figure 22: Reusable packaging by LOOP, Pieter pot, Returnr.

Circolution (n.d.) has created a system that rents out reusable containers and takes care of the reverse logistics. They have one type of packaging called 'Anita in steel' (figure 23): a stainless-steel cup with a sealing film which allows for resealing and a removable plastic lid. The plastic lid is single-use and should be recycled. In addition, the packaging is accepted by existing deposit machines. Circolution claims that their packaging is suitable for almost all product categories (more specifically they state product categories that are dry and/or refrigerated), can last up to 80 cycles and that it supports brand differentiation through shapes and labelling options. However, they only have one packaging design yet. Circolution has their first customers piloting the Circolution system in Germany: Nesquick by Nestlé and espresso beans by BEAN are now packed. However, they explain that they are material agnostic, meaning that there is no ideal material for reusable packaging as the material choice should be based on the system- and product requirements. Therefore, they are developing more materials, shapes, and sizes.

Figure 23: 'Anita in Steel' by Circolution.

Lastly, the **Dairy use Moonshot project** was started by 'het Versnellingshuis'; they support companies, organisations and entrepreneurs in the transition to a circular economy (Het Versnellingshuis Nederland Circulair, 2024.). One thing they do is provide moonshots: potential major breakthroughs with a (inter)national orientation and impact. Moonshots are often complex problems with multi stakeholder management. Participants of the Dairy Moonshot project are Dutch supermarkets Lidl, Jumbo and Albert Heijn, brand owner FrielandCampina and Private labels Farm Dairy and Royal A-Ware. Their goal is to investigate the feasibility of a reuse pool system for dairy in the Netherlands. No publications have been released yet, however the fact that this is a Moonshot project emphasizes the complexity and importance of the subject.

Key takeaways on the next page

3.2.1 Key takeaways

This state of the art shows some of the innovations and challenges in the field of reusable packaging systems. Based on the three factors of the triangular design space of this research, some conclusions can be drawn.

The performance of existing initiatives with regards to sustainability is hard to determine. They all state to be sustainable, but numbers are missing. It is however important to **explain clearly to customers the benefit of reuse,** as from the trial of Tesco with LOOP, this was found to be a problem.

Material

Circolution emphasises that they are **material agnostic**, meaning that there is no ideal material for returnable packaging, as the choice of material should be based on system and product requirements. However, looking at the state-of-the-art materials for reusable packaging in a return system **mostly glass and stainless steel** are used. This suggests that these materials could be used for the standardised designs of reusable packaging. In addition, Dizzie's example suggests that their original material, bio-PP, is not suitable for reuse.

Differentiation

The BNR shows that even though there is a successful, standardised system in place, marketing keeps **pushing for differentiation** as Grolsch and Heineken left the pool. Also in the reusable packaging by LOOP, it shows that brands prefer their own designed packaging instead of choosing from LOOP's stock. The urge to differentiate is clearly present, even when standard options are cheaper and already present. This shows that **the future holds another challenge of keeping brands in the pool system** and using the standardised packaging.

Collaboration

Furthermore, most existing reusable packaging initiatives are private pool systems; companies create their own return system and packaging. These different systems and packaging designs make it difficult to scale up. The success of the Nederlandse Brouwers and LOOP, the company Circolution, the redesign of Dizzie, and the Dairy use Moonshot demonstrate the **need for collaboration** and strategic partnerships to create scalable reusable packaging systems. In addition, one could argue that setting up new online stores does not seem to work as Pieter Pot and Dizzie both failed with this approach, however no hard evidence was found to draw definite conclusions on this subject. Nevertheless, from the state of the art, it could be concluded that partnering with larger, successful brands and retailers will increase the success of a system.

3.3 REQUIREMENTS FOR REUSABLE PACKAGING

The other two sections of this chapter looked into the requirements for standardised packaging with regards to marketing and discussed the state of the art. The design of the reusable packaging should also be feasible for the reuse ecosystem. Therefore, this section aims to set up a list of requirements for the standardised, reusable packaging and answer one of the sub questions: “What is the most scalable, reusable packaging for a managed pool system in the Netherlands?”.

A recent study by Kuks (2023) argued that scalability can be achieved by matching the largest number of products (or product categories) with the lowest possible variation in standard packaging. This means that one tries to create the smallest selection of packaging to pack the most products, resulting in the highest form of standardisation. To reach this goal, matching the requirements of the products and the system with the specifications of packaging elements is needed.

Literature on requirements for reusable packaging is limited, this chapter gives an overview of recommendations and considerations mentioned in literature to form a list of requirements. The following sources were mainly used in this chapter. PR3, a partnership between corporate, government and NGO stakeholders, is creating standards for reusable packaging systems. They have published several documents based on the input from stakeholders. Even though their documents are drafts, their findings on requirements, recommendations and permissions are considered valuable for this research because of their approach (RESOLVE-PR3, 2022, 2023b, 2023a). In addition, Packback (2020) has performed interviews with stakeholders and industrial cleaning machine suppliers to create a list of functional and non-functional requirements for reusable packaging. Furthermore, Global Plastics Policy Centre (2023) has performed literature research and interviews with businesses, NGOs, multinational corporations, community advocacy groups, waste worker groups and individuals operating in the reuse system and refill space. They looked into the benefits of reuse as a system and the packaging design for consumers, private sector, workers and communities. Lastly, World Economic Forum (2021b) developed design guidelines for reusable packaging in cooperation with stakeholders that are meant to support designers through recommendations, considerations, and criteria.

This section first evaluates the suitability of materials for reuse. Thereafter, literature on the shape, dimensions and closures is discussed. Furthermore, the appearance of the packaging is discussed with regards to durability. Lastly, tracking possibilities, labelling requirements and pricing are discussed.

3.3.1 Material

Several sources state that reuse systems should be material agnostic; there is no ideal material for reusable packaging, the material should be based on the requirements of the system and the product (Global Plastics Policy Centre, 2023; World Economic Forum, 2021; Circolution, 2024; Greenwood et al., 2021). Therefore, this section does not aim to present the most suitable material for the reuse system in this research, but it provides an overview of promising materials. Based on literature research and existing reusable packaging solutions, the following materials were chosen for this evaluation: polypropylene, high-density polyethylene, soda-lime glass, stainless steel, aluminium, Tritan and polyethylene terephthalate (figure 24).

Initially, the materials Echovai, bio-PP and bio-HDPE were also taken into consideration, however soon into the research, it became clear that there was too limited objective literature to be found on the attributes of these materials. Nevertheless, these materials might be good options in the future when more objective research has been performed.

The materials are evaluated on its performance with regards to the cleaning process, sustainability, weight and barrier properties.

PP

Polypropylene (PP) is a thermoplastic polymer. It is a tough, translucent plastic with good chemical and temperature resistance (British Plastics Federation, n.d.) PP is commonly used as packaging material in both flexible and rigid form.

HDPE

High-density polyethylene (HDPE) is a very inexpensive plastic which is mostly used for milk, water, and juice bottles. HDPE is stiff, strong, tough, and resistant to moisture (Marsh & Bugusu, 2007). This plastic is not translucent, has a hazy appearance, is light weight and has a lower temperature resistance than PP.

PET

Polyethylene terephthalate (PET) is a very common material for soda or water bottles, it is very affordable and transparent.

Tritan

Tritan is a copolyester that looks like glass due to its stiffness and transparency. It has a high temperature resistance and durability. It is most commonly used for reusable water bottles. Tritan is non-recyclable currently in the Netherlands and would therefore most likely be incinerated end of life.

Glass

Soda-lime glass is a transparent type of glass with great barrier properties. It is used to pack vulnerable products or to preserve products for a long period of time.

Stainless steel

Stainless steel is used as rigid packaging, mainly in the shape of containers or bottles. It has a high temperature resistance, great barrier properties and is very durable.

Aluminium

Aluminium is lighter than stainless steel, also has great barrier properties but is vulnerable to scratches. In addition, aluminium look more dull than stainless steel.

Figure 24: Various products made from the presented materials.

Cleaning

Packback (2020) has performed interviews with stakeholders to collect considerations and create requirements for standardised packaging. Packback (2020) found that the main issue for stakeholders is setting up food safety requirements. An important step in the reuse ecosystem that influences the food safety is the cleaning process as this is where micro-organisms have the chance to grow when the packaging is not cleaned or dried properly. Hence, design considerations and requirements to optimise the cleaning process and ensure food safety are discussed in this section.

The material should withstand wet cleaning, which makes porous materials such as cork and paper logically inappropriate, but also in case of damages aluminium has a chance of forming rust, holes and gets a deteriorated look (KIDV, 2021). The temperature at which the cleaning takes place varies per source. Packback (2020) talked with the industrial cleaning machine supplier Hobart who state that the packaging should withstand temperatures up to 85 degrees Celsius, while Dutchcups (2023) state temperatures up to 100 degrees Celsius are necessary to ensure proper drying. RESOLVE-PR3 (2023a) mention different temperatures with the highest minimal temperature of 90 degrees Celsius to sanitize. Lastly, the material should withstand chemicals used during the cleaning process.

Under these temperatures and high humidity, plastics deteriorate more quickly resulting in deformations or degradation, which can create microplastics and make the material vulnerable to bacteria growth (World Economic Forum, 2021). In addition, plastic is hard to dry properly because it does not absorb much heat (Packback, 2020; RESOLVE-PR3, 2023a), which makes these materials less appropriate. More specifically, PET is not a suitable material as it cannot withstand the high temperatures or the alkalinity of the cleaning process (Impact Plastics, 2018; Packback, 2020; Van Velzen & Brouwer, 2022). However literature states that PP and HDPE could have sufficient temperature resistance which makes these materials still an option for reuse, together with stainless steel and glass (Global Plastics Policy Centre, 2023; Impact Plastics, 2018; Packback, 2020).

Sustainability

When selecting materials, it is crucial to consider their environmental impact throughout their entire life cycle (RESOLVE-PR3, 2023a). Life Cycle Analysis (LCA) is a reliable method for assessing sustainability that provides a comprehensive view of the environmental impact of materials or a packaging. An LCA is essential for determining if reusable packaging has a smaller environmental impact than single-use packaging. This analysis considers all stages of packaging life, including extraction, processing, production, use, and end-of-life. With an LCA, responsible sourcing and production, transportation methods, and manufacturing practices are all considered to provide a holistic understanding of the impact of packaging. LCAs do not include all environmental impacts, factors such as litter on marine or terrestrial ecosystems, impact of microplastics or other social impacts are not considered. Nevertheless, an LCA is the only tool to compare environmental factors between packaging designs.

An LCA allows for calculating the number of loops that a reusable packaging must make to offset its environmental impact compared to single-use packaging. This break-even point helps to quantify the environmental benefits of reusable packaging. It can be used to guide the design process, as the packaging design should be optimized to reach the necessary number of loops. The more times a packaging is reused, the lower the impact will be (Greenwood et al., 2021; RESOLVE-PR3, 2023a). Figure 25 shows the results of the LCA conducted by Cottafava et al. (2021). It illustrates the Climate Change (CC) for several reusable and single-use packaging. It reveals a lower CC for reusable packaging than for single-use packaging from 50 cycles. For the reusable cup made of PP, the break-even point with the single-use PP variant was less than 20 loops. This means that when this reusable PP packaging is used more than 20 times, it has a smaller impact than the single-use variant. In addition, Greenwood et al. (2021) found that for plastic reuse options, five uses were required for the carbon footprint to be lower than its single-use variant. While in case of steel, between 13 and 33 loops are necessary to offset its carbon footprint compared to single-use packaging. These numbers however are dependent of the specific packaging design and reuse ecosystem, because these determine the production, water usage, and other factors used in the LCA.

Although plastics have a lower break-even point than stainless steel and glass, some may prioritise the durability of these materials over a lower break-even point and less durable packaging. This study shows that the material choice has a great impact on the break-even point. RESOLVE-PR3 (2023a) states that reusable containers should be designed to optimize durability to create the maximum environmental and social benefits. They state as a recommendation, that reusable containers should achieve at least 10 use cycles on average within the first 3 years and 20 use cycles on average within the first 5 years of the system operation, independent of the material. In addition, if from practice it becomes clear that a reusable container achieves more than 10 use cycles, the container should be designed to withstand double the amount of use cycles (20 cycles in this example).

To get an idea of a material's impact without performing an entire LCA, one can look at the different stages in the lifecycle of materials that are independent of the design such as the extraction and end-of-life methods. For example, a packaging's environmental impact will be lower if the material is recyclable, or if it can be made from scrap materials. PP cannot be recycled into food grade rPP, while HDPE can be recycled into food grade rHDPE. In addition, stainless steel can be made from scrap materials and is 100% recyclable as long as its recaptured, which lowers its environmental impact (World Economic Forum, 2021). However, in other parts of its lifecycle stainless steel has a greater impact as it requires a high amount of energy for production and together with the extraction emits high levels of GHG (World Economic Forum, 2021; Global Plastics Policy Centre, 2023). Glass is endlessly recyclable; however, this process can be costly and the production of glass is energy intensive (World Economic Forum, 2021; Global Plastics Policy Centre, 2023). For plastics, the GHG emissions and pollution to surrounding communities at the production are issues (World Economic Forum, 2021; Global Plastics Policy Centre, 2023). Tritan can also be recycled; however, this has to done differently than other plastics (Eastman, n.d.). This shows some of the steps in the lifecycle that affect the impact of several material. However as mentioned above, the entire LCA needs to be performed to be sure that the reusable packaging can have a lower impact than the single-use variant.

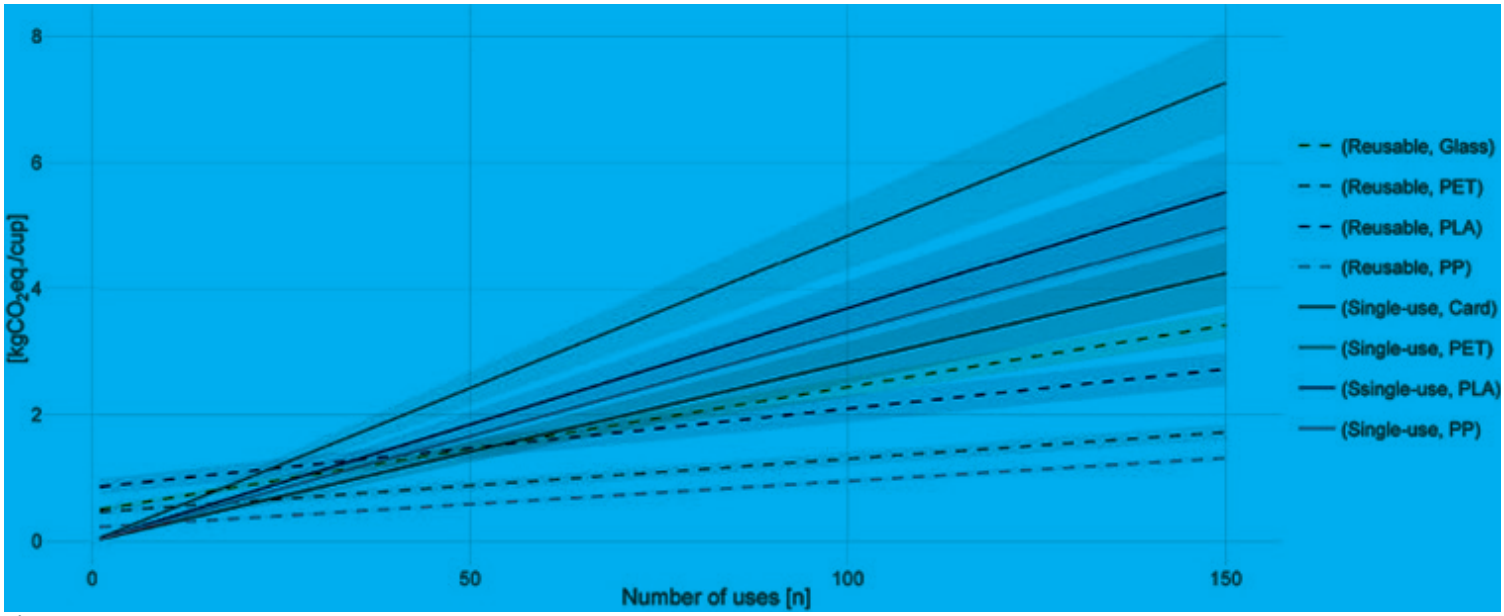


Figure 25: Assessment of the environmental break-even point for deposit return systems through an LCA analysis of single-use and reusable cups (Cottafava et al., 2021).

Barrier properties

The create the smallest selection of packaging to pack most products, one must match the requirements of the products and system with the specifications of packaging elements. One of the main functions of packaging is to protect the product. Materials have their own barrier properties to prevent moisture, oxygen, carbon dioxide, UV-light or grease and oils from exiting or entering. One has to evaluate the barrier properties of materials with the requirements of products. However, the necessary barriers differ per product. For instance, soda packaging needs to keep the carbonic acid inside, meats are packed under special conditions and have to keep these special gasses inside and crisps need to be protected from oxygen. These differences in requirements per product make it difficult to create a standardised set of packaging that complies to all the requirements. A solution would be to have very high barrier properties for all products by using materials such as glass or stainless steel. This can also be achieved by increasing the wall thickness of the packaging. However, many products do not need all these barriers and preferably one uses less or other material to minimise the environmental impact (Reduce waste strategy). Packback (2020) mentions the risk for 'over'-packing, which results in a larger environmental impact by using too much material. One could argue that if the break-even point is reached, the reusable packaging is still better than its single-use variant, therefore making overpacking not a risk. The break-even point is one of the most important factors within reusable packaging design. Not reaching the break-even point would decrease the positive effect of reusable packaging or even lead to a higher environmental impact than the single use system. Therefore, the design of the packaging should focus on durability.

Weight

The weight of the material has an impact on the packaging's sustainability and usability (Global Plastics Policy Centre, 2023; Ellen MacArthur Foundation, 2023). Glass and stainless steel are heavier than the plastics, creating a larger environmental impact as more weight has to be transported compared to its single use variant. The Ellen MacArthur Foundation (2023) found that even though the reusable glass bottle weighs 20 times more than single-use PET bottles, its GHG emissions can be reduced by 34% and water use by 66%. This emphasizes the importance of the lifecycle analysis once again. Weight also has an influence on the usability. For the system to work, the packaging must be returned. To improve the return rate (the amount of packaging being successfully returned by consumers), returning the packaging must be made very easy for customers. Imagining that customers buy multiple reusable packaging; the weight of the packaging should be kept as low as possible. Glass and stainless steel are relatively heavy which makes these materials less favourable for usability reasons. Overall, RESOLVE-PR3 (2023a) states that the weight should be optimized to the lowest weight while meeting durability requirements. Heavier containers have a better durability, but also increase transport emissions.

To conclude, promising materials are glass, stainless steel, PP, Tritan and HDPE. However, with plastic not being preferred, glass and stainless steel are the most suitable materials.

3.3.2 Shape, dimensions & closures

Other elements of packaging design are the shape, dimensions, and closures. As mentioned before, the design needs to be optimized for durability to increase the chances of reaching the break-even point. Besides, the design can be optimized for transport, cleaning, storage, reduce costs and increase usability.

With regards to shape, based on the cleaning process literature presents the following requirements: no deep edges, grooves or narrow holes in the shape as these areas are hard to clean properly, smooth surfaces (Packback, 2020; RESOLVE-PR3, 2023a; World Economic Forum, 2021b). To minimize transport volumes, the reusable packaging should be stackable and nestable and preferably square shaped. This way, the packaging takes less space during transport and storage. These recommendations put a strain on the differentiation ability of brands. Will all reusable packaging become square shaped?

Furthermore, as mentioned before, costs can be kept to a minimum by reducing the number of changes to the production lines. No literature was found on standards of existing lines and reusable packaging design which is the reason that no further elaboration on dimensions is provided. PR3 adds that containers should have narrower tops to facilitate insertion into secondary packaging and minimize breakage for glass containers.

Literature recommends a separate and universal lid that is easy to (dis)assemble (Packback, 2020; RESOLVE-PR3, 2023a). Separating the lid makes it easier to wash and it is more efficient as the lids and containers or bottles can be cleaned separately (Packback 2021). In addition, by creating a universal lid there is no problem with matching the lid to the wrong container, increasing the efficiency at the cleaning process and usability at the consumers' homes. RESOLVE-PR3 (2023a) adds that due to the multiple filling processes, it is should be possible to add closures, lids and safety seals multiple times to the same container and that they may be single-use for safety reasons. It would be beneficial to maintain existing standard aperture and closure sizes. Lastly, for liquids it is advised to make the lids anti-leakage after use as it will not leak at the consumers' home, during transport or at point of return at the deposit machine, which has been an issue when tin cans deposit was introduced in the Netherlands (NOS, 2023).

With regards to dimensions, from the interviews by Packback (2020) with cleaning machine suppliers Hobart and Meiko, it was found that industrial cleaning machine suppliers refer to Euronorm standards. In addition, it became clear that there are maximum heights to guarantee an optimal cleaning and drying, however they differ per supplier. Although specifically designed machines are possible, costs can be kept to a minimum by adhering to Euronorm dimensions. This means that diversity in outer dimensions could be possible.

3.3.3. Appearance

The appearance of the packaging influences the customers experience and perception which have an effect on brands, durability of the packaging and on the return rate. It is recommended that the reusable packaging should not be too attractive, as this may lead to consumers keeping or collecting the packaging (Closed Loop Partners, 2021; Global Plastics Policy Centre, 2023). The reuse ecosystem can only be environmentally effective if the packaging stays within the system. This is mainly a challenge when using stainless steel or glass as these materials are perceived as more 'high-end'. On the other hand, the reusable packaging design should attract attention and be appealing to consumers persuade them into buying the reusable packaging instead of the single-use.

Figure 26: Plastic container stained by food. This is more likely to happen for plastics than glass or stainless steel.

Reusable packaging needs to withstand multiple loops and consequently need to be designed to be strong and keep an attractive appearance for as long as possible. Consumers are less likely to buy a product that looks used or unhygienic. Therefore, the appearance should be designed to keep the packaging looking attractive and minimise the traces of reuse for as long as possible. These traces include: scuffing, discolouration, odour, scratches and dents. Packback (2020) recommends using patterns and imprints as they can help disguise small damages. Furthermore, they recommend to avoid complete transparency or clear white as food pigments will be more visible (figure 26), reducing consumer confidence and acceptance which can cause fewer use cycles of a packaging (RESOLVE-PR3, 2023a). Visual tainting can be mediated by using darker- or cardboard-like colours (Packback, 2020; RESOLVE-PR3, 2023a). Glass and metal have less risk of tainting by flavours, fragrances and colours. Lastly, they also recommend to design for guided impact; strategically guide where the damage will occur and make sure that the most important parts stay intact. An example is a beer bottle, where the bottom of the bottle can be scuffed but the label needs to be intact (figure 27). By adding two edges around the label placeholder, the label design is protected during transportation.

Figure 27: Beer bottle with guided impact (green lines, protecting the label.

3.3.4 Pricing and tracking

Literature and existing initiatives show the importance of tracking every single packaging in the system to get insights into the performance of the reuse system and to create more engagement with the consumer (Charnley et al., 2015; Global Plastics Policy Centre, 2023; RESOLVE-PR3, 2023a; World Economic Forum, 2021b). Tracking creates the possibility to communicate to the consumer about offers or return reminders, and to create a digital passport of individual reusable packaging with its return rates, travel distances, and actual number of reuse cycles. This way, the success of the reuse system can be monitored. Additionally, the number of actual packaging items in the cycle, the amount of loss and breakage rates, and recycled content can be tracked. This information can be used in an LCA to test the actual environmental impact and to optimise the supply chain (Global Plastics Policy Centre, 2023). Tracking can be done in various ways. One effective approach is the utilization of technologies such as Quick Response (QR) codes, or Radio-Frequency Identification (RFID) tags (Global Plastics Policy Centre, 2023). These technologies provide real-time information on the location and status of the reusable packaging. QR codes have a low environmental footprint, do not interfere with recycling and provide access to websites and product information (Global Plastics Policy Centre, 2023). However, it does require consumers to use a mobile phone with camera or it must be scanned individually by a reader or staff, which can increase the costs and staffing levels (Global Plastics Policy Centre, 2023). RFID tags can record location, memorize information and it can be used for inventory control. With an RFID, automatic deposit return is possible when using a smart bin containing an RFID reader. In addition, an RFID reader has the ability to scan multiple items at the same time, making it possible to hand in more packaging faster. This makes it easier and faster for consumers to hand in their packaging and could benefit the usability of the system. Research has shown that using RFID, reduces CO2 emissions due to optimization of supply chains, inventory management and traceability (Bose & Yan, 2011). Disadvantages of RFID are the costs and difficulty with recycling as the tag is made of multiple materials that could leach chemicals during washing or contaminate recycling (Global Plastics Policy Centre, 2023). The tags can be made removable to prevent recycling contamination, however leaching chemicals during washing can still form a problem.

Lastly, the total price of the packaging is crucial to make the system successful. Glass, Tritan and stainless steel are more expensive than plastics, but also have a longer durability which could level out the costs (Closed Loop Partners, 2021; World Economic Forum, 2021).

3.3.5 Labelling

A reuse symbol (figure 28) should be developed that makes it easy for consumers to recognize the packaging as being reusable, making sure that they do not throw away the packaging but return it. It is important to inform the consumer about the packaging type (reuse), value (deposit) and instructions for returning the container (RESOLVE-PR3, 2023a).

Figure 28: Reuse logo presented by RESOLVE-PR3 (2023a)

3.3.6 The first reusable packaging design

One could envision a design for the first reusable packaging that could be put on the market. In the Reuse Roadmap 2030 project, one of the outcomes was a prioritization of implementation. This illustrates a ranking of ease of implementation. **The following ranking was created (from easiest to hardest): Dry groceries (Dutch: droge kruidenierswaren, DKW), non-food (NF), Perishables, Fresh produce, Dairy.** Based on this ranking, dry groceries such as crisps, herbs, soups, coffee, tea will be the first products to be packed in reusable designs. It is probable that these type of products will first be sold in reusable packaging, followed or simultaneously with non-food products such as soaps, shampoos, cleaning wipes et cetera. These types of products can come in many different sizes, shapes and with various closures. Dry groceries might be packed in containers as they do not require special handling like pumps.

It is probable that there will be different type of reusable packaging with different materials. This has two reasons: (1) using one type of packaging can create material scarcity and (2) by putting two types of materials on the market, one could find the pro's and cons of both materials. Literature and theory go a long way, but practice should prove what material and design work best.

RESOLVE-PR3 (2023a) mention that reusable packaging should preferably be plastic free, and no multilayer materials should be used or layers that could limit the recycling. Plastic could have intentional and unintentional additives and contaminants that have an impact on human health and ecosystems. They find that the industry should move towards a 'phase-out' of plastic packaging. Based on the materials that were analysed in this research, one would be left with **glass and stainless steel as optimal materials, considering plastics are not desired.**

3.3.7 Key takeaways

This section aimed to set up a list of requirements for the standardised, reusable packaging and answer one of the subquestions: "What is the most scalable, reusable packaging for a managed pool system in the Netherlands?". In order to do so, it was discussed where the reuse system and packaging influence each other in the assumed reuse ecosystem. The desire to create the smallest selection of packaging to pack the most products was studied. Therefore, materials and packaging design elements were discussed. The final list of requirements, recommendations and considerations can be found in table 1.

Based on the requirements and recommendations derived from literature, it is **not possible to state what the most scalable, reusable packaging must look like** for a managed pool system in the Netherlands; there is not one clear or best answer. However based on the requirements in table 1, a general design, optimized for the reuse ecosystem can be envisioned. The packaging would be:

A square shaped container made of glass or stainless steel. It is stackable, nestable, becomes narrow at the top, with outer dimensions conform to Euronorm standards. It has a universal and separate lid based on existing standards which makes the packaging leak-proof and resealable. The shape contains no deep edges or grooves and the design is optimised for durability and sustainability.

This could look something like presented in figure 29. This picture was created by AI (Adobe Firefly) using the description above as a prompt. However, this design is not optimal as it should be proven with an LCA what the break-even point would be of the packaging, after which it should be tested that the packaging easily reaches this point. This is necessary to assure the environmental benefit of reuse. In addition, the costs should be kept to a minimum, it is therefore necessary to get insights into the existing production lines and make a calculation of the costs that have to be made considering this design. Table 1 can be used to design the reusable packaging, however these **two factors (sustainability and costs) have to be tested and researched before suggesting the success of the design.**

Lastly, this chapter discussed the requirements for reusable packaging, but did not consider that standardisation entails limiting the number of volumes (and dimensions) available. This subject was not discussed in this section as there was no literature found on this matter, and it is too broad to determine what volumes should be available to match the requirements of all FMCGs. Therefore, a case study was conducted on a specific product category to find out to what extent standardisation could be achieved within the category and the problems that standardisation could cause. This study can be found in chapter 4.1.

Table 1: Requirements, recommendations and considerations for the design of reusable packaging/

Requirement
Recommendation
Consideration

	Material	Shape, dimensions & closures	Appearance, tracking and labelling
Cleaning	Non-porous material Heat resistant up to 85-100 degrees C Withstand wet cleaning Chemical resistant No plastic	A smooth surface No deep edges, grooves or narrow holes in the shape Easy to (dis)assembly Euronorm standards	
Logistics	Lightweight Pricing should be viable	Stackable Nestable Anti-leakage after use Suitable for existing deposit machines	· Integrate technology (RIFD)
Use by consumer	Lightweight Aesthetic Scratch resistant	Stackable Nestable Separate lid Universal lid Anti-leakage	Aesthetic Scratch resistant Avoid transparency and clear white Light colours Use patterns and prints
Sustainability	Recyclable Can be recycled into existing waste stream Can be recycled in itself Material lifespan should reach break-even point Responsible sourcing and production Can be made from scrap material		
Safety	Non-hazardous and harmful subtances (phthalates, bisphenols, styrene, perfluoroalkyl substances, percolates, etc.) EFSA approved		

Figure 29: A design for standardised reusable packaging created by AI (Adobe Firefly).

3.6 CONCLUSION LITERATURE REVIEW

This chapter looked at the design of standardised, reusable packaging from all three perspectives of the design space: sustainability, standardisation and differentiation. The first section focussed on standardisation versus differentiation, the state of the art focussed on all three and the last section focussed mainly on standardisation and sustainability. Based on the findings in this chapter, requirements for the design of standardised reusable packaging from all three perspectives can be created.

Standardisation

From the perspective of the reuse ecosystem which focussed on standardisation and sustainability, **a list of requirements, recommendations and considerations was set up.** It was found that the materials PP, HDPE, Tritan, stainless steel and glass would be options for reuse systems with a **preference towards stainless steel and glass** as plastic could have negative influences on health and the environment. In addition, glass and stainless steel were most often used in existing initiatives, suggesting their suitability for reuse. With the list of requirements, **the basis of a standardised, reusable packaging** can be created. However, further details on the design could not be given based on the existing literature, because the effect on costs and environmental impact are not certain.

Sustainability

With regards to sustainability, it was found that the **environmental impact of reusable packaging should be tested with an LCA** and the design should be **optimised for durability** to make sure the packaging goes beyond its break-even point.

Differentiation

Several more requirements were identified from the differentiation perspective. The reusable packaging should **fit the typicality of the product category** to prevent wrong expectations as incongruence in expectations and product attributes can create dissatisfaction. In addition, consumers should still be able to recognise different products and flavours. Products are currently **categorised through colours,** this should still apply for the standardised designs. As differentiation through shape is not possible anymore, the **focus should be on the visual level,** however brands should **explore other media or strategies to create a customer experience and differentiate.** This could be done through creating certain in-store experiences for example.

It was found that the level of standardisation differs per product (category) which could suggest a ranking of ease of implementation with regards to differentiation and standardisation. A ranking of ease of implementation based on product requirements was created during the Roadmap Reuse 2030 project. These two rankings can be combined into a ranking that takes both marketing and product safety into account (figure 30).

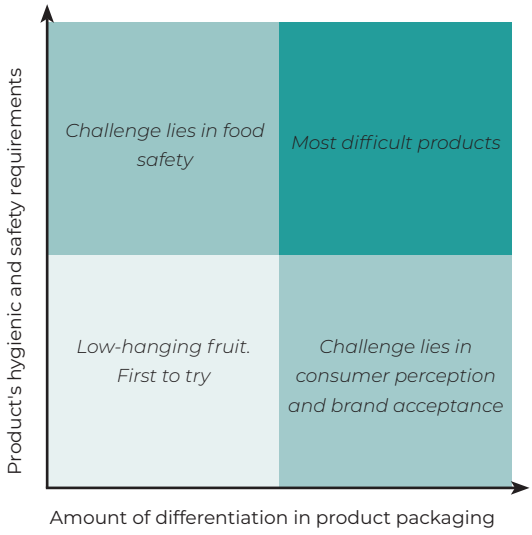


Figure 30: A ranking based on product requirements and level of standardisation to assess the ease of implementation for reuse.

Lastly, the state of the art showed that partnering with larger, successful brands and retailers will increase the success of a system. In addition, even with existing standardised packaging and pool systems (LOOP and BNR), marketing pushes for differentiation. This highlights the conflict between standardisation and differentiation even more and that **keeping brands involved in the pool is another challenge for the future.**

More on the next page

What is next?

The sub question of how to design the most scalable, reusable packaging was found to be too ambitious as the current literature and knowledge is too limited. Further deepening into this technical area of the research was done through **a case study** to find out to what extent standardisation could be achieved within a product category. This study can be found in the next chapter.

The question arose whether the existing theories on packaging design and product/ brand perception will still hold with standardised packaging. More specifically, will harmonisation on the structural level have consequences for brands? Therefore, chapter 5 discusses **a consumer study** about the effect of standardisation on brand perception, perceived quality and willingness to buy.

Lastly, chapter 6 will discuss how **interviews** were done with brand owners to learn more about their perspective on standardisation.

The findings of all the four studies are combined and interpreted in chapter 7 where a **final list of requirements** is created. This is used to create reusable packaging with the **ideal balance between standardisation, differentiation and sustainability.** In addition, **future scenario's** are discussed on how to educate consumers on reuse, nudge them into buying reusable packaging and offer brands more room to differentiate themselves.

4. CASE STUDY

This study looks at the standardisation of tomato products. It focusses both on the standardisation and differentiation. The aim of the study was to find out the reason for differentiation and to create standards for this product category.

CASE STUDY

Further deepening into the practical side of standardisation was done through a case study to find out to what extent standardisation could be achieved within a product category.

This study aimed to answer the following questions

1. What could be reasons for differentiation for this product category?
2. What different materials and volumes are used?
3. What would standardised packaging look like for this product category?

4.1 Methodology

To find a suitable product category, the ranking from the literature review conclusion was used. It was preferred to find a product category with low hygienic and safety requirements, to be able to say something about suitable packaging. In addition, it was desired to have a product category with high levels of differentiation as this could better provide answers to the research questions of this study (figure 31).

The product category that was selected for this study were tomato products, this includes: diced tomatoes, passata, polpa, peeled tomatoes, tomato puree, frito, tomato soup and tomato sauce. These products have similar product requirements with regards to food safety. Therefore, these products can be compared. In addition, it was considered that some tomato products seem to have quite standard packaging formats,

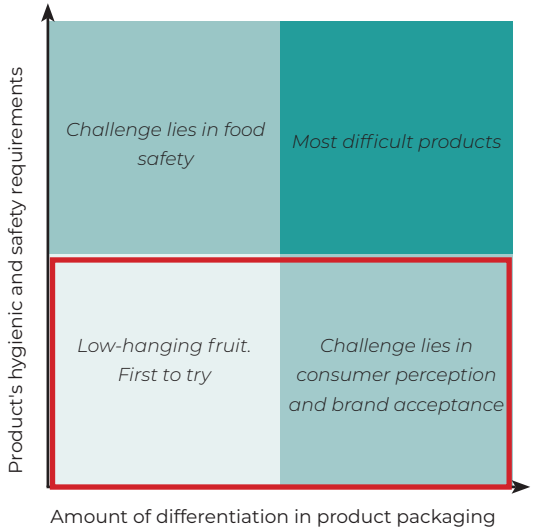


Figure 31: Tomato products lie in the lower two quadrants of the ranking.

while other tomato products are common to be packed in unique designs.

The data was collected from the websites of Albert Heijn, Ekoplaza and Jumbo. The data was analysed using Microsoft Excel.

The packaging type and volumes were analysed per product to see what materials and volumes were used. For research question one, the results were analysed using different categorisations to find relations between the level of differentiation and categories. For example, grouping by brand mights show if certain brands have more unique packaging than others.

4.2 Results

For 219 products, the brand, volume (in grams or mL), and packaging type were recorded. Every variety of a product was recorded (e.g. every flavour of a pasta sauce) and count individually.
The study identified various packaging types and materials, including plastic containers, multilayer pouches, glass jars, glass bottles, tin cans, multilayer cartons, and tubes (figure 32).

Grouping by product type showed that the number of packaging types varied across products. Soup, puree, frito, and pasta are available in a wider range of packaging designs, while polpa, diced tomatoes, and peeled tomatoes have fewer options (figures 33). Grouping by packaging type showed that there is a diversity in volumes for glass jars and bottles and tin cans, while plastic containers and tubes have standard sizes (figure 33). Grouping by brand would not give valuable results, because there were too many brands with different products that the data could not be compared. All the graphs can be found in Appendix A.

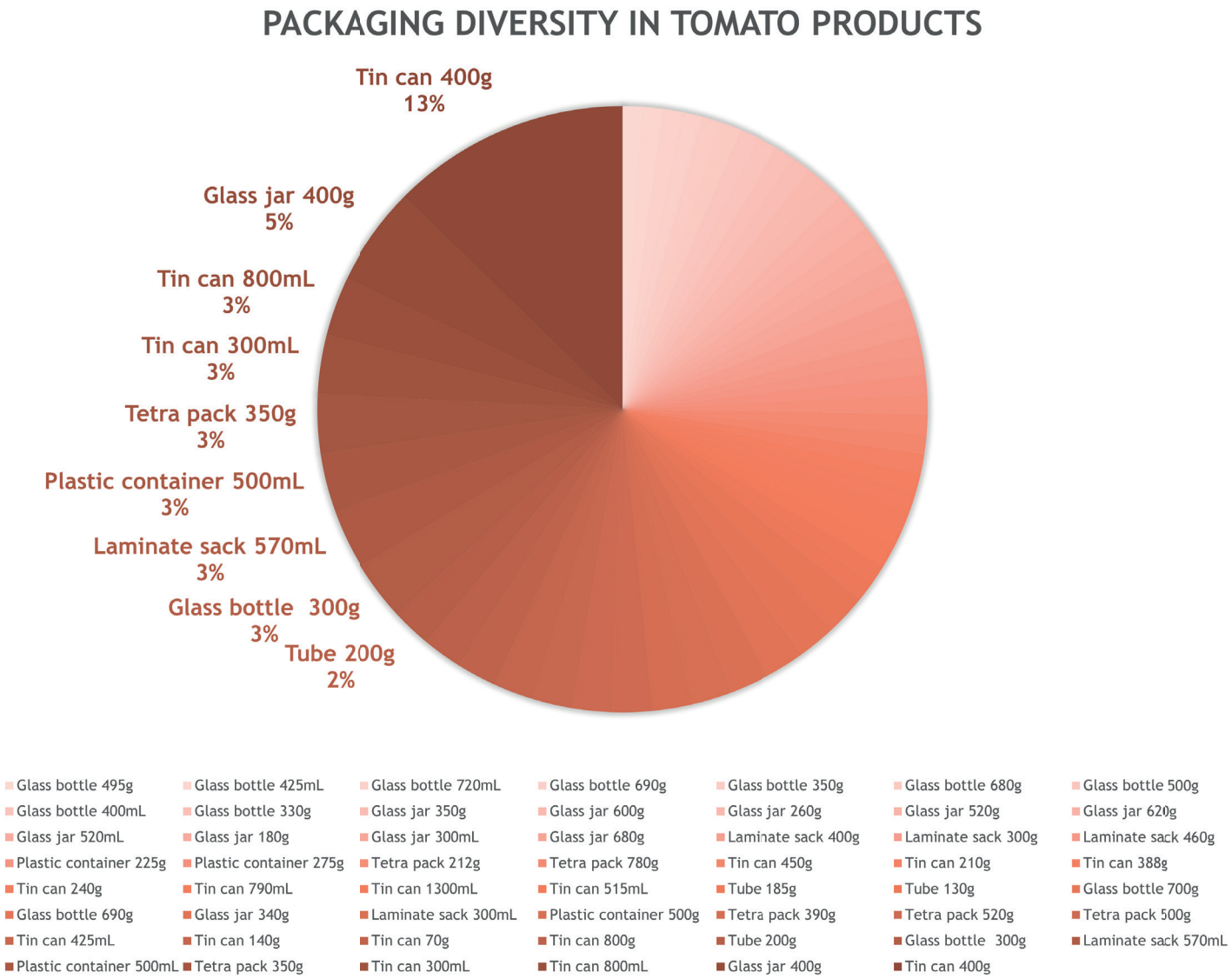


Figure 32: The total number of packaging found for tomato products.

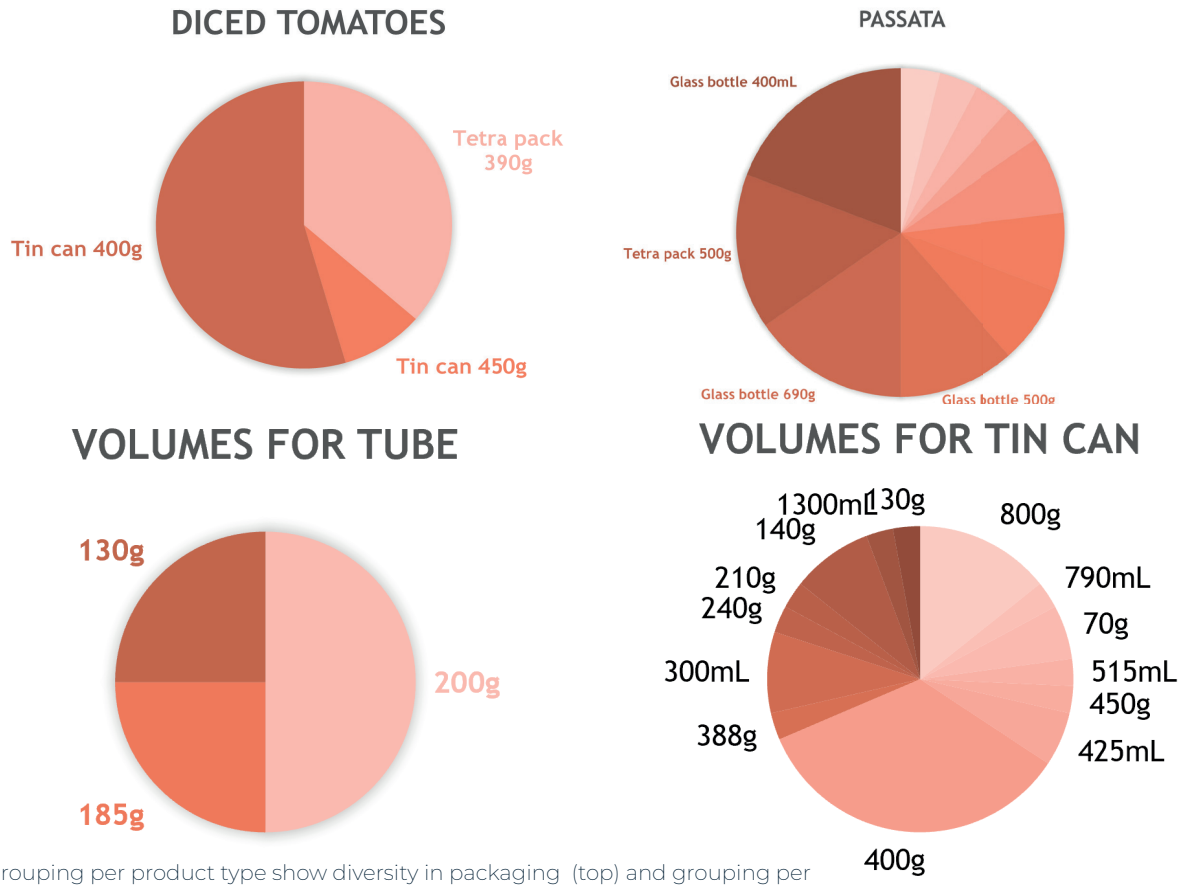


Figure 33: Grouping per product type show diversity in packaging (top) and grouping per packaging type (bottom) show diversity in volumes.

Why is there so many different packaging?

Based on the data, one can think of three reasons for the differentiation in packaging: barrier properties, marketing and usability. These are further discussed below.

Barrier properties

One could argue that the differentiation in packaging types is the difference in barrier properties. Soups, frito and pasta sauces may contain other ingredients that affect the barrier requirements for these specific products. However, glass jars, tin cans, and laminate sacks all have high barrier properties, suggesting that this barrier requirement is not the reason for material differentiation.

Marketing

Polpa, diced tomatoes and peeled tomatoes are all similar products that consist of tomatoes, tomato juice or concentrate, and an acidity regulator. These products are typically packed in tin cans, except for Heinz diced tomatoes, which are packed in multilayer cartons (figure 34). This may be done for marketing purposes, to differentiate from other packaging on the shelf. However, Heinz sells their peeled tomatoes and polpa in tin cans, which makes this reasoning unlikely.

Usability

Usability may also be a factor in Heinz's choice of packaging. They may want to create a specific user experience that can be achieved with this packaging. Usability could be a factor for many other types of packaging. Tomato puree is available in two different types of packaging: small cans and tubes. While cans are single-use and can be easily stacked, tubes allow for easy dispensing and resealing after use. Glass bottles and multilayer cartons make it easier to pour the contents compared to tin cans or containers. Finally, laminate sacks are lightweight and do not require a lot of space. Brands can select different packaging types based on the desired consumer experience and cost considerations.

What happens with standardisation?

Although the reasons for the existence of various packaging designs are not evident, it is clear from this chapter that the sheer number of packaging options available today is staggering. If a reuse system were in place, it would be impractical to incorporate such a diverse range of products into the system. If this product category would be standardised, there are several challenges that arise and considerations that come forward based on the data. First, the amount of variation differs per product. For example, pasta sauce is available in 11 different volumes in glass bottles or jars, while polpa is only sold in three sizes of tin cans. Consequently, one could argue that the standardisation of pasta sauce in this case would be harder than standardising polpa packaging.

In addition there are small and large portion sizes available (figure 35). Large portion sizes provide the benefit of using less material while small portion sizes can prevent food waste. The most commonly used quantity is 400mL, which is often used when cooking a recipe for four people. However, there are many other quantities that differ from this standard and are not specifically large or small portions. It is not clear why the sizes in between need to be different. However, it should be taken into account with setting new standards that there are both small and larger portion sizes available. In addition, not all products can be sold in the same quantities as they are not all used in the same amount.

Figure 34: Heinz diced tomatoes are not packed in the typical tin cans.

Figure 35: Tomato puree in two sizes.

New standards

The overview of tomato products demonstrates the significant differences in packaging designs and provides an initial impression of the most common packaging types and quantities. This could serve as a basis for standardisation of this product category. Suppose that this product category must standardise; what volumes and packaging types could be used? Per type of packaging, the occurrence of all sizes were derived. This does not include all variations of a product (e.g. all 5 flavours are counted as one), to make it brand independent. In addition, grams and mL are considered the same (so 400mL = 400g) to analyse the data more easily. Appendix A shows the results for the volumes per packaging type. Table 2 summarizes this data by presenting the most common volumes found.

One could argue that the most common sizes based on all packaging should be the standardised volumes, meaning that the reusable packaging would be sold per 400, 300, 500, 800, 350 and 520 mL or grams, or a smaller selection of these volumes. However, the common volumes of glass bottles and tubes do not match with these volumes, suggesting that these product types are not desired or possible with this selection of volumes. In addition, taking into account the usability reasons, these presented volumes are quite large. Mainly tomato puree is sold in smaller quantities, both in tube and tin can format. This raises usability issues as consumers are not used to this amount and a risk for food waste.

As for the standardisation of packaging types, the requirements of reusable packaging as described in chapter 3.5 cause that laminate sacks and multilayer packs are not suitable for reuse because they are not made from one material. These packaging types are mainly used for soups and sauces and could be replaced by the other formats. Furthermore, tin cans, glass jars and glass bottles are most common. These packaging types already have familiarities with the requirements for reusable packaging, which could benefit the transition to reuse for this product

Table 2: Most common volumes per packaging type.

Packaging type	Most common volumes (gr and mL)
Glass bottle	690, 700
Glass jar	400, 300
Laminate sack	570, 300 (only four sizes available)
Multilayer pack	350, 520, 390, 500
Plastic container	500 (only three sizes available)
Tin can	400, 800, 300, 140
Tube	200 (only three size
Based on all packaging	400, 300, 500, 800, 350, 520

4.3 Discussion and conclusion

This study was conducted to investigate the reasons for the diversity of packaging designs in tomato products, to find what materials and volumes are used to create an idea of what standardised packaging could look like for this product category.

Based on the results of this study, it was found that the differentiation in volumes and packaging types depend on the product. For the product with a high level of differentiation, no clear answer could be found for the reasons for the diversity. **Possible causes of differentiation were discussed (usability, portion packs, marketing), but nothing could be concluded as this was based on assumptions**. Although the reasons for the existence of various packaging designs remain unclear, it is evident that the sheer number of packaging options available today is staggering. If a reuse system were in place, it would be impractical to incorporate such a diverse range of products into the system.

An analysis on common volumes and packaging types was performed which showed that there is common ground and standards that could be used for reusable packaging. **Standards in volumes were more evident for specific packaging types.** A selection of 6 volumes was found to be most common, however these were all large portions. Tomato puree is normally not sold in these quantities, which could prevent acceptance by consumers and food waste. Therefore, **standardisation should take into account the quantities of different products**; another challenge which was not yet found in literature.

With regards to standardisation of packaging types; the challenge is not that great for tomato products. For example, laminate sacks and multilayer packs are not suitable for reuse but can be easily replaced by glass jars or tin cans as they are also commonly used for the same products. **The most common packaging types were tin cans and glass jars and bottles**, which correspond to the list of requirements of reusable packaging. This benefits the transition to reuse for tomato products.

Limitations and future research

This study has some limitations that need to be discussed to interpret the results and to reason future research recommendations. The first limitation is that this study did not evaluate the findings with experts or brand owners. Therefore, no answer could be given on one of the research questions, because it was based on assumptions. Therefore, it is advised that future research checks assumptions with packaging technologists, producers or brand owners. Another future research would be to check the standards that were derived from this study and test them with consumers and brand owners; would these standards (volumes and packaging types) be sufficient, or what problems will arise? This could give more practical insights and might identify new requirements for standardisation.

The second limitation is that mL and grams were neglected and taken as one during the analysis for new standards. This is not actually correct, so for future research both grams and mL have to be considered independently.

Lastly, tomato soup, frito and sauces contained other ingredients which might make these product types less appropriate for comparison. This should be considered when interpreting the results.

5. CONSUMER STUDY

This study looks at the effect of standardisation on perceived quality, willingness to buy, brand perception and the differences per brand. Therefore, this study focusses on the core of the conflict between standardisation and differentiation.

CONSUMER STUDY

Literature has revealed that the structural level of packaging serves an informational role as it can be used to create meaning and associations in consumers' minds (Chen et al., 2020; Hassan et al., 2012; Pantin-Sohier, 2009; Velasco et al., 2014; Vladić et al., 2015). By correctly translating the brand values into design features, desired associations can be created to reinforce the brand image. For example, the angular lines and shapes used by Axe create associations such as aggressive and powerfulness. With standardisation, brands will not have the freedom to design uniquely shaped packaging. Therefore, standardisation could influence the brand and product perception. In addition, it might be possible that brands will be perceived more alike when presented in standardised packaging. For example, Axe and Dove will be perceived more alike when Dove is perceived as less feminine and Axe less masculine. This study was set up to see if standardisation has an effect on the perceived quality, brand perception, differences between brands and willingness to buy. This was done by comparing consumers' perceptions of standardised designs to their perception of the original, single-use packaging.

Perceived quality is defined as the consumer's judgement about the overall excellence or superiority of the product and its packaging (Snoj et al., 2004; Zeithaml, 1988). This can be a benefit for the customer, which could lead to a better brand image and a higher purchase intention (Keller, 2013; Calvo-Porral & Lévy-Mangin, 2017). Willingness to buy is how likely it is that a customer would buy the product. The terms brand perception and brand image are often used interchangeably, this study uses the term brand perception, however the definition is the same as brand image: 'consumers' perceptions and associations with the brand held in memory'. The term brand perception is used in this study as it better explains what happens in the study. This study wants to know how consumers perceive the brand based on the packaging design, not their entire image of the brand based on different elements. It is believed that the term brand perception suits this study better. Lastly, the difference between brands is defined as the difference in brand perception between two brands.

The research question follows: what is the effect of standardisation of FMCG packaging on the perceived quality, willingness to buy and brand perception?

Based on the literature review and background, it is expected that the perceived quality, willingness to buy and differences between brands will be lower/smaller for standardised packaging, compared to the existing, single-use packaging design. For brand perception, it is expected that the perception of the standardised packaging will not correspond to the brand perception of the existing, single-use packaging design, suggesting that the standardised design moves away from the desired associations and does not reinforce the brand values.

The following hypotheses are stated as followed:
H1: Standardisation has a negative effect on the perceived quality.
H2: Standardisation has a negative effect on the willingness to buy.
H3: Standardisation has a negative effect on the brand perception.
H4: Standardisation has a negative effect on the differences between brands.

Figure 36: Graphical represenation of this study. Left is single-use and right is reusable packaging.

5.1 Methodology

The study consisted out of two parts: a pre-study and a main study. The main study aimed to answer the research question and test the hypotheses. A pre-study was necessary to determine the length of the main study and to determine the associations, and therefore the most suitable adjectives, necessary to measure the brand perception. To understand this, one must know how brand perception was measured.

Brand perception was measured using seven-point semantic differential scales containing two opposing adjectives (figure 37). Participants were shown packaging designs in the main study, after which they filled in the seven-point semantic scales. The average score per scale was taken as a measure of brand perception. To get precise and accurate results in the main study, one wants the associations (masculine and feminine in figure 37) to fit the brands. Therefore, the pre-study presented collages (figure 38) featuring the brands' advertisements and products, and asked participants to write three associations that came to mind when presented these brand collages. In addition, participants filled out semantic differential scales with associations that were chosen based on the brands' identity, use of language and advertisements. Various adjective categories as presented by (Krippendorff, 2005) were used to present different types of associations to the respondent. These categories were: objective (bright-dark), aesthetics (elegant-graceless), social value (high class-low class), emotional (exciting-boring) and quality (dangerous-safe). The adjective categories by Krippendorff (2005) were considered, to make sure there was a variety of association types presented to the consumer. Based on the results of the pre-study, associations (adjectives) were chosen for the main study.

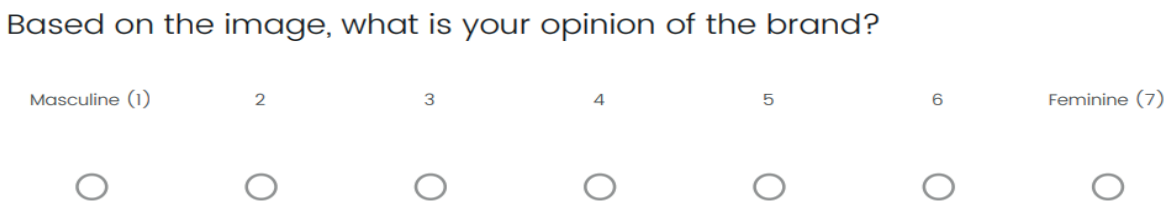


Figure 37: A question with a semantic differential scale to measure brand perception. This scale shows the adjectives Masculine-Feminine

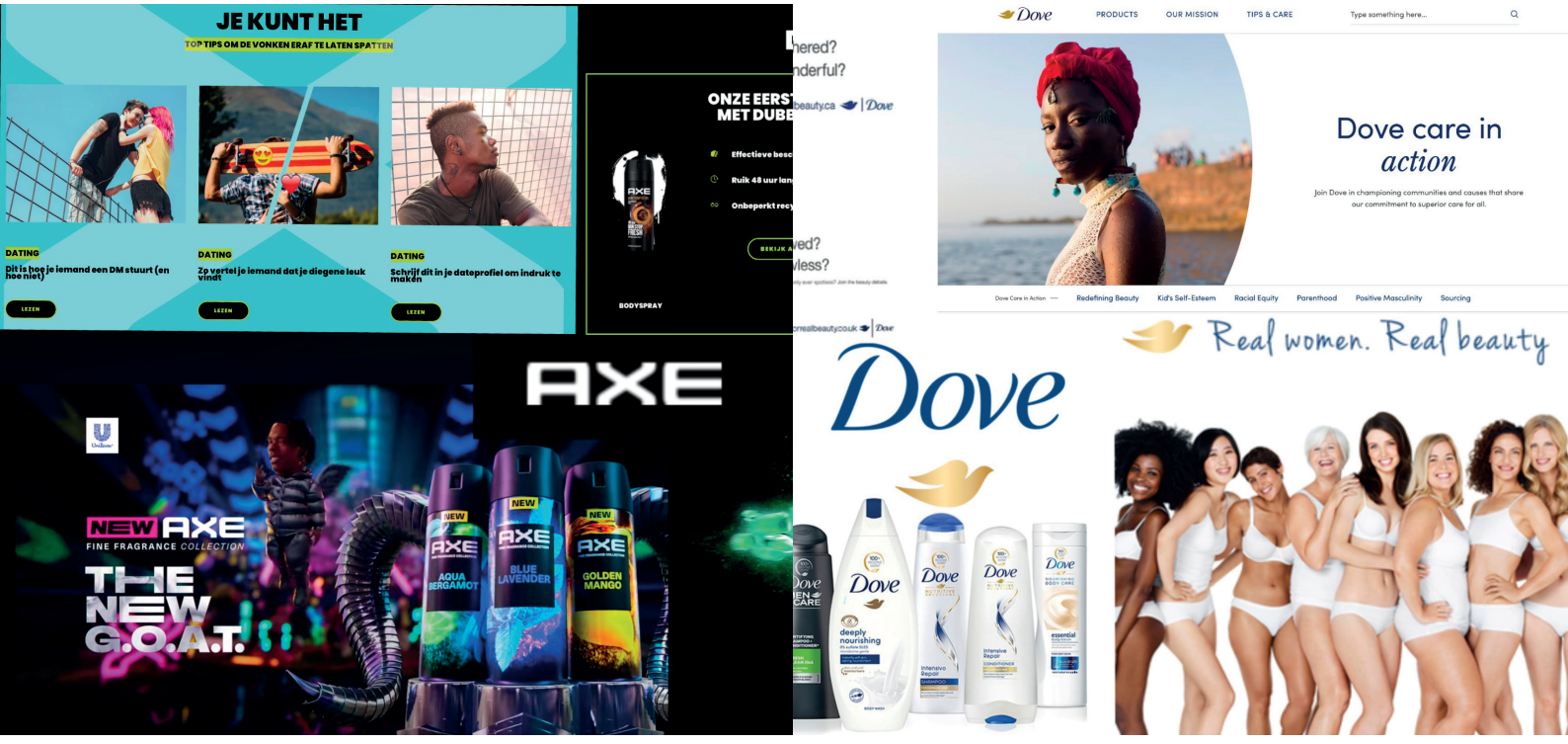


Figure 38: Part of the collages for Axe and Dove which were used to in the pre-study.

Selection of brands

The brands for the study were selected based on their difference in product quality, brand values and they had to have a unique packaging shape, because this creates a greater contrast with the standardised designs. To compare brands, the products had to be the same. Two food and two non-food products were included considering potential variations in response between food and non-food items (figure 39). Pasta penne of Albert Heijn and De Cecco were selected. Albert Heijn is a Dutch supermarket which has its own private label products and can be considered low cost, low quality. De Cecco however portrays itself as being high-quality, real-Italian pasta. This brand-pair is therefore selected for their difference in product quality. In addition, orange soda of the brands Orangina and Fanta was selected. These two brands have very unique packaging. Orangina and Fanta both have unique shapes, but Orangina also uses a rough surface on their bottle, mimicking the feeling of the skin of an orange. Dishwasher soap by Dreft and Seepje was selected, because of their unique packaging and because Seepje portrays itself very much as a sustainable, green product while Dreft does this less. Lastly, body wash by Axe and Dove was selected because they are almost opposites in their packaging design and brand values.

Pre-study

The pre-study aimed to answer the following research questions:

1. What adjectives can best be used for the main study?
2. How long do participants take to answer semantic differential scales?

Methodology

The pre-study was an online survey made with Microsoft Forms. Participants were recruited through Whattsapp and the data was analysed using Microsoft Excel. The survey consisted of 59 questions of which 48 semantic differential scales, 8 open questions and 3 demographic questions. The entire survey can be found in appendix B. Collages were made for the eight brands, featuring the brands' advertisements and products (figure 39). The other collages can be found in appendix C.

Figure 39: Packaging of the selected brands. The packaging of Dove and Axe, clearly show the different brand identities. Dove uses soft lines and curves, evoking associations such as softness, caring, and feminine. Axe uses harsh lines, and sharp corners that evoke associations such as powerful, aggressive, and masculine.

Results

A total of 9 responses were collected over the course of one week. Because of time constraints, this response rate was considered enough for the main study. The average duration to complete the survey was 10 minutes and 47 seconds.

The scales where the brand perception between two brands differed most, suggested that this these adjectives were suitable for the main study as they could give clear results. For example, if Albert Heijn is perceived as very modern whule De Cecco is perceived as traditional, these adjectives are suitable for the main study. Table 3 summarized the adjectives that presented such large differences. These are further dscussed below.

For De Cecco and Albert Heijn, there was a large difference in brand perception with regards to the scale Traditional-Modern. In addition, often mentioned associations for De Cecco were 'Italy, pasta, summer/sun', there were no common associations found for Albert Heijn based on the open questions.

For Orangina and Fanta, the difference in brand perception was clear for the scale Ugly-Beautiful, Cheap-Expensive and Traditional-Modern. In the open questions, 'summer, vacation, sweet' were associated with Orangina and 'children, orange' associated with Fanta.

Dove and Axe had great differences in brand perception for the adjectives Graceless-Elegant, Inspiring-Uninspiring and Feminine-Masculine. And words that were associated with the brands were 'clean, woman, inclusive' for Dove and 'men, strong smell' for Axe.

Lastly, Seepje and Dreft differed in brand perception for Traditional-Modern and Environmentally Conscious-Environmentally Unconscious. Associations mentioned for Dreft were 'green, clean, dishes, good quality' and 'eco-friendly, confusing, new, nice visuals' for Seepje.

Discussion

Not all of the adjectives in table 3 were used in the main study because of the following reasons.

- Cheap-Expensive found for Orangina and Fanta was not used in the main study as it was found that Playful-Serious were more fitting to the two brands. This was based on their advertisements and the new adjectives focus more on brand perception instead of value for price.
- Ugly-Beautiful found for Orangina and Fanta was not used in the main study. Instead, Unique-Ordinary was used as it was thought that this would accentuate the differences between the brands better.
- For Dove and Axe, the adjectives were all used, however 'Graceless-Elegant' was changed to 'Robust-Elegant' as this gives more nuance since graceless can be perceived as negative.

Lastly, these findings did not provide enough adjective pairs for the main study. Therefore, other adjective pairs were selected for the main study based on the brands' use of language, portolios, advertisements, and websites.

Another goal of the pre-study was to determine the time that people take to answer semantic scales. To keep the main study between 10 and 15 minutes, this means that 59 questions could be a sufficient number of questions for the main study.

Table 3: Results from the pre-study: adjectives that presented a large differences in brand perception.

Brand-pairs	Adjectives with large differences in brand perception
De Cecco & Albert Heijn	Traditional - Modern
Orangina & Fanta	Ugly - Beautiful Cheap - Expensive Traditional - Modern
Dove & Axe	Graceless - Elegant Inspiring - Uninspiring Feminine - Masculine
Seepje & Dreft	Traditional - Modern Environmentally Conscious - Environmentally Unconscious

Main study

The main study aimed to test the hypotheses and answer the research question: 'What is the effect of standardisation of FMCG packaging on the perceived quality, willingness to buy and brand perception?'

The hypotheses were:
H1: Standardisation has a negative effect on the perceived quality.
H2: Standardisation has a negative effect on the willingness to buy.
H3: Standardisation has a negative effect on the brand perception.
H4: Standardisation has a negative effect on the differences between brands.

In order to test the effect, the perception of existing, single-use packaging designs was compared to the perception of standardised packaging designs. In addition, two competing brands were compared to one another to test the difference between brands.

Standardised designs

The same brands were used as in the pre-study, For every brand, there was a single-use and reusable (standardised) packaging. The single-use designs were existing packaging designs. The reusable packaging design was based on existing reusable concepts with the label design and other visual elements based on the existing single-use packaging. This means that the structural level of the packaging design is different, but the verbal and visual level are kept as equal as possible to the single-use packaging. Figure 40 shows the single-use and reusable packaging designs for all brands.

As can be seen in the figure, the packaging was shown together with its content and price. These were actual prices for the single-use packaging. The price and quantity was kept equal for the single-use and reusable packaging, to better compare the results.

Methodology

The packaging designs were evaluated by participants through an online survey. which was created using Qualtrics. It consisted of 10 questions per brand, 2 multiple choice questions for a manipulation check and 6 demographic questions. All questions can be found in appendix D. The participants were recruited through LinkedIn, Whatsapp and word of mouth. The survey was open for three weeks during which the participants could fill in the survey. The variables were measured as follows.

The perceived quality was measured using different indicators of perceived quality: overall product excellence, packaging suggestion of high quality and visual appeal. To assess whether standardisation has a negative effect on the perceived quality, participants answered three questions with a score of 1 to 7. For every participant, the average score of these three questions was taken as the perceived quality.

The willingness to buy was evaluated through assessing the perceived value for price, pricing perception and purchase intent. To assess whether standardisation has a negative effect on the willingness to buy, participants answered three questions with a score of 1 to 7. For every participant, the average score of these three questions was taken as the willingness to buy.

The brand perception was measured similar as during the pre-study, by use of seven-point semantic differential scales using adjectives from the pre-study and more that were selected based on the brands' use of language, portolios, advertisements, and websites. Again, the various adjective categories by Krippendorff (2005) were considered to present a variety of association types to the consumer.

Lastly, the differences between brands was measures by taking the absolute difference of the brand perception between two brands. The differences between brands were determined independently for every adjective-pair. Therefore, in order to compare two brands, the same semantic differential scales had to be used per brand-pair.

The data were analysed using a one-way ANOVA with the statistical software in Microsoft Excel.

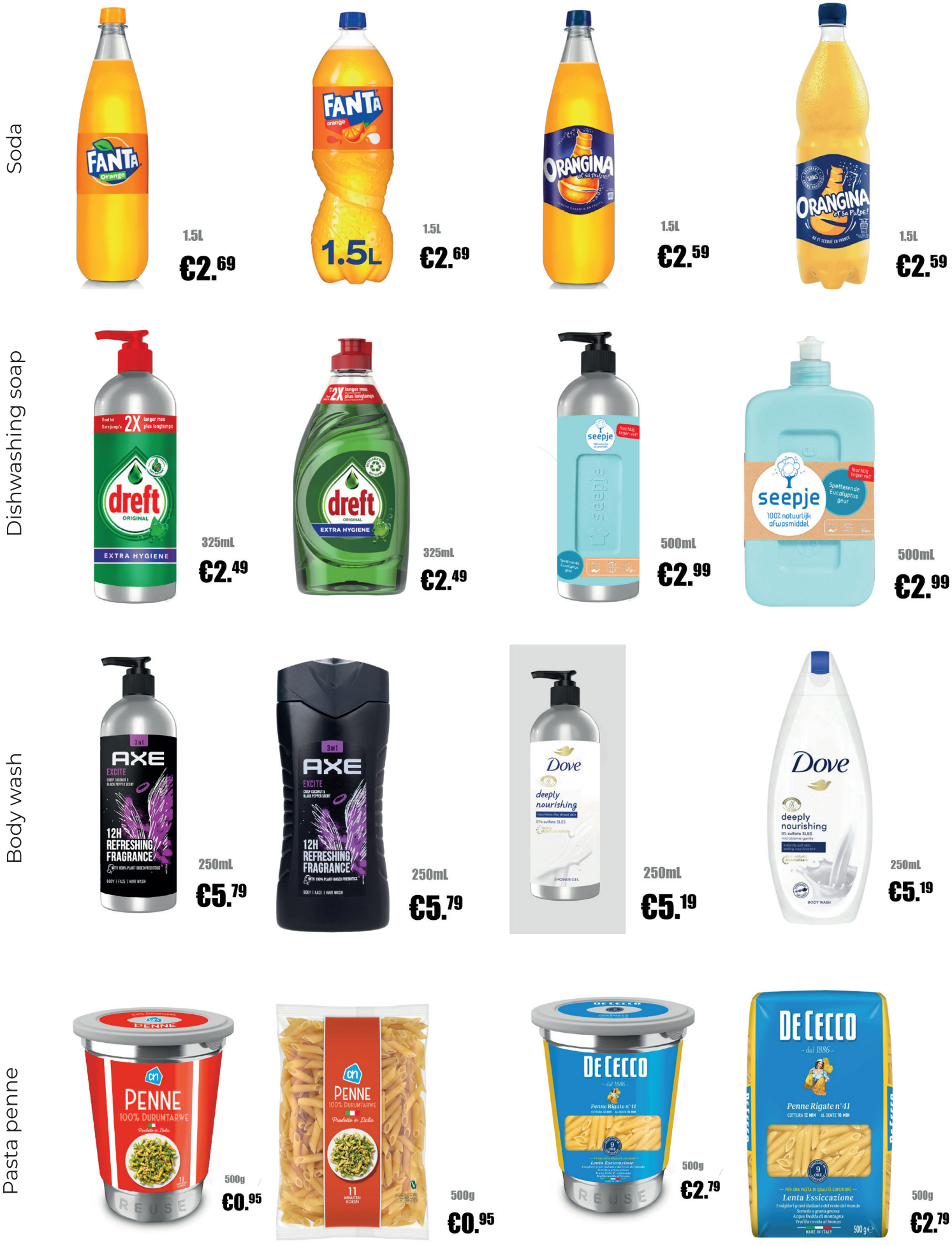


Figure 40: Single-use and reusable packaging designs used in the consumer study

Flow of the questions

During the survey, participants evaluated 4 packaging designs in total. The designs were shown one-by-one and the respondent answered 10 questions per packaging design. To increase the reliability of this study, randomisation and a manipulation check were applied. The survey was set up to randomly show people either four single-use packaging designs or four reusable packaging designs as it was thought that mixing the two types of packaging could create bias response. People were not aware of this randomisation; if they saw single-use packaging, they were not aware that there were other people seeing reusable packaging designs. This was the first set of randomisation. Another randomisation was added to determine what brands they would evaluate. A participant would always see both brands per product (e.g. never see Axe and not Dove). Finally, the survey optimised the randomisation of equal responses per single-use/ reusable and per brand to ensure equal results. Appendix E shows the survey flow graphically.

In addition, an explanation was given to the participant of the type of packaging they would evaluate. For the reusable packaging group, it was explained that this type of packaging is more sustainable and the fact that multiple brands would use the same packaging (figure 41). Further details regarding the reuse ecosystem or the deposit were not specified to prevent confusion.

Reuse group explanation
Please read the following instruction carefully.
You will be presented with several supermarket products one by one, each from a specific brand and packed in reusable packaging. This reusable packaging is standard and used by multiple brands which makes it a more sustainable option for customers. For each product, you will be asked to answer a few questions to provide your perspective on the product and its packaging. Each question will feature a 7-point scale with two contrasting values (e.g. feminine versus masculine). Choose a point on the scale that represents your opinion of the product's appearance and packaging.

For instance, if you perceive a product to have a more masculine appearance, you may rate it as a 6 on the 1 (Feminine) - 7 (Masculine) scale.

Figure 41: Example of question set-up for measuring brand perception of the reusable packaging design for Axe.

Subsequently, participants were presented with images of the packaging design, accompanied by its price and volume information (figure 42). The exact questions of the survey can be found in appendix D.

Lastly, a manipulation check was included to ensure people filled out the survey consciously. The respondent was asked what brand and type of packaging (reusable or single use) they saw in the last slide. If the answer did not correspond with the packaging and brand, the results would be excluded from the study.

Indicate your perception of value for price.

Poor value (1)	2	3	4	5	6	Excellent value (7)
○	○	○	○	○	○	○

What do you think of the pricing of this product?

Very cheap (1)	2	3	4	5	6	Very expensive (7)
○	○	○	○	○	○	○

Would you buy this product?

Definitely not (1)	2	3	4	5	6	Definitely yes (7)

Figure 42: Example of question set-up for measuring perceived quality of the reusable packaging design for Albert Heijn.

5.2 Results

Of the 155 responses to the survey, 47 (30%) failed to complete it, resulting in a final of 108 participants. During the manipulation check, participants frequently answered the first question incorrectly, which was about the type of packaging (single-use or reusable) they had seen. The chance of answering this question correctly was 50%. All participants answered the second question correctly, which asked about the last-seen brand, with a chance of 12.5% of a correct answer. Therefore, no additional data was excluded. The time that participants took for filling in the survey varied between 3 minutes and 2 hours with an average time of 8 minutes.

Perceived quality

When looking at the effect of standardisation on perceived quality for all brands combined, the standardised packaging has a higher perceived quality (M=4.26, SD=1.23) compared to the single-use packaging (M=4.05, SD=1.33). However, this result is not statistically significant (F(1,406) = 2.77, p = 0.097). For individual brands, the one-way ANOVA demonstrated that the effect of standardisation on perceived quality was significant for the brand Axe (F(1,46) = 9.86, p = 0.003) as the reusable packaging (M=4.11, SD=1.34) had a higher perceived quality than the single-use packaging (M=2.93, SD=1.26) (figure 43) table 4 shows the other results.

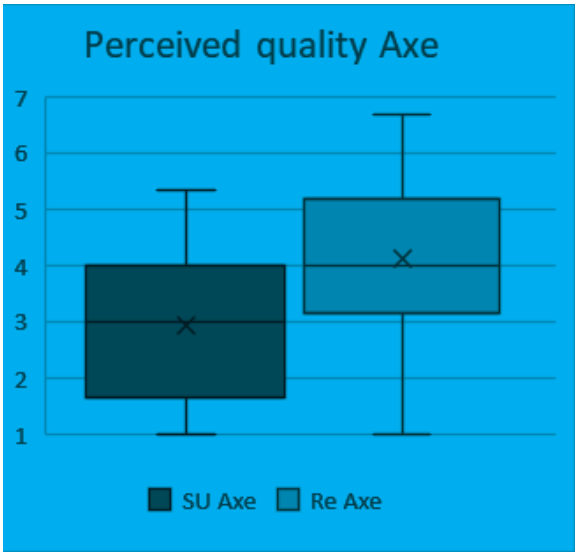


Figure 43: Results perceived quality Axe (SU=single-use, Re=reusable).

Table 4: Results perceived quality. Blue highlighted row is a significant result.

Brand	Single use	Reusable	F	P-value
De Cecco	M=4.68, SD=1.15	M=4.12, SD=1.27	2.59	0.114
Albert Heijn	M=3.48, SD=1.19	M=3.53, SD=1.43	0.02	0.897
Fanta	M=4.05, SD=1.30	M= 4.17, SD=1.08	0.14	0.715
Orangina	M=3.69, SD=1.39	M=4.23, SD=1.27	2.00	0.163
Dove	M=4.09, SD=1.17	M=3.99, SD=1.11	0.76	0.762
Axe	M=2.93, SD=1.26	M=4.11, SD=1.34	9.86	0.003
Dreft	M=4.55, SD=0.88	M=4.86, SD=1.12	1.36	0.249
Seepje	M=4.73, SD=1.33	M=4.90, SD= 0.84	0.34	0.565
Total comparison	M=4.05, SD=1.33	M= 4.26, SD=1.24	2.77	0.097

Willingness to buy

When looking at all brands combined, there is not a significant effect of standardisation on willingness to buy. However, when looking at individual brands, it was demonstrated that the effect of standardisation on willingness to buy was significant for several brands (figure 44). For Albert Heijn, there was a significant effect (F(1, 47) = 9.48, p = 0.004) as the reusable packaging (M=4.48, SD=1.28) had a lower WTB compared to the single-use packaging (M=5.47, SD=0.95). This also was present for the brand De Cecco (F(1, 47) = 9.09, p = 0.004) where the reusable packaging (M=2.79, SD=1.07) had a lower WTB compared to the single-use packaging (M=3.73, SD=1.10). For the brand Dove, there was also a significant effect (F(1, 46) = 8.15, p=0.006), but in this case the reusable packaging (M=3.64, SD=0.82) had a higher WTB than the single-use packaging (M=2.78, SD=1.55). Similarly, a significant effect was found for Axe (F(1, 46) = 4.61, p = 0.037) where the reusable packaging (M=2.97, SD=1.07) also had a higher WTB compared to the single-use variant (M=2.36, SD=0.89).

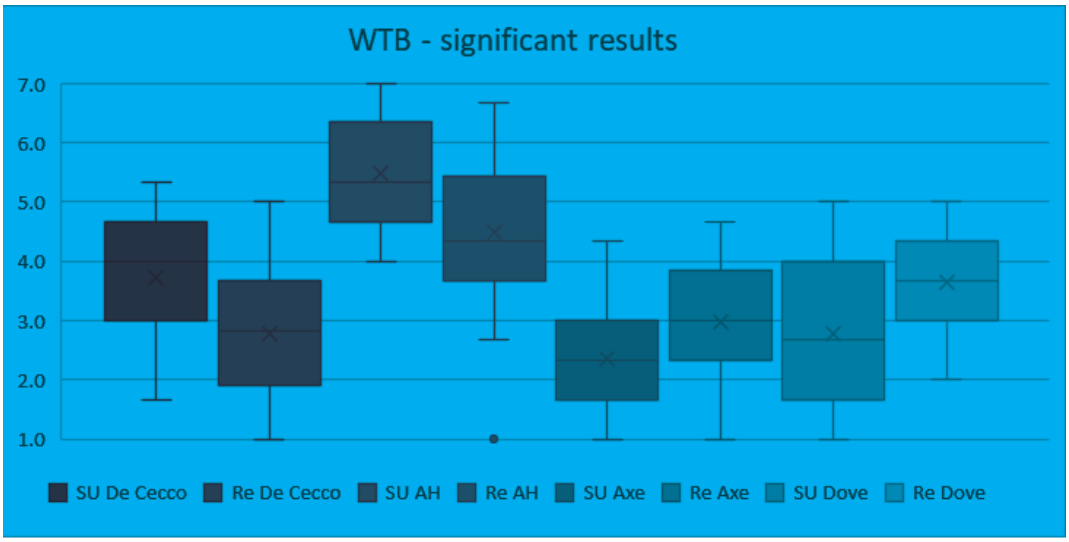


Figure 44: Significant results of the difference between willingness to buy between standardised (Re) and single-use (SU) packaging.

Table 5: Results willingness to buy. Blue highlighted rows are significant results.

Brand	Single use	Reusable	F	P-value
De Cecco	M=3.73, SD=1.10	M=2.79, SD=1.07	9.09	0.004
Albert Heijn	M=5.47, SD=0.95	M=4.48, SD=1.28	9.48	0.004
Fanta	M=3.40, SD=2.34	M= 3.59, SD=1.06	0.43	0.514
Orangina	M=3.50, SD=0.94	M=3.65, SD=1.08	0.30	0.586
Dove	M=2.78, SD=1.55	M=3.64, SD=0.82	8.15	0.006
Axe	M=2.36, SD=0.89	M=2.97, SD=1.07	4.61	0.037
Dreft	M=4.35, SD=1.22	M=4.46, SD=0.87	0.15	0.699
Seepje	M=4.25, SD=1.23	M=4.73, SD= 0.99	2.50	0.120
Total comparison	M=3.78, SD=1.95	M= 3.81, SD=1.46	0.04	0.839

Brand perception

All significant findings are visualised with a spider diagram in figure 45. The blue line represents the brand perception of the reusable packaging (Re) and black represents the results of the single use packaging (SU). All other differences were not statistically significant, but can be found in Appendix F.

A significant effect was found for two adjectives for the brand De Cecco. The reusable packaging was thought to be more modern ($F(1, 47) = 12.8$, $p<0.001$) and less Italian ($F(1, 47)=12.0$, $p=0.001$). Without standardisation, De Cecco was perceived as rather traditional ($M=2.78$, $SD = 1.09$) and real Italian ($M=2.67$, $SD = 1.44$) while in case of standardisation, there was a shift towards modern ($M=3.95$, $SD=1.21$) and 'definitely not Italian' ($M=4.23$, $SD=1.72$).

Two adjectives for the brand Fanta were found to have a significant effect. First, the reusable packaging was found to be more serious ($F(1, 50) = 18.5$, $p<0.001$) and more boring ($F(1, 50)=12.3$, $p<0.001$). Without standardisation, Fanta was perceived as more exciting ($M=3.39$, $SD = 1.34$) and playful ($M=2.62$, $SD=1.30$) than in the reusable packaging ($M=3.69$, $SD=1.23$; $M=4.04$, $SD=1.08$).

A significant effect for the brand Axe was also shown, with regards to the adjectives robust-elegant ($F(1, 44) = 4.65$, $p=0.037$), masculine-feminine ($F(1, 44) = 13.0$, $p<0.001$) and inspiring-uninspiring ($F(1, 44) = 9.32$, $p=0.004$). Without standardisation, Axe was perceived as rather robust ($M=2.26$, $SD = 1.39$), masculine ($M=1.70$, $SD = 0.82$) and uninspiring ($M=5.70$, $SD=1.49$) while in case of standardisation, there was a shift towards elegant ($M=3.09$, $SD=1.20$), feminine ($M=2.87$, $SD=1.32$) and inspiring ($M=4.39$, $SD=1.41$).

For the brand Seepje in the adjective exciting-boring ($F(1, 53) = 4.40$, $p<0.041$) a significant effect was seen. Without standardisation, Seepje was perceived as more exciting ($M=3.39$, $SD = 1.34$) than in the reusable packaging ($M=4.11$, $SD=1.19$).

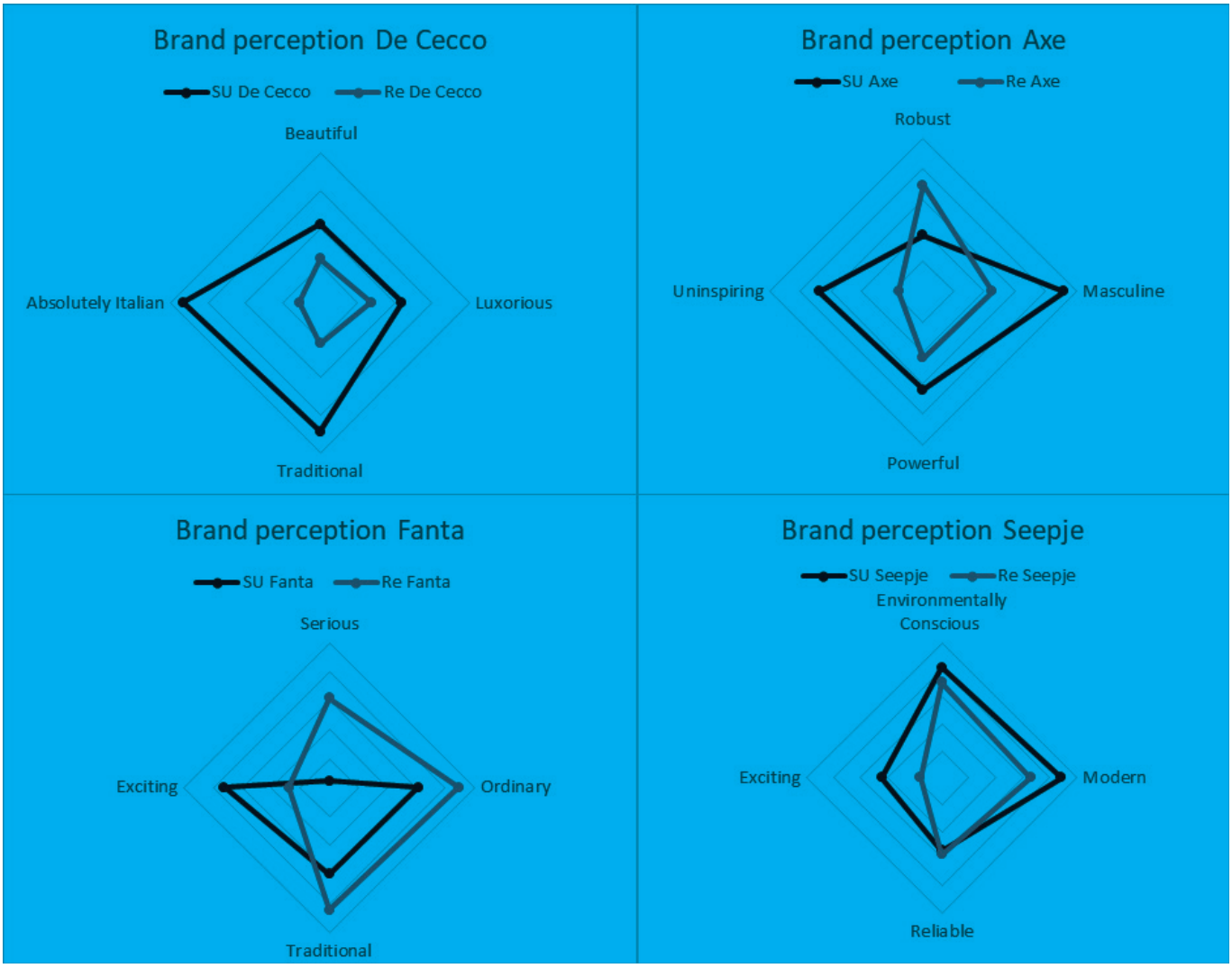


Figure 45: Results brand perception for al brands

Differences between brands

The difference between brands was measured by taking the absolute difference of the brand perception between two brands. For example, Albert Heijn had an average score of 3.79 for the scale 'traditional-modern' for SU and 4.05 for the Re-packaging. De Cecco had a score of 2.78 for SU and 3.95 for Re. The difference between Albert Heijn and De Cecco for SU was 1.01 and for Re 0.1. Hence, for the reusable packaging the difference between Albert Heijn and De Cecco became smaller. Figure 46 shows the differences between the brands for the single use (blue) and reusable (orange) packaging for all scales. The significant results are marked in the figure 47 by an arrow.

It can be seen that in most cases (87.5%), the differences between brands decreases, suggesting a trend of brands being perceived more alike with standardisation. However, only a few significant effects were found. A significant effect was found for De Cecco and Albert Heijn for two adjectives. For the adjectives 'real Italian-definitely not Italian', the brand differentiation decreased ($F(1, 47) = 6.93$, $p = 0.011$). For single-use packaging there was a large difference ($M=3.07$, $SD=1.52$) while with standardisation the difference became smaller ($M=1.91$, $SD=1.57$). The same effect was found for the adjectives 'traditional-modern', the brand differentiation decreased ($F(1, 47) = 4.01$, $p = 0.051$). For single-use packaging there was a large difference ($M=1.59$, $SD=1.31$) while with standardisation the difference became smaller ($M=0.91$, $SD=1.02$).

A significant effect for the brands Dreft and Seepje was also shown, regarding the adjectives 'exciting-boring' ($F(1, 53) = 6.66$, $p=0.013$) as with the reusable packaging the two brands differed less ($M=1.19$, $SD=1.44$) than in case of the single use packaging ($M=2.07$, $SD=1.44$).

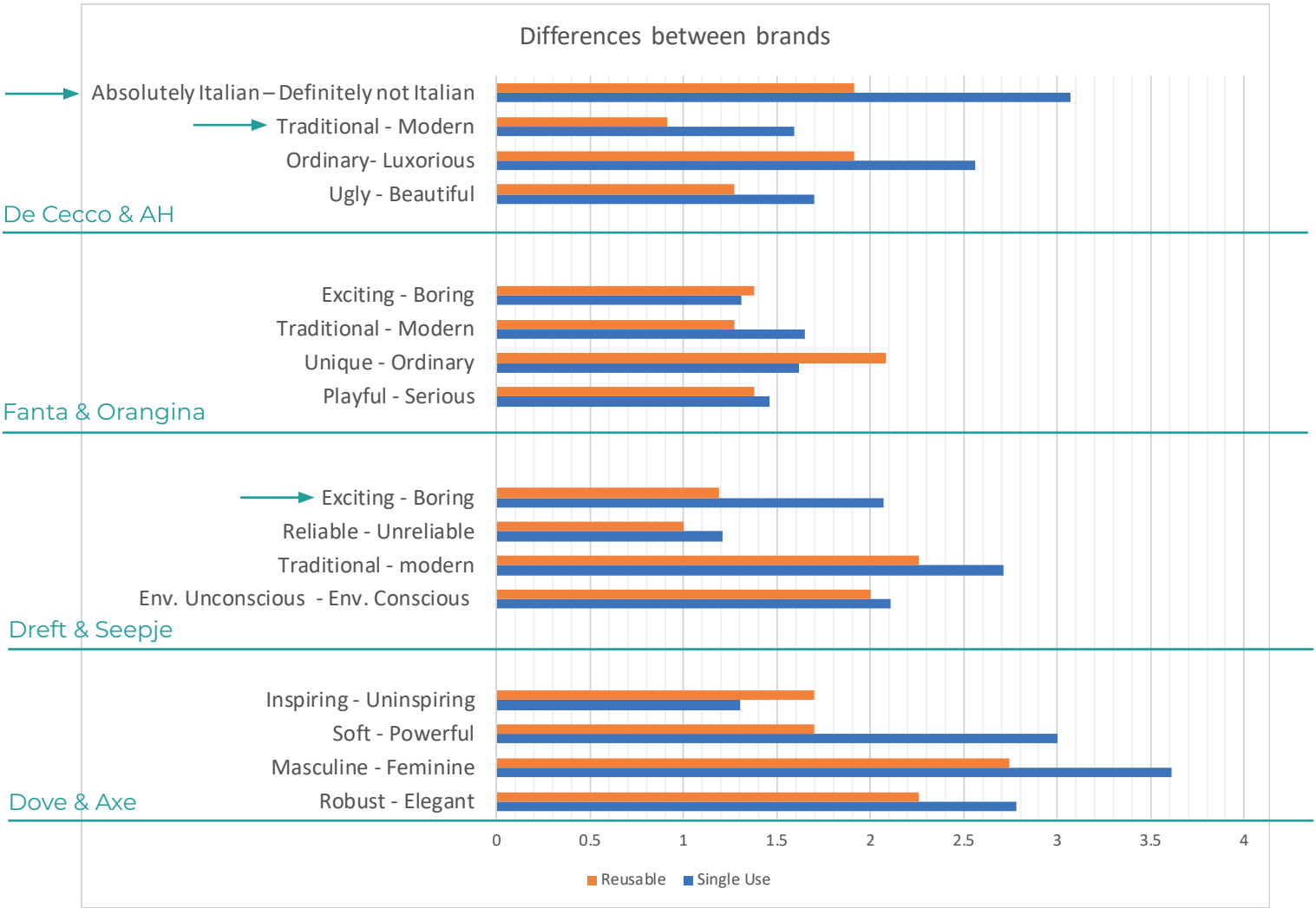


Figure 46: Results differences between brands, calculated by the absolute difference between the brand perception of two brands. The significant results are marked by an arrow.

5.3 Conclusion

The goal of this study was to answer the following research question: what is the effect of standardisation of FMCG packaging on the perceived quality, willingness to buy and brand perception? Based on the results, the following conclusions can be drawn to answer this research question. They are discussed per variable.

Perceived quality

The results indicate that **standardisation has no effect on the perceived quality** as for only one brand a significant effect was seen. This effect for the brand Axe indicated a higher perceived quality with standardisation which is even contradicting with the hypothesis (H1).

Willingness to buy

The data suggests that **standardisation may have an effect on the willingness to buy (WTB).** For both the pasta products (De Cecco and Albert Heijn) and body wash (Dove and Axe) the results were significant. However, **the direction of the effect is unclear** as for the pasta products the WTB decreased (a negative effect) and in case of the body wash, WTB increased (positive effect). The other brands showed a trend towards an increase in WTB, whilst this effect was not significant. These findings cause H2 not to be accepted.

Brand perception

It **cannot be concluded that standardisation has a negative effect on brand perception.** Only **four brands showed a significant effect,** with new perceptions moving away from their brand values (De Cecco, Fanta, Axe and Seepje). For Seepje and Fanta, their brand was perceived as less exciting (and more boring) and Fanta more serious which indicates that **standardisation creates a more boring brand perception** compared to having a uniquely shaped packaging. The shift towards more elegant and feminine packaging for Axe suggest that **brands that want to portray masculinity and robustness could have more difficulty** doing so when presented in this reusable packaging. Lastly, the results for the brand De Cecco suggest that **standardisation can have a negative effect for brands that want to portray themselves as traditional and/or authentic**. These findings are in-line with the hypothesis, however because of the limited amount of significant results H3 cannot be accepted.

Differences between brands

In most cases (87.5%) the difference between brands decreases, suggesting a trend of less differentiation due to standardisation. The analysis showed **few significant changes in the differences between brands.** However, because of the limited number of brands in this study, the conclusion that standardisation has a negative effect on the differences between brands cannot be made.

To answer the research question, standardisation does not have an effect on the perceived quality. Furthermore even though this study cannot prove the significance, standardisation does seem to have an effect on the willingness to buy, brand perception and differences between brands. The direction of the effect for WTB however was not clear. The next section discusses limitations, future research and the implications of this study.

5.4 Discussion

This study has some limitations. These include the reusable packaging design, selection of brands and products, and the amount of participants in the pre-study. These are discussed below, followed by recommendations for future research and the implications of this research.

Design reusable packaging

The first limitation has to do with the results of the WTB. For the WTB, both a positive effect (for body wash) and a negative effect (for pasta) was found. It can be discussed that the effect of a lower WTB for the pasta products was influenced by the design of the reusable packaging. Prior research (Simmonds et al., 2018) and a comment by a participant in the survey showed that in case of food, people prefer transparent packaging to see the product. More specifically, Simmonds et al. (2018) found that “transparent windows on product packaging can lead to increased willingness to purchase”. The reusable packaging in the survey was non-transparent which could have influenced the WTB. The design could be a confounding factor in these results. In future research, it is recommended that the reusable packaging allows the participant to see the product to get more accurate results.

This study was based on 2D images, which does not always provide the possibility for consumers to fully understand and interpret the design. Therefore, it is recommended that 3D designs are made and tested with consumers. This could also be done through virtual reality or augmented reality.

Selection of brands and products

Another factor that could have influenced the results is the use of existing, well-known brands. This caused participants to have prior knowledge and attitudes towards these brands. One could reason that using real brands is closer to the reality as in practice the reaction of consumers would be on these same brands instead of fictive ones. However, using existing brands could have made the results less objective and too specific for these certain brands. Therefore, if this research was to be performed in the future, it would be recommended to use fictive brands. Furthermore, because of the limited number of brands in this study, the conclusion that standardisation has a negative effect on the differences between brands cannot be made. In addition, the product categories that were used in this study was limited and the results can be influenced by these products. Therefore, it is recommended that future research studies more brands and product categories.

Number of participants

The small number of participants in the pre-study is also a limitation. Because of a time constraint, the decision was made to start with the main study and work with the 9 responses on the pre-study. Normally, this number of responses is not sufficient to draw clear conclusions, however because this was a pre-study this number was neglected.

Recommendations for future research

There is much unknown about the effect of standardisation, therefore this study suggests some future research. This study did not incorporate the deposit or a higher price for the reusable packaging. However, in real-life this could influence consumers' responses and therefore the success of reuse. Therefore it is recommended that this is incorporated in future studies. There is a possibility that there are other factors that influence the effect of standardisation, and that could explain the results found in this research as well. These findings could give very helpful insights into the effect of standardisation and be used in the developments of reusable packaging and consumers' reactions. Therefore, it is suggested that more factors of brand equity and consumer perception are tested with the effect of standardisation. Furthermore, this study showed that standardisation could have a negative effect on brand perception, which indicates that marketeers or future research should delve into marketing strategies or techniques to mitigate or prevent this effect by maintaining their desired brand image. Lastly, the differences between brands was only tested on a very small scale and comparing only two brands. It would be interesting to see what the results would be if consumers were presented shelves full of similar looking designs.

Implications

This study offers intriguing insights into the impact of standardisation on factors that can influence the transition from single-use to reuse. It is not possible to determine whether standardisation has a negative or positive influence on the transition from single-use to reuse, as both effects were observed, and further research is necessary to identify more significant results. The findings on perceived quality are positive for the transition to reuse. The findings on WTB are both positive and negative. The findings on brand perception are also positive and negative, as there were minor significant results, whereas all the results that were significant were negative for the transition to reuse. Furthermore, a trend was found towards less differences between brands, which does not support standardisation from a marketing perspective. This study provides a new step towards the transition and offers suggestions for future research.

6. INTERVIEWS

This study consists of interviews with packaging and innovation managers of premium brands to get their insights on the design of standardised, reusable packaging and the transition to reuse.

INTERVIEWS

To gather details and rich qualitative data about standardisation of reusable packaging, interviews were conducted with innovation- and packaging managers of premium brands. Premium brands were chosen as it was expected that they were more concerned about their branding than supermarkets.

The goal of the interviews was to get insight into the practical sides of standardising reusable packaging and to learn more about brand owners' perspective on reuse.

The following research questions were set for the interviews:

1. Are brands open to using reusable packaging?
2. What are the barriers for premium brands to transition to reuse?
3. In what ways can premium brands safeguard their brand identity and recognition?
4. What is the origin of current standards and why do some have unique sizes?
5. Are there any other (negative) consequences of standardisation?

6.1 Methodology

The interview was semi-structured and consisted of two phases; the first phase was focused on the current state of brand's position in reuse, their type of packaging and their standards. The second phase asked the interviewees to think; questions regarding the effects of standardisation with regards to marketing, standards and the implementation of the reuse ecosystem were asked. Both phases focussed on technical standards and differentiation elements.

Prior to the first questions, the reuse system set as a scope for this research was explained and it was emphasized that the interview was about the design of the packaging and not the system. The total set up of the interview with all the questions (in Dutch) can be found in appendix G.

The interviewees were contacted via email. All were online meetings between 30-60 minutes.

Table 6: Interviewees

Function title	Brand
Packaging Innovation Manager	Cloetta
Innovation Manager	HAK
Packaging Technologist	Coroos

6.2 Results

Three people were interviewed over the course of two months, these can be found in table 6. For privacy reasons the data of the interviews will not be linked to the corresponding person.

Reflection

Before diving into the results, it should be noted that the structure of the interview was often not followed, because of the response of the interviewees. Overall, during the interviews it was necessary to push the interviewees into a positive mindset as most often answers were based on why something is not feasible or what aspects are difficult, instead of looking for solutions. In addition, some interviewees were more up to date on reuse than others. It seemed that the more experience an interviewee had with reuse, the more critical they were. Answers were then often linked to their experience, which can provide very specific, valuable insights, but this also caused interviewees to get stuck in only thinking of barriers and things that make reuse not possible. One can clearly see that reuse is a new subject and interviewees are still not sure about how to start this transition from single-use to reuse.

Even though the structure of the set up was not followed, enough information was found with regards to the research questions. The information is grouped per: barriers, reasons for differentiation and future perspectives. Finally, these findings will be linked to the research questions. The results start on the next page.

Are brands open to reuse?

All interviewees found that reuse is a promising method to get to a circular economy, one of the interviewees even found that reusable packaging is the only way to a circular economy, however there are several barriers.

Barriers

These barriers mentioned by the interviewees were both from the companies' perspective as barriers that they think would hold for consumers. It was mentioned that more sustainable packaging is more expensive and that this would lead to consumers having to pay more. Some interviewees were sceptical about **consumers' intrinsic motivation for sustainability;** if an alternative is less expensive, consumers will go for the cheaper product instead of the sustainable, more expensive product. A solution mentioned by one the of the interviewees would be that the reusable packaging offers a competitive advantage such as a better consumer experience. This was explained with the company LOOP, also discussed in the state of the art. LOOP has luxurious packaging which is not always more sustainable, but they focus on the consumer experience which makes it possible to make it more expensive, according to this person.

Costs are also a barrier for the companies. Two of the interviewees emphasized that it should be commercially attractive for brands to join the reuse pool, because similar to consumers, costs are very important and sustainability is not as intrinsically motivating as financial success. This could apply even more for brands that have shareholders. All interviewees mentioned that reuse has large consequences on the entire chain; **production lines and their quality checks** need to be changed, there are high costs and also the collection of empty packaging at supermarkets is mentioned as a barrier in the chain. Another interviewee mentioned a concern about the **supply chain**; what if retailers want extra products, how does one make sure that the amount of washed packaging is enough for your demand?

Lastly, it was mentioned that **legislation is needed** for the packaging world to change; as long as there is no legislation in place, nothing will happen.

Standardisation versus differentiation

Standards that are used nowadays by the brands are needed for efficient production and marketing. The marketing and costs are the main barriers for standardisation. One of the brands uses unique packaging for all their products while the other brands use both unique as uniform packaging. For the unique packaging, one of the brands mentions they differentiated their packaging because the product differed from their portfolio and was more of a luxury product: "How do I communicate to the customer that they have to pay 5x as much? You do that through the packaging".

History was mentioned as a driver for differentiation by two of the interviewees; a certain packaging is used for all these years and never changed. As time passes, new packaging is introduced **based on trends and changing demographics,** according to one of the interviewees. It is mentioned that nowadays, more portion packaging is desired which explains why there are for example jars of 100mL and 750mL. **Shelf space in the supermarkets** is considered a factor of differentiation; the diverse types of packaging that they have are optimized for the shelves in the supermarkets. Standardisation could negatively influence the shelf space and playing into the changing demographics.

One interviewee believed that **consumers will not care much for the type of packaging** if the usability requirements such as resealing are still met. This is also mentioned by another brand as they have a unique feature on their packaging which allows for easy handling by the consumer and they would not want to lose this feature because of usability reasons. Two brands mention that they would not immediately standardise their packaging as they are afraid that the standardised packaging could have **negative effects on brand perception, brand recognition and quality perception** They state that the standardised packaging should not change the perceived quality and that their brand should still be recognized. This is something that they find should be investigated; what happens and what is the impact?

"How do I communicate to the customer that they have to pay 5x as much? You do that through the packaging".

Future perspective

It was asked what would happen if the reuse ecosystem was in place and standardisation would be legally required.

One of the interviewees was **very sceptical** about this idea and believed that this would never happen in the Netherlands as no politician dares to implement this because it could make them unpopular and because of the lack of sustainable intrinsic motivation.

Furthermore, the interviewees were **not confident about to what level the standards should be applied;** National, European or worldwide. Setting up national standards is already hard enough, and creating European or worldwide standards is even more difficult. This is due to different legislation per country but also the level of recycling or deposit systems that are in place differs among uropean companies. One of the interviewees argued that it will not benefit the successfulness of the system to scale it up to such a level because of these challenges. However, interviewees agree that for large, international companies such as Unilever, it is highly impractical and costly to develop national standards.

Another aspect mentioned about the future of reuse was how the standards will be created. One interview thought that the **creation of the standardised designs will grow organically**; over time companies will ask for new volumes or formats and when there is enough demand for it to be profitable, a new packaging will become available. This is also how new uniform single-use packaging is introduced by producers nowadays. All interviewees think that the **transition to reuse will take many years and that companies will transition to reuse in phases.**

It is believed by one of the interviewees that if e-commerce scales up, many people do their groceries online, the packaging design does not need to stand out on the shelves so unique packaging is not as important. In addition, logistics and the consumer experience would benefit from this system as there is already an entire logistics system of delivering and returning in place.

It is argued that reuse is technically possible, however the effect on costs, environmental impact and adjustments should be carefully considered. The **importance of an LCA** was mentioned as this should prove that moving to reuse is in fact more environmentally friendly. Mainly for packaging that are optimized for their weight, to use as less material as possible, it is questioned whether the reusable packaging would be better. **Using all glass and metal is found not to be realistic** because of this reason and one should question if it can compete with a plastic pouch. The production and manufacturing of these materials have such high impacts which makes it hard to believe that the reusable packaging formats would be better. In addition, the durability of glass packaging can be a problem because of breakage.

It is thought that **retailers, legislators, and producers have to take the step to more sustainable options** as it is not believed that consumers will do so. Another interviewee thinks that **reuse is going to be pushed from retailers** as they have great power in the packaging world.

In addition one interviewee thinks that volume is important to make reuse affordable, “If everything stays in the niche corner, it remains expensive and it is difficult to make it attractive”.

“If everything stays in the niche corner, it remains expensive and it is difficult to make it attractive”

6.3 Discussion and conclusion

The interview study provided valuable insights into the perspectives and challenges faced by premium brands in the implementation of reusable packaging and standardisation. The study highlighted the reasons of differentiation, the origin of existing packaging standards, and the potential impact of standardisation on brand perception. While some brands emphasised the importance of unique packaging to communicate product value and maintain brand recognition, others expressed concerns about the potential loss of differentiation and brand identity through standardisation. It was mentioned that consumers do not always care for the packaging design, however reasoning for differentiation imply otherwise. Additionally, future perspectives on the implementation and transition to reuse were gathered. It is expected that the development of standardised, reusable packaging will happen organically based on demand by participants of the reuse pool and that it should be pushed by retail, legislation and/or producers. The study affirmed the technical feasibility of reusable packaging but emphasized the need for life cycle assessments (LCAs) to evaluate the environmental impact of different packaging materials and formats.

To provide a clear overview of the results, the research questions are answered in this section with bullet points.

Are brands open to using reusable packaging?

- All interviewees found that reuse is a promising method to get to a circular economy, one of the interviewees even found that reusable packaging is the only way to a circular economy
- A possible reinforcement for brands would be to prove that it is profitable.

What are the barriers for premium brands to transition to reuse?

- Costs; investments by companies and they stress that the reusable packaging should be reasonably priced as consumers will not pay more.
- Doubt of intrinsic motivation of consumers for sustainability
- Supply chain
- Legislation, this is considered essential for a change in the packaging industry
- Maintaining product quality
- Brand and quality perception
- Retain functionalities that consumers value

In what ways can premium brands safeguard their brand identity and recognition?

- This was not answered. There was one interviewee who mentioned that e-commerce will solve part of this problem as packaging design will become less important.

What is the origin of current standards and why do some have unique sizes?

- Marketing pushes differentiation to evoke certain values such as luxury, to compensate for the high price of the product
- History: A concept was made back in the days, some designs never change and others change their features over time, because of changing trends.
- Practical aspects; optimal shelf space and features that are either brand specific or provide usability benefits.

Future perspectives

- The importance of an LCA was mentioned, mainly for packaging that is optimized for weight
- E-commerce has the potential to upscale reuse in the future.
- Implementation of standardisation: There are doubts about the feasibility and effectiveness of setting up national, European or global standards because of legal and operational challenges.
- Transition to reuse: It is expected that the transition to reuse will take a long time and will be happen in stages while the collection of reusable designs will grow organically based on demand.
- Reuse should be pushed by legislation, retail and/or producers.

Limitations

This interview has some limitations. Clearly, one would prefer to talk with more brand owners to get more objective results. Another limitation is that interviews were only performed with brand owners, while the transition to reuse is a multistakeholder problem. The findings of the interview currently do not provide multi perspectives.

7. DEVELOPMENT

This research has performed many studies and gained a lot of knowledge on the design of standardised, reusable packaging from the sustainability, standardisation and differentiation perspective. Even though a final design of reusable packaging cannot be created, this chapter presents solutions to the main research question through visualisations of future perspectives and recommendations.

This chapter consists of two sections. Together, they provide future recommendations for how to design standardised, reusable packaging while taking into account market differentiation. The first section shows the final list of requirements and a design of standardised, reusable packaging for the product jam. The second section proposes and discusses two scenario's, on how reusable packaging can be placed in supermarkets to allow for differentiation and nudge consumers to buy reusable packaging.

7.1 CREATING REUSABLE PACKAGING

The final list of requirements can be used to design standardised, reusable packaging to allow for market differentiation and optimize consumer acceptance. In addition, recommendations can be given about what product categories are suitable to start with reusable packaging first. This section presents the the final list of requirements, recommendations for the first product categories for reuse and a design for reusable packaging for jams which presents the balance between standardisation, differentiation and sustainability.

Final list of requirements

The literature review presented a list of requirements from all three perspectives. The table from section 3.4 was complemented with the other requirements found in the literature, but also new requirements found from the studies. This resulted in the final list of requirements (table 7, next page). The new requirements are discussed below.

Brands need to stand out, be recognized and they want to create associations that resonate with their brand values. It became clear that more focus should be on the visual and verbal level. Therefore, the requirement was made that at least 50% of the surface area of the reusable packaging should be available for branding purposes. However, it should be avoided that brands create enormous labels as this could increase the environmental impact. To force brands to create a certain sized label, but also to protect the label during its life, edges should be added to the packaging to create a place-holder for the label (guided impact).

There are many requirements to optimize for the acceptance by consumers. As discussed in the literature, colours are currently used for many products to easily recognize products or flavours (milk chocolate= blue, dark = purple or milk=blue, yoghurt = green). For reusable packaging, this categorisation by colour should still apply. In addition, reusable packaging should match the typicality of the product category to avoid false expectations, as incongruence between expectations and product attributes can lead to dissatisfaction. Furthermore, if the product is visible in its disposable packaging, it should also be visible in the reusable packaging. The consumer study showed that this could have influenced the willingness to buy of the pasta. The case study showed that quantities of products should be taken into account when developing the standards. Therefore, the requirements were set to be based on the most commonly used quantities per product. Finally, consumers need to be educated about reuse and its benefits to ensure they understand how it works and to encourage them to buy the reusable packaging.

The first reusable packaging

In addition to the list of requirements, this research also produced a matrix that can be used to assess the ease of implementation of products (categories) for reuse (Figure 47). For example, low-hanging fruit includes flour, rice, tomato products, jams, herbs and peanut butter. On the other hand, products such as meat, cheese and single-serve ice cream are not recommended to start with for reuse. Another recommendation can be made regarding the design of the selection of reusable packaging. From the literature review, case study and interviews, glass and stainless steel were found to be the most promising materials for reuse. However, to avoid material scarcity, it is recommended that plastic reusable packaging should also be developed, although this was not desired. Then, based on the literature review, PP will be the most suitable material.

With the matrix and the final list of requirements, one can design standardised, reusable packaging with regards to market differentiation. This means a reusable packaging balanced for sustainability, standardisation and differentiation. To show what this ideally looks like, reusable packaging for jams has been designed. This will be explained in the following paragraphs.

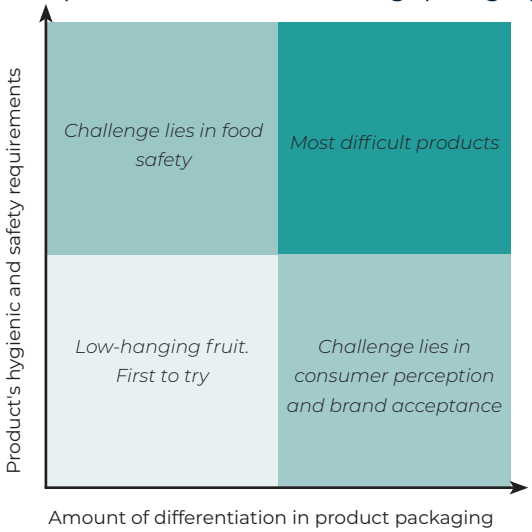


Figure 47: A ranking based on product requirements and level of standardisation to assess the ease of implementation for reuse.

Requirement
Recommendation
Condiseration

	Material	Shape, dimensions & closures	Appearance, tracking and labelling
Cleaning	• Non-porous material • Heat resistant up to 85-100 degrees C • Withstand wet cleaning • Chemical resistant • No plastic	• A smooth surface • No deep edges, grooves or narrow holes in the shape • Easy to (dis)assembly • Euronorm standards	
Logistics	• Lightweight • Pricing should be viable	• Stackable • Nestable • Anti-leakage after use • Suitable for existing deposit machines	• Integrate technology (RIFD)
Sustainability	• Recyclable Can be recycled into existing waste stream Can be recycled in itself • Material lifespan should reach break-even point • Responsible sourcing and production • Can be made from scrap material		
Safety	• Non-hazardous and harmful subtances (phthalates, bisphenols, styrene, perfluoroalkyl substances, percolates, etc.) • EFSA approved		
Branding (recognition and associations)			• At least 50% of the front surface area available for branding • Guided lines for label placement
Use by consumer	• Lightweight • Aesthetic • Scratch resistant	• Stackable • Nestable • Separate lid • Fit the typicality of the product category • Volume is based on the most common quantities per product (except portion sizes) • Universal lid • Anti-leakage	• Scratch resistant • Allow for categorisation through colours • Fit the typicality of the product category • Products that are visible in single-use packaging, should always be visible in reusable packaging • Information on how reuse works and benefits (educate consumer) • Aesthetic • Avoid transparency and clear white • Light colours Use patterns and prints

Table 7: Final list of requirements for designing standardised, reusable packaging.

Reusable packaging for jams

Jams were chosen as an example for standardised packaging as this product is considered low-hanging fruit, based on the ranking created earlier in this research. Jam has a low level of differentiation as it is most frequently packed in glass jars. While there is some differentiation in shape and size, compared to other products, jams have relatively standard packaging. In addition, jam does not have many safety requirements. As glass is currently used, this will also be the case for the reusable packaging. Lastly, the brands that sell this product have various graphic designs which makes it a good example to show the differentiation.

The design

Based on the list of requirements, a reusable glass jar was envisioned (figure 48). The jar has a metal twist off lid with a silicone liner on the inside. The cap is within the diameter of the glass jar, which makes it more efficient for transport. It was decided to create a round glass jar, instead of a square shaped one because this is easier to empty and it fits more within the typicality of the product. Two edges are added to the glass to create a place-holder for the label. This protects the label and forces brands to place their label within this area. The lid has been coloured orange with a white line to indicate that it is a reusable lid. On the backside of the label, there is a reuse logo presented to indicate to the consumer that this packaging is reusable. The label itself can be washed off during the cleaning process.

Figures 48 and 49 show the reusable packaging when used by multiple brands. They all use the same size label, but differentiate through graphic design (visual and verbal). The graphic designs are based on the single-use packaging (figure 49). In addition, different flavours of jams are recognizable by the colours and imagery used on the label.

Differentiation

One can see that all brands can still be distinguished from one another for this product category. All brands have their own way of standing out. Hero has a very striking colour that has a high contrast with their logo. This makes their packaging stand out from the rest. For Bonne Maman, their signature Gingham pattern (picnic pattern) of the lid is been put on the label as the lid cannot be customized. In addition, St.Dalfour has their unique colour, making them stand out as well. However, Jumbo does not have a large logo, signature colour or something recognizable on its single-use packaging. Jumbo is the private label of the supermarket, which could make it less important for Jumbo to stand out, it is already favourable over the rest because of its price.

Even though the label design is square shaped, whereas the brands use different shaped labels in their single-use packaging, the brands have the freedom to use multiple different cues on the visual and verbal level to differentiate.

Figure 48: Jams presented in the super-market. Single-use and reusable packaging are placed alongside each other.

Discussion

There are several limitations and considerations in this concept. First, as discussed in literature, elongated shapes such as the single-use packaging of St.Dalfour, can be perceived as sophisticated and expensive. With the new shape, it is possible that St.Dalfour will get a different brand perception. With the results from the consumer study, one cannot state that there will be no consequence.

In addition, Jumbo is not that recognizable, but they might have less urge to stand out because their jams are the cheapest. Therefore, consumers will eventually recognize the Jumbo packaging due to frequent exposure. However, to stand out even more, Jumbo might want to create more signature elements and present their logo bigger with reusable packaging.

Furthermore, this design has an orange lid with a white line, to indicate to the consumer that the packaging is reusable. This lid would become a signature for sustainable packaging. It should be guarded that brands will not develop similar lids to prevent green-washing as consumers might think that the single-use packaging is reusable.

Lastly, this design is now only developed for jams as this is a promising product for reuse. For other brands and products, this might not be as easy. Even more so, as more products will be considered, this glass jar might have to change to fit the other products. The list of requirements should help in this process. Designs should be tested and created to explore differentiation possibilities. Maybe more is necessary than a label design to help brands differentiate with reusable packaging. The next section discusses two scenario's on how the supermarket environment can be designed to help differentiation and nudge consumers to choose for reuse.

Figure 49: Reusable (top) packaging with graphic design based on its single-use (bottom) variant. Brands: St. Dalfour, Bonne Maman, Jumbo and Hero.

7.2 PRESENTING REUSABLE PACKAGING IN STORE

Based on the interviews, it is expected that reuse will be pushed from supermarkets and legislation. Legislation is necessary to set future goals and to keep brands accountable. From the interviews it was told that legislation is necessary for packaging technologists to come into action. However, legislation might not be enough. To bring reuse to the consumer and to scale reuse, supermarkets play a key role. From the interviews it became clear that retail has the upper hand in the packaging industry, which emphasizes this expectation. In addition, supermarkets have already shown that they see a future in reuse through their cooperation in the Reuse Roadmap 2030 and the Dairy use Moonshot (Het Versnellingshuis Nederland Circulair, 2024). Together, legislation and retail can push towards the transition to reuse.

For products that might have more difficulty in standing out, and to nudge consumers into buying reusable packaging, this section explores two scenario's on how reusable packaging can be presented in-store. Both a short-term and long-term solution are provided.

A separate reuse section?

When reuse will be introduced, it is expected that a certain % of al products will be packed in reusable packaging, this amount will grow over the years. These can be placed between the single-use packaging or reuse can get its own display. Both cases have their benefits and disadvantages. If reusable packaging were to be placed alongside the single-use packaging, the products are easily found by consumers. Whereas reusable packaging having its own display, consumers who are looking for a specific product will not walk to the reuse section, therefore missing the opportunity to introduce consumers to reuse. However, a reuse section makes it easy for consumers to find reusable packaging and have an overview of what products they can buy more sustainably. Hence, a display would only work when consumers go to the supermarket with the goal to purchase reusable packaging. As supermarkets are low-involvement environments where consumers generally make quick decisions, and with the findings of the interviews where the trust in consumers' intrinsic motivation for sustainability is lacking; it is not likely that many consumers will go to the reuse section. To persuade or convince consumers in buying reuse, it should be placed next to the single-use packaging, at the location that consumers will search for the product.

When reusable packaging is placed alongside single-use, there is the possibility that it will be harder to stand out as much as the single-use packaging, compared to standing out with an entire reuse section. On the other hand, brands with reusable packaging could highlight their difference with the single-use brands, creating a benefit as being perceived as sustainable and innovative.

Lastly, supermarkets nowadays have separate sections for gluten-free, vegan, and organic (bio) products which suggests that a separate section is a good way to present these type of atypical products to the consumer. However, these products have proven itself to the consumer, while reuse still has to be introduced.

Based on these advantages and disadvantages, it is believed that placing reuse alongside single-use will be the best decision. However, both cases are explored in this section to provide clear benefits and disadvantages.

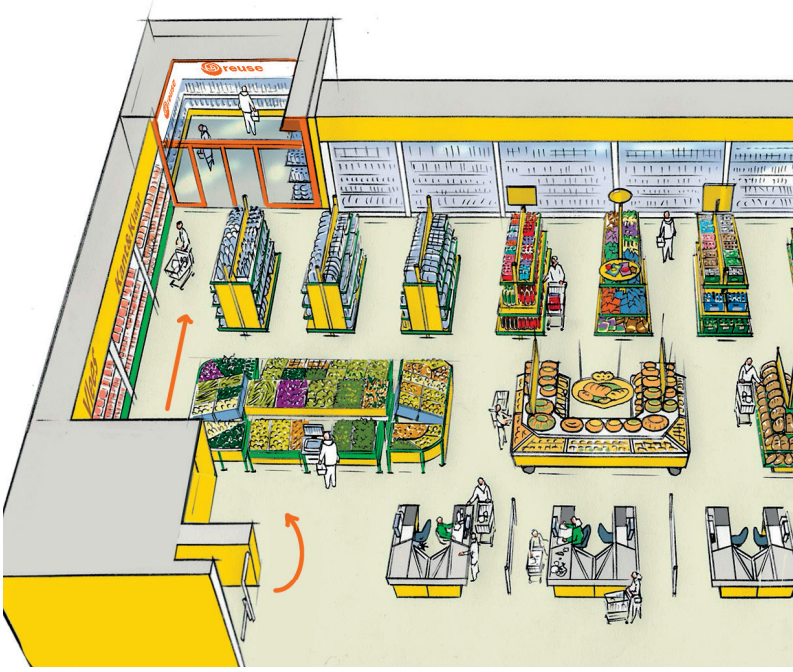


Figure 50: A supermarket with seperate reuse section (original drawing by Ron Offerman

SCENARIO 1

The first idea is closest to existing tactics of getting attention in supermarkets; using stickers and signs. This way, reusable packaging gets some more attention. This scenario is mainly focussed on getting attention for reuse, and less on creating brand specific associations. This idea works both for a reuse section as placing it along products.

Figure 51 shows what it would look like without a reuse section. Reusable packaging is highlighted, putting a focus on these products. In addition, the consumer should be educated on what reuse is and how it works, but also be persuaded or nudged into participating. Presumingly, reusable packaging will be more expensive and the consumer will have to pay (see interviews). Therefore, by use of extra information and advertisement, the consumer has to be convinced of the benefits or reuse. Figure 52 shows one way of doing so by hanging a flyer next to the products (information on the flyer is not extensively researched, and therefore purposely not readable in the picture).

Furthermore, the banners can also be made brand specific. This way, brands can differentiate themselves from the other brands and gain more attention on the shelves.

Figure 52 shows what it would look like for a reuse section In this case, the deposit machine is placed near to provide reuse all in one area, which can provide consumers with a better experience.

However, there are also disadvantages or limitations with this scenario. These are discussed on the next page.

Figure 51: Reusable packaging highlighted by banners on the shelves.

Discussion

For the reuse section, there is a risk that placing the deposit machine causes long waiting lines getting in the way of shopping customers. In addition, in this scenario, packaging has no other way of setting itself apart from other brands, besides the label as the reuse banners apply to all products.

For the case of no reuse section, one can see that placing a marker around the reusable packaging creates more visual stimuli, putting more focus on those within the square. This should trigger consumers to look at the reusable packaging first. In addition, brand specific banners can give brands more space for advertisement. Brands should take into account the colours of competitors and their own products, so they can choose a colour that stands out from the rest. With reuse scaling up in the future, one can wonder whether this idea will still work or if it might cause too much visual stimuli, creating a messy look of the shelves and loosing its effectiveness.

This scenario only shows one way of using stickers and banners, a very simple visual stimulus. It is expected that professional marketeers can think of more effective ways of presenting visual and verbal cues to persuade and educate the consumers.

This first scenario is the most basic idea, closest to existing initiatives. Therefore, this idea is very feasible, a short-term solution.

Figure 52: A seperate reuse section highlighted with banners and stickers.

SCENARIO 2

This research explained that with reusable packaging, more focus should lie on the visual (and verbal) level as differentiation on the structural level will not be possible. However, differentiation on the visual and verbal level is already widely applied by brands, so how can brands focus on these levels even more? As discussed in the state of the art, there is a standard beer bottle in the Netherlands. One can learn from how the different beer brands try to differentiate themselves. Figure 53 shows some brands that use the BNR. They have an outer packaging which creates a larger surface area that can be used to differentiate. This might be a good solution for other reusable packaging too. For beer, this idea of an outer packaging is logical as one buys multiple beers, however for other product types this might not be the case. Therefore, the design was made to allow brands to have a larger surface area, without consumers having to buy multiple products and to prevent using additional packaging material.

Figure 53: Beer bottles in the Netherlands differentiate with outer packaging.

A way to give more design space for brands, is to create moveable displays (figure 54 and 55). These are firm plaques that are placed in front of the packaging on the shelves. It is held together by magnets for example. Brands can use this space for their advertisement and it can be used to educate the consumers while consumers can find the products behind or beside the display. The type of advertisement could even be moving pictures or interactive displays in the future. These displays can be of different sizes, depending on the shelf space.

Figure 55: Moveable display alongside single-use packaging.

This is a step more extreme than scenario one and is more visible. This would give brands a lot of freedom to differentiate themselves in supermarkets.

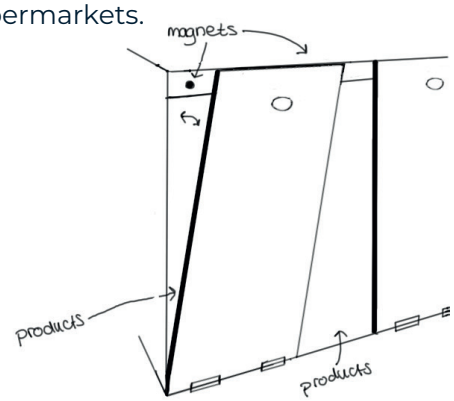


Figure 54: A drawing of how the moveable display works

Discussion

Supermarkets value every square metre of shelf space, yet the moveable display does not affect this. Instead, it allows brands a great deal of design freedom. This is a promising solution. However, it is important to ensure that consumers will not become overstimulated. If many brands use digital screens with their advertisements, this could create a very overwhelming shopping experience, which is neither desired by the retailer nor the consumer. Nevertheless, this concept necessitates a different setup of supermarkets, making this a solution for the long-term.

Other ideas

Further scenarios were explored with various technological aspects, including augmented reality, holograms and virtual reality. However, in these innovations, it became apparent that their integration might not offer the desired benefits.
One primary concern that emerged was the potential for these technologies to create an environment that could overwhelm and overstimulate customers. Instead, simpler, more straightforward approaches that prioritise clarity and effectiveness while minimising the potential for unintended complications were found to work better.

Conclusion

It is recommended that reusable packaging is placed in between the single-use packaging, at the place where the product belongs. This is preferred over a separate reuse section as consumers do not enter the supermarket with the intent to buy reusable packaging, but to buy a certain product. The reusable packaging should be where the consumer searches for the product, alongside the single-use packaging.

Scenarios were created with different solutions to differentiate standardised packaging. The best solution was found to be the moveable displays as this enlarges the area that brands can use to advertise while not taking up extra space. The first displays could be 2D images, but it can be experimented with digital screens in the future. However, over-stimulation by lights and moving objects should be prevented. Because this idea requires a different supermarket set up, this idea is a long-term solution. The first scenario, using stickers and information leaflets is a promising short-term solution for brands to stand out with their reusable packaging and to nudge consumers into buying their products.

8. WRAP-UP

This chapter summarizes and reflects on the entire research to answer the research questions, identify limitations and to form recommendations for future research.

8.1 CONCLUSION

To move towards a circular economy, reuse is found to be a promising but challenging strategy to lower packaging waste and therefore the environmental impact of packaging. Prior research on the design of standardised reusable packaging and its impact on branding was missing. The goal of this research was to find out how one designs standardised, reusable packaging while maintaining market differentiation. This entails finding the balance between standardisation, which is pushed by the reuse ecosystem, differentiation, coming from the marketing perspective and making sure the design is optimized for sustainability. This creates a triangular designer space of sustainability, differentiation and standardisation (figure 56).

Based on quantitative and qualitative studies focussed on existing literature, consumer perception of standardised designs, brand owners' perspective on reuse and a case study on tomato products, it became clearer how one could design standardised, reusable packaging, however no actual designs could be realised yet. Creating standards to design the most scalable reusable packaging was difficult as there is not one answer to this problem. This led to a shift in the focus of this research: less focus on standardisation for the reuse system, and more focus on the how to find the balance between standardisation and differentiation.

This research presented a solution that has found a balance between standardisation and differentiation in the format of a list of requirements and future perspectives. The final list of requirements was used to create a first reusable packaging design, presenting the ideal balance in the design space. In addition, future perspectives were created of how standardised, reusable packaging could be presented in supermarkets to (1) allow for more differentiation through visual and verbal elements, (2) nudge consumers into buying reusable packaging and (3) educate consumers about reuse.

Overall, this research aids the transition to reuse by providing solutions from multiple perspectives: marketing, sustainability and technical. It presents a future perspective on how the balance can be found between standardisation and differentiation while maintaining sustainability. Therefore, it is a valuable contribution to people and organisations who's goal is for reuse to become a reality and move towards a circular economy. In addition,this research presents many recommendations for future research. These are discussed in the following section.

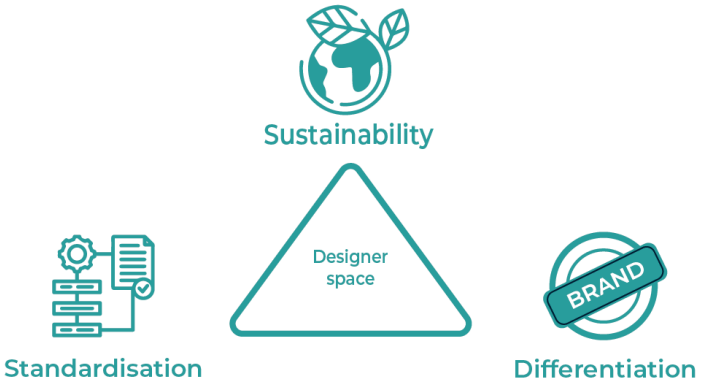


Figure 56: The design space for this research.

8.2 FUTURE STUDIES

From this research, it is evident that there is no straightforward solution to the question of how to design standardised, reusable packaging. Prior to this research, the objective was ambitious, and it was not anticipated that the research would be so complex. The complexity of reuse is also evident from the interviews. Those working in the field lack clarity on how to initiate this transition, and numerous barriers exist. This section describes the limitations identified from each perspective and provides recommendations for future research to facilitate the transition to reuse, a summary is presented at the end of this section.

The first limitation relates to the development of an actual packaging design. It was found that the technical area of creating the standards for reusable packaging is very complex. This is due to the interdependence of the reuse ecosystem and the packaging, with decisions regarding the packaging influencing the design of the reuse ecosystem and vice versa. Nevertheless, as there is not yet an existing reuse ecosystem in place, and the lack of consensus in the literature regarding standards such as dimensions makes it challenging to fully understand the interrelationship of these two elements. Additionally, creating standards with regards to sustainability proved to be a challenging task without the performance of a life cycle assessment (LCA) study. An LCA was not performed in this research as it required the definition of a well-developed reuse ecosystem, and the focus was shifted more towards the marketing aspect. The performance of an LCA based on numerous assumptions did not align with the time frame of this research and was deemed to be of lesser value than a more comprehensive investigation into the conflict between standardisation and differentiation.

To further develop in the technical domain of reusable packaging design, it is recommended that prototypes be created and pilot tests conducted to assess the real-world efficacy of different standardised packaging designs. One of the key considerations in the design phase should be durability, as this can significantly reduce costs and the environmental impact of the system. Furthermore, future designers should perform Life Cycle Assessments (LCAs) with these designs. This necessitates that designers make assumptions and iterate to ascertain which elements of packaging design or other factors influence the success of a packaging most. The products that will be used in this pilot must be carefully considered, but the ranking presented in this research could provide guidance in this process. It is recommended that products such as flour, herbs, and spreadables such as peanut butter, chocolate spread, and jam be considered for inclusion in a pilot. These product categories present low safety risks and low levels of differentiation, making them suitable for initial testing. Additionally, the product-packaging ratio should be taken into account in this selection. It will be more challenging to create a lower environmental impact with reuse compared to single-use packaging that has been optimised to reduce packaging materials (flexibles, for example). The products with the lowest product-packaging ratio are the most promising candidates for reuse.

As previously stated in the literature review, there are numerous additional materials that could be considered for reuse. The materials Echovai, bio-PP and bio-HDPE were identified as promising options in the future, Therefore it is recommended that innovative materials such as these are also considered in future research. Furthermore, it is recommended that industry stakeholders collaborate to establish common standards and pool resources in order to make reusable packaging more efficient and cost-effective. Additionally, this would clarify how the reuse ecosystem and the packaging influence one another, simplifying the design of standardised, reusable packaging.

The second limitation is that the future scenarios and final list of requirements were not evaluated with brand owners and/or supermarkets. This was not possible due to time constraints. However, this should be done to iterate on the ideas. Furthermore, this research addressed many requirements based on the interaction with the consumer. However, this research did not test actual designs with consumers. It is recommended that future designs are always tested with consumers to improve its appearance, usability and to make sure that the design fits within the typicality of the product category. This will improve the acceptance of consumers, who are necessary for this system to work.

The third limitation of this research is that it primarily focused on a selection of factors that influence differentiation. Further research is necessary to investigate other factors that influence the balance between differentiation and standardisation. For instance, how can differentiation be achieved when the packaging is used for other product categories? This may alter consumer perception or result in other unintended consequences that could negatively impact the success of reuse. Finally, future research should investigate new marketing strategies and technologies or other factors that can help brands to express themselves more effectively with standardised packaging, in order to achieve an even better balance.

Although this research could not conclude with reusable packaging designs, it contributes to this goal and to the transition from single-use to reuse. It provides a more nuanced understanding of the conflict between standardisation and differentiation, which can be used for the development of reusable packaging.

Limitations

- No design was created due to the absence of a reuse ecosystem and the lack of a Life Cycle Assessment (LCA)
- The future scenarios and the final list of requirements were not evaluated with stakeholders
- Only a selection of factors that influence the balance between standardisation and differentiation was considered

Future studies

The creation and iteration of designs should be undertaken with the following objectives:

- Optimisation for durability
- Performing Life Cycle Assessments (LCAs)
- Testing the real-world efficacy
- Investigation of innovative materials
- Usability and acceptance testing with consumers

The first reusable packaging should be selected based on:

- The ranking of this research (differentiation and safety concerns)
- Consideration of the product-packaging-ratio

Other future studies:

- Creation of common standards by industry stakeholders
- Investigation of additional factors of differentiation and standardisation

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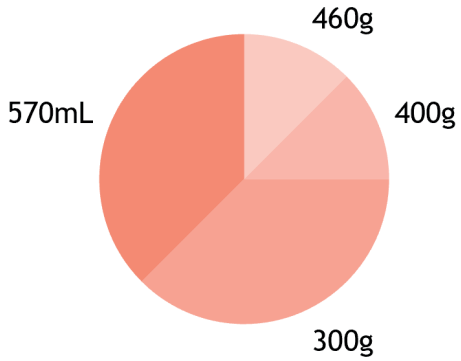
6. APPENDIX

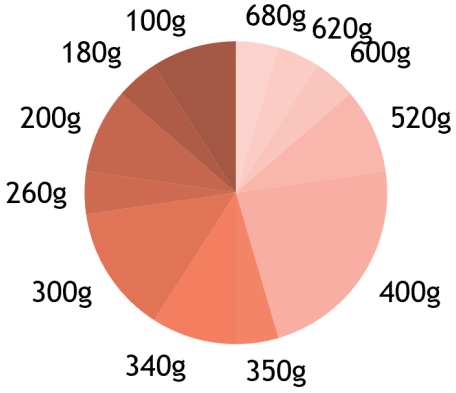
During the preparation of this work the author used Deepl, Adobe Firefly, Mendeley reference manager and Microsoft Word in order to improve writing language, manage references and to create images (front page and reusable packaging). After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the work.

APPENDIX A - Results case study

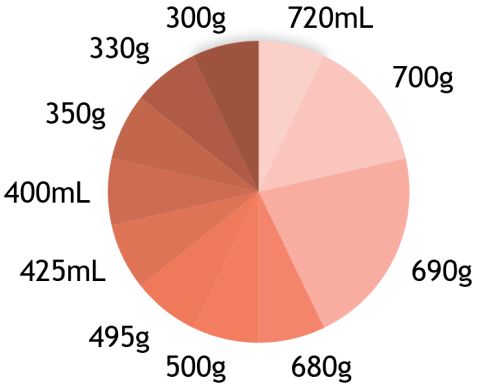
VOLUMES FOR LAMINATE SACK



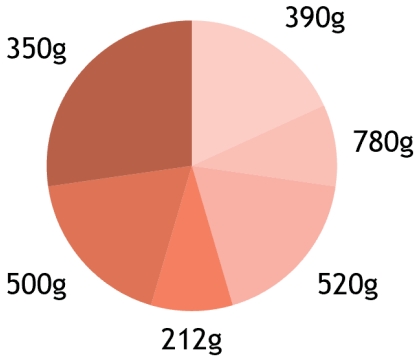
VOLUMES FOR GLASS JAR



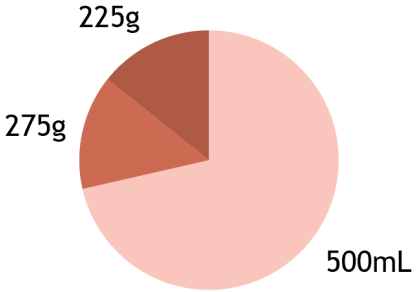
VOLUMES FOR GLASS BOTTLE



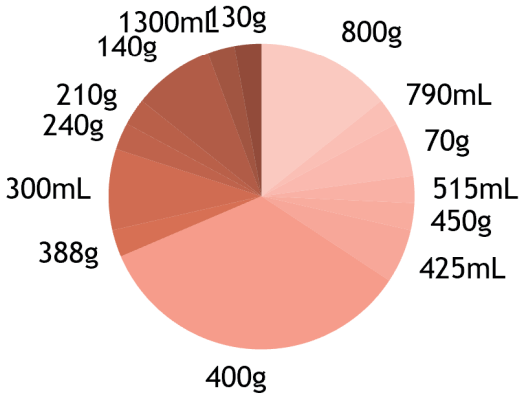
VOLUMES FOR MULTILAYER PACK



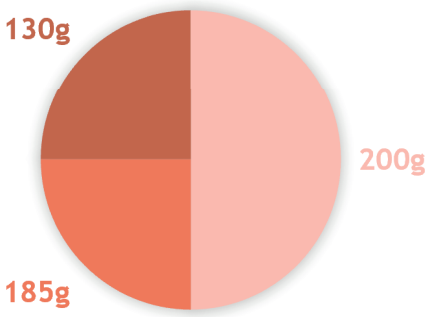
VOLUMES FOR PLASTIC CONTAINER



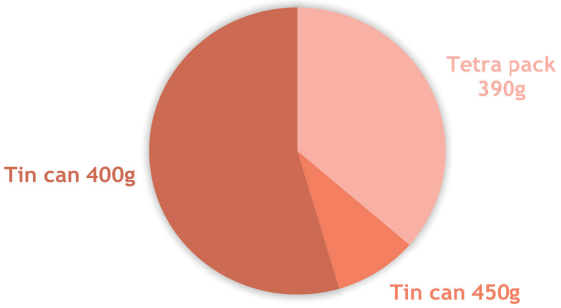
VOLUMES FOR TIN CAN



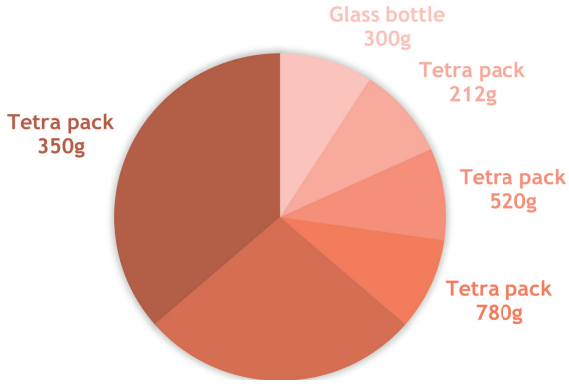
VOLUMES FOR TUBE



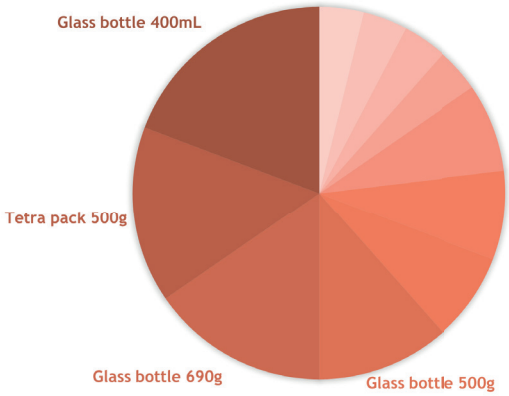
DICED TOMATOES



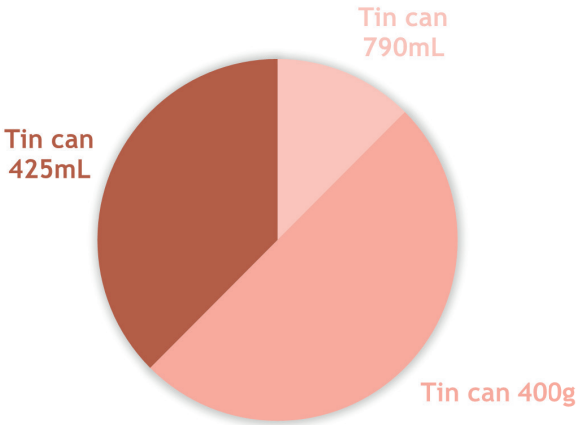
FRITO



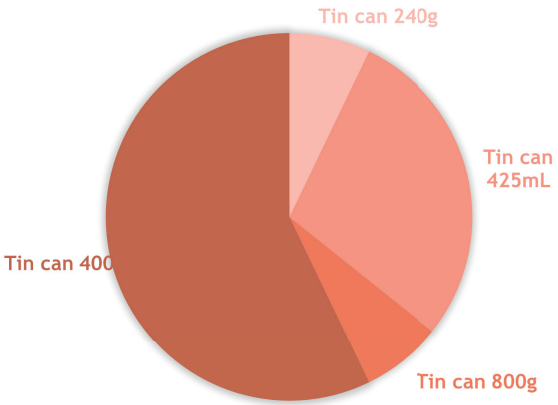
PASSATA



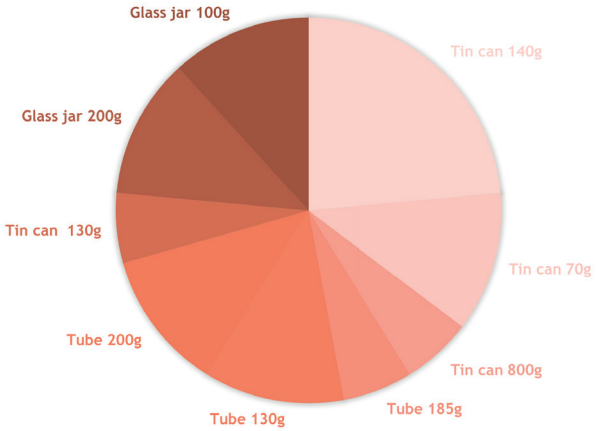
POLPA



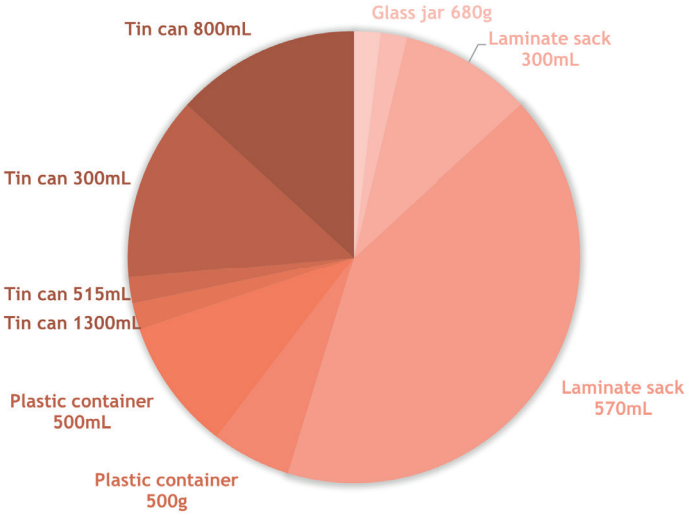
PEELED TOMATOES



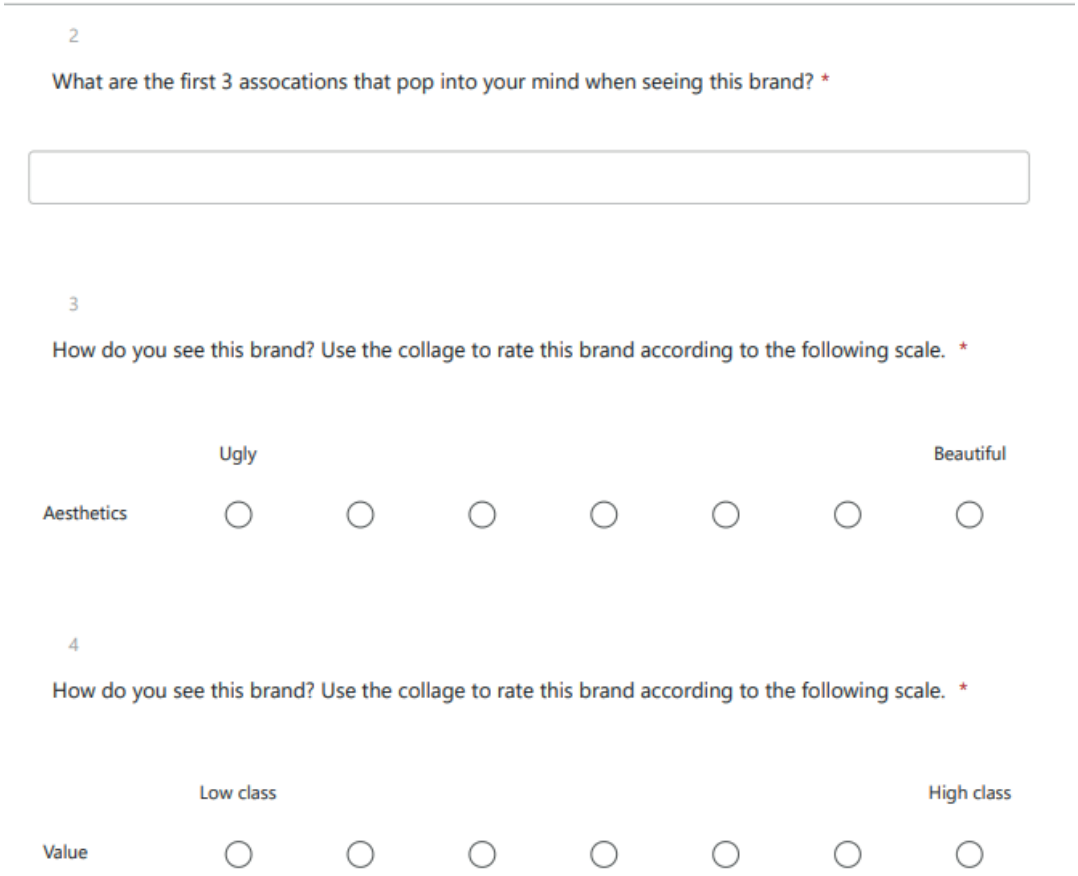
TOMATO PUREE



TOMATO SOUP



APPENDIX B - Questions pre-study consumer study



2

What are the first 3 assocations that pop into your mind when seeing this brand? *

3

How do you see this brand? Use the collage to rate this brand according to the following scale. *

	Ugly						Beautiful
Aesthetics	○	○	○	○	○	○	○

4

How do you see this brand? Use the collage to rate this brand according to the following scale. *

	Low class						High class
Value	○	○	○	○	○	○	○

Note: these questions differed per brandpair, for the other questions see this link.

How do you see this brand? Use the collage to rate this brand according to the following scale. *

	Ordinary						Luxorious
	○	○	○	○	○	○	○

6

How do you **feel about** this brand? Use the collage to rate this brand according to the following scale. *

	Exciting						Boring
Emotions	○	○	○	○	○	○	○

7

What do you think of the quality of this brand? Use the collage to rate this brand according to the following scale. *

	Clear						Confusing
Quality	○	○	○	○	○	○	○

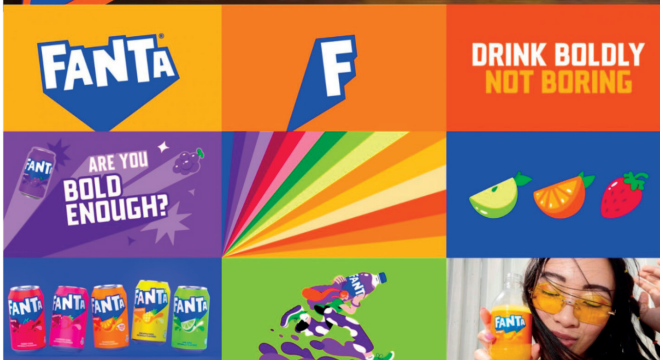
8

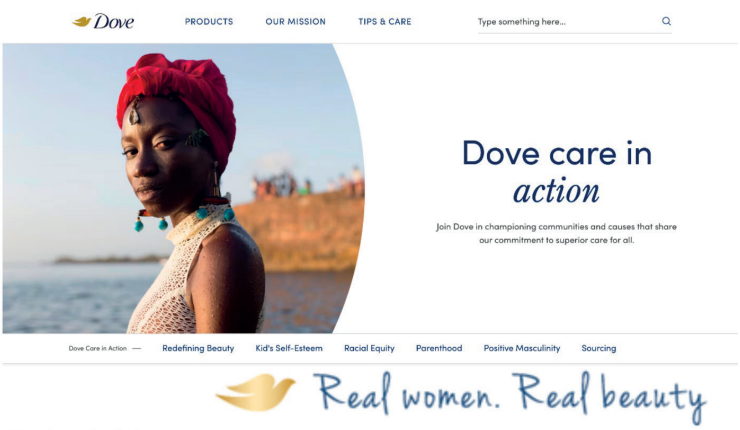
How do you see this brand? Use the collage to rate this brand according to the following scale. *

	Traditional						Modern
	○	○	○	○	○	○	○

APPENDIX C - Collages used in the pre-study

seepje
was je wereld schoner

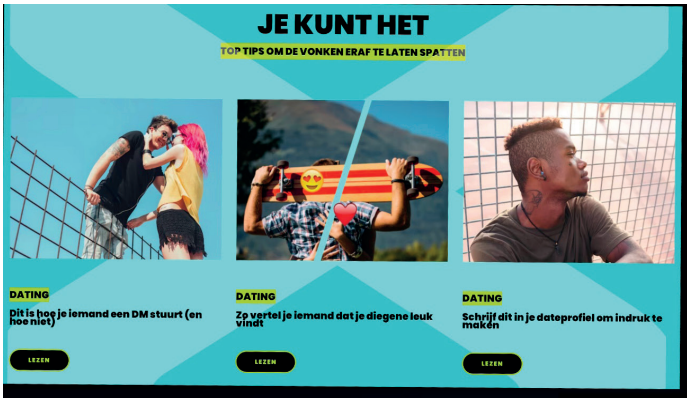




Real women. Real beauty

Dove

Dove
Let's Change Beauty



APPENDIX D - Survey questions consumer study

Informed consent

English (United Kingdom)

Informed consent

Thank you for taking time to answer this survey. This survey consists of 40 questions and will take approximately 15 minutes to complete.

The goal of this research is to determine people's associations with certain packaging designs and brands. The results of this study will be used for my master thesis on designing standardised reusable packaging.

Participation to this research is completely voluntary. Your age, nationality and gender will be collected and linked to your answers. No further personal data is collected. You have the right to decline participation and withdraw from the research at any time without any negative consequences and without providing any reasons. The consent applies until the finalization of my master thesis (approx. 07/2024)

If you have any questions, contact the responsible researcher: Linh Ho-dac, l.m.hodac@student.utwente.nl. If you have any complaints about this research, please direct them to the Secretary of the Natural Sciences and Engineering Sciences Ethics Committee at the University of Twente, P.O. Box 217, 7500 AE Enschede (NL), telephone: +31 (0)53 489 5607; email: a.m.klijnstra@utwente.nl).

'I hereby declare that I have been informed in a manner which is clear to me about the nature and method of the research. I agree of my own free will to participate in this research. I reserve the right to withdraw this consent without the need to give any reason and I am aware that I may withdraw from the experiment at any time. If my research results are to be used in scientific publications or made public in any other manner, then they will be made completely anonymous. My personal data will not be disclosed to third parties without my express permission. If I request further information about the research, now or in the future, I may contact Linh Hodac, l.m.hodac@student.utwente.

- ◯ I consent
- ◯ I do not consent

Information single-use and reuse group

Single Use group

Please read the following instruction carefully.
You will be presented with several supermarket products one by one, each from a specific brand and packed in single-use packaging. For each product, you will be asked to answer a few questions to provide your perspective on the product and its packaging. Each question will feature a 7-point scale with two contrasting values (e.g. feminine versus masculine). Choose a point on the scale that represents your opinion of the product's appearance and packaging.

For instance, if you perceive a product to have a more masculine appearance, you may rate it as a 6 on the 1 (Feminine) - 7 (Masculine) scale.

Reuse group

Please read the following instruction carefully.
You will be presented with several supermarket products one by one, each from a specific brand and packed in reusable packaging. This reusable packaging is standard and used by multiple brands which makes it a more sustainable option for customers. For each product, you will be asked to answer a few questions to provide your perspective on the product and its packaging. Each question will feature a 7-point scale with two contrasting values (e.g. feminine versus masculine). Choose a point on the scale that represents your opinion of the product's appearance and packaging.

For instance, if you perceive a product to have a more masculine appearance, you may rate it as a 6 on the 1 (Feminine) - 7 (Masculine) scale.

Questions regarding perceived quality

How do you perceive this product's quality?

Poor (1)	2	3	4	5	6	Superior (7)
○	○	○	○	○	○	○

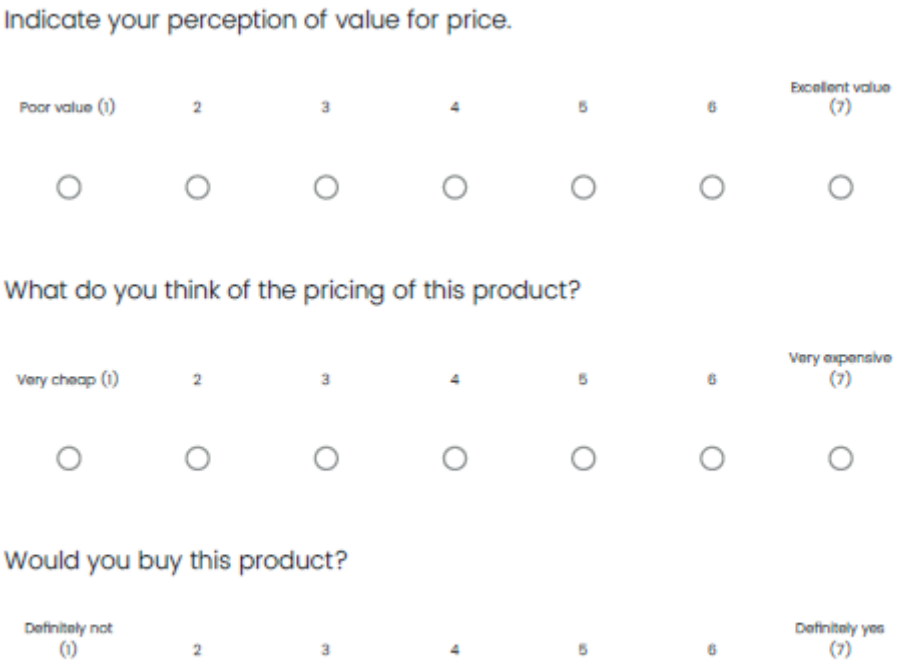
Does the packaging suggest a high-quality product to you?

Definitely not (1)	2	3	4	5	6	Definitely yes (7)
○	○	○	○	○	○	○

How visually appealing do you find the packaging?

Unappealing (1)	2	3	4	5	6	Appealing (7)

Questions regarding willingness to buy



Questions regarding brand perception.

Note: these questions differed per brandpair, for the other questions [see this link.]

APPENDIX E - Survey flow consumer study

- Standard: Informed consent (2 Questions)
- Branch: New Branch
  - If
    - If 'I hereby declare that I have been informed in a manner which is clear to me about the nature and... I do not consent Is Selected
- EndSurvey: Advanced
- BlockRandomizer: 1 - Evenly Present Elements
  - Group: Single Use group
    - Standard: Single Use group (1 Question)
    - BlockRandomizer: 2 - Evenly Present Elements
      - Group: SU Dishwashing liquid
        - Standard: Single Use Dreft (10 Questions)
        - Standard: Single Use Seepje (10 Questions)
      - Group: SU Body gel
        - Standard: Single Use Dove (10 Questions)
        - Standard: Single Use Axe (10 Questions)
      - Group: SU Soda
        - Standard: Single Use Fanta (10 Questions)
        - Standard: Single Use Orangina (10 Questions)
      - Group: SU Penne
        - Standard: Single Use De Cecco (10 Questions)
        - Standard: Single Use AH (10 Questions)
  - Group: Reuse Group
    - Standard: Reuse group (1 Question)
    - BlockRandomizer: 2 - Evenly Present Elements
      - Group: Reuse Dishwashing liquid
        - Standard: Reuse Seepje (10 Questions)
        - Standard: Reuse Dreft (10 Questions)
      - Group: Reuse Shower gel
        - Standard: Reuse Axe (10 Questions)
        - Standard: Reuse Dove (10 Questions)
      - Group: Reuse Soda
        - Standard: Reuse Orangina (10 Questions)
        - Standard: Reuse Fanta (10 Questions)
      - Group: Reuse Penne
        - Standard: Reuse AH (10 Questions)
        - Standard: Reuse De Cecco (10 Questions)
- Standard: Manipulation check (2 Questions)
- Standard: Demographics (7 Questions)

APPENDIX F - Results consumer study

Brand perception

De Cecco				
Adjectives	**Single Use**	**Reusable**	**F**	**P-value**
Ugly - Beautiful	M= 4.56, SD=1.34	M=4.09, SD=1.51	1.30	0.260
Ordinary- Luxorious	M=4.59, SD=1.47	M=4.18, SD=1.53	0.91	0.345
Traditional - Modern	M=2.78, SD=1.09	M=3.95, SD=1.21	12.8	<0.001
Real Italian – Definitely not Italian	M=2.67, SD=1.44	M=4.23, SD=1.72	12.0	0.001

Albert Heijn				
Adjectives	**Single Use**	**Reusable**	**F**	**P-value**
Ugly - Beautiful	M= 3.44, SD=1.22	M=3.36, SD=1.33	0.05	0.826
Ordinary- Luxorious	M=2.41, SD=1.39	M=2.73, SD=1.49	0.60	0.442
Traditional - Modern	M=3.78, SD=1.15	M=4.05, SD=1.56	0.48	0.493
Real Italian – Definitely not Italian	M=5.59, SD=1.37	M=5.95, SD=1.29	0.89	0.349

Fanta				
Adjectives	**Single Use**	**Reusable**	**F**	**P-value**
Playful - Serious	M= 2.62, SD=1.30	M=4.04, SD=1.08	18.51	<0.001
Unique - Ordinary	M=4.04, SD=1.64	M=4.73, SD=1.37	2.73	0.105
Traditional - Modern	M=4.0, SD=1.36	M=3.38, SD=1.13	3.15	0.082
Exciting - Boring	M=3.69, SD=1.23	M=4.81, SD=1.06	12.33	0.001

Orangina				
Adjectives	**Single Use**	**Reusable**	**F**	**P-value**
Playful - Serious	M= 3.54, SD=1.39	M=3.19, SD=1.27	0.88	0.353
Unique - Ordinary	M=4.27, SD=1.66	M=4.42, SD=1.63	0.11	0.738
Traditional - Modern	M=3.12, SD=1.34	M=3.58, SD=1.14	1.80	0.186
Exciting - Boring	M=4.31, SD=1.52	M=4.20, SD=1.27	0.09	0.767

Dove				
Adjectives	**Single Use**	**Reusable**	**F**	**P-value**
Robust - Elegant	M= 4.96, SD=1.66	M=4.83, SD=1.27	0.09	0.77
Masculine - Feminine	M=5.30, SD=0.82	M=5.52, SD=1.08	0.59	0.450
Soft - Powerful	M=2.61, SD=1.31	M=2.35, SD=1.15	0.52	0.476
Inspiring - Uninspiring	M=5.00, SD=1.48	M=4.26, SD=1.32	3.20	0.081

Axe				
Adjectives	**Single Use**	**Reusable**	**F**	**P-value**
Robust - Elegant	M= 2.26, SD=1.39	M=3.09, SD=1.45	4.65	0.037
Masculine - Feminine	M=1.70, SD=0.82	M=2.87, SD=1.32	13.04	<0.001
Soft - Powerful	M=5.61, SD=1.16	M=5.09, SD=0.95	2.79	0.102
Inspiring - Uninspiring	M=5.70, SD=1.49	M=4.39, SD=1.41	9.32	0.004

Dreft				
Adjectives	**Single Use**	**Reusable**	**F**	**P-value**
Environmentally Unconscious - Environmentally Conscious	M= 3.71, SD=1.61	M=3.70, SD=1.64	0.0006	0.98
Traditional - modern	M=3.14, SD=1.48	M=3.48, SD=1.55	0.68	0.412
Reliable - Unreliable	M=2.64, SD=1.28	M=2.67, SD=1.27	0.005	0.945
Exciting - Boring	M=4.89, SD=1.23	M=4.70, SD=1.44	0.276	0.601

Seepje				
Adjectives	**Single Use**	**Reusable**	**F**	**P-value**
Environmentally Unconscious - Environmentally Conscious	M= 5.54, SD=1.26	M=5.26, SD=1.13	0.73	0.396
Traditional - modern	M=5.71, SD=1.05	M=5.15, SD=1.38	2.95	0.092
Reliable - Unreliable	M=3.14, SD=1.35	M=3.07, SD=1.21	0.04	0.843
Exciting - Boring	M=3.39, SD=1.34	M=4.11, SD=1.19	4.40	0.041

Differences between brands

De Cecco and AH – brand differentiation

Adjective	Single use		Reuse		F	P-value
	M	SD	M	SD		
Ugly - Beautiful	1.70	0.91	1.27	1.28	1.89	0.176
Ordinary- Luxorious	2.56	1.53	1.91	1.57	2.12	0.152
Traditional - Modern	1.59	1.31	0.91	1.02	4.01	0.051
Absolutely Italian – Definitely not Italian	3.07	1.52	1.91	1.57	6.92	0.011

Fanta and Orangina– brand differentiation

Adjective	Single use		Reuse		F	P-value
	M	SD	M	SD		
Playful - Serious	1.46	1.39	1.38	1.13	0.05	0.828
Unique - Ordinary	1.62	1.42	2.08	1.09	1.73	0.194
Traditional - Modern	1.65	1.44	1.27	1.00	1.25	0.27
Exciting - Boring	1.31	1.29	1.38	1.13	0.05	0.82

Dreft and Seepje– brand differentiation						
Adjective	Single use		Reuse		F	P-value
	M	SD	M	SD		
Environmentally Unconscious - Environmentally Conscious	2.11	1.75	2.00	1.69	0.05	0.818
Traditional - modern	2.71	1.94	2.26	1.53	0.93	0.340
Reliable - Unreliable	1.21	1.03	1.00	1.18	0.52	0.475
Exciting - Boring	2.07	1.44	1.19	1.08	6.66	0.013

Dove and Axe– brand differentiation						
Adjective	**Single Use**		**Reusable**		**F**	**P-value**
	M	SD	M	SD		
Robust - Elegant	2.78	2.26	2.26	1.25	1.03	0.317
Masculine - Feminine	3.61	1.44	2.74	1.63	3.68	0.062
Soft - Powerful	3.00	1.91	1.70	1.55	0.00	1.000
Inspiring - Uninspiring	1.30	1.33	1.70	1.52	0.86	0.358

APPENDIX G - Interview questions

Email contact

Geachte (heer, mevrouw.. achternaam, Beste [voornaam],

Mijn naam is Linh Ho-dac, ik ben student industrial Design Engineeringaan de Universiteit Twente en op het moment ben ik bezig met mijn afstudeeronderzoek. Ik doe onderzoek naar standaardisatie van herbruikbare verpakkingen voor FMCG's in opdracht van www.SUPZero.nl , een adviesbureau gespecialiseerd in Zero Waste oplossingen voor bedrijven. Ik zou graag met u in gesprek gaan over de transitie van single-use naar hergebruik.

De onderwerpen van dit interview gaan zowel over technische aspecten (standaarden) als marketing. Ik zou u graag interviewen over hindernissen en kansen die u ziet als het gaat om standaardisatie van supermarktverpakkingen en wat de veranderingen zouden inhouden voor uw bedrijf. Zo hoor ik graag meer over standaarden die belangrijk zijn voor uw producten en ook hoe in uw optiek we ervoor kunnen zorgen bij standaardisatie van verpakkingen dat merken onderscheidend en herkenbaar kunnen blijven.

Ik heb contact met u gelegd omdat ik het idee heb dat u mij het beste over deze onderwerpen kunt vertellen, maar denkt u dat iemand anders binnen het bedrijf mij hier beter bij kan helpen zou ik het waarderen als u mij met diegene kan doorverbinden.

De inhoud van ons gesprek zal ik geanonimiseerd, na uw toestemming, gebruiken als input voor mijn afstudeeronderzoek. Ik hoop dat u 30 minuten vrij kunt maken om mij te helpen bij mijn onderzoek. De resultaten deel ik graag met u in de vorm van mijn scriptie. Graag plan ik de interviews in februari en maart in. Deze kan online of in sommige gevallen fysiek plaatsvinden.

Ik hoor graag van u.

Met vriendelijke groet,
Linh Ho-dac
+31613993173

Introductie

1. Schets het reuse ecosysteem
2. Laat voorbeelden van verpakkingen zien (survey plaatjes)

Schets reuse ecosysteem

Stel je voor dat er een selectie aan standaard, herbruikbare verpakkingen bestaat. Alle supermarkten en A-merken in Nederland verkopen hun producten in deze standaard verpakkingen en delen deze verpakkingen met elkaar. Ze zitten samen in een poolsysteem. Dit houdt in dat ze gezamenlijk de verpakkingen bezitten en dus delen.

Voor de consument werken deze verpakkingen hetzelfde als de bierflesjes. Zij kopen een product, ingepakt in de winkel en na consumptie leveren zij de lege verpakking in dmv een ophaalservice of bij een emballage automaat. Bij aanschaf betaalt de consument statiegeld en bij terugbrengen ontvangen zij dit weer. Hierna worden de verpakkingen schoongemaakt en weer naar de vul en label-lijnen gebracht waarna het weer gevuld in de schappen komt te staan. Het is dus een ‘return’ systeem.

Bij dit systeem gebruiken dus verschillende merken, met verschillende waarden en visuele kenmerken, dezelfde verpakking. De verwachting is dat er mogelijkheid in differentiatie zit in het label ontwerp en wellicht de kleur van sluitingen/doppen. Maar wat voor effect heeft deze standaardisatie? Zowel op de marketing, gebruik en acceptatie.

Er zijn natuurlijk heel veel aspecten die invloed hebben op het succes van dit systeem zoals financieel en wetgeving. Vandaag wil ik het specifiek hebben over de standaarden en marketing.

Als er wordt gevraagd naar kosten: het idee is om de kosten gelijkmatig te verspreiden over alle stakeholders.

Vragen

Wat zijn hun barrières?

Algemeen

- Wat zijn uw grootste zorgen of barrières bij de verandering naar herbruikbare verpakkingen in dit systeem?
- Welke verschillende zorgen/problemen heeft u bij het idee van standaardisatie en dit reuse systeem? --> zorg ervoor dat je graaft naar alle antwoorden.

Marketing

- Wat is het onderscheidende vermogen van uw merk t.o.v. concurrenten? En hoe vertalen jullie dat in de verpakking? Bijvoorbeeld bij dit product (foto bestaande single-use verpakking)

Standaarden

- Hanteren jullie standaarden voor maatvoering in NL en internationaal?

(aanvullen met barrière standaarden, volume maten, kwaliteit, product specifieke eigenschappen zoals pompen)

- Waarop baseren jullie de huidige standaarden?

Laten nadenken

Marketing

- Wat voor effect heeft het standaardiseren van de verpakkingen op jullie verpakkingsontwerp? Toon een design van een herbruikbaar, gestandaardiseerde versie van hun product. Zorg hier ook ervoor dat je doorvraagt naar andere producten/merken van het bedrijf.
- Hoe zou u de marketing van uw producten aanpakken met deze gestandaardiseerde verpakkingen? Zijn er andere strategieën of media die u zou toepassen?
- Op wat voor manier zou u uw merkidentiteit kunnen waarborgen bij gestandaardiseerde verpakkingen?

Standaarden

- Stel dat de verzameling standaard verpakkingen bestaat uit verschillende materialen: glas, rvs, rigide plastic bijvoorbeeld. Hoe maakt u dan de keuze tussen deze materialen?
- Waar zouden de nieuwe standaarden volgens u op gebaseerd moeten worden?
- Zouden jullie als bedrijf uit de voeten kunnen met verpakkingen met alleen de volgende afmetingen: aanvullen met product specifiek kenmerkende maten. Voor frisdrank/zeep/groenten in blik zullen andere maten nodig zijn.
- Op welk niveau zouden deze standaarden het beste afgesproken kunnen worden?

Algemeen

- Stel dat dit systeem wettelijk verplicht wordt over 10 jaar. Wat zijn hiervan de gevolgen voor jullie? Wat zijn de stappen die jullie moeten ondernemen?

Tot slot

- Hoelang denkt u dat het kan duren totdat een eerste pilot aan herbruikbare verpakkingen volgens dit systeem in werking gaat?
- Hoe zou uw bedrijf bij kunnen dragen aan een snellere transitie naar hergebruik?