PERCEPTION OF CONSUMERS AND COMPANIES ON THE USE OF SUSTAINABLE PACKAGING IN THE GROCERY RETAIL INDUSTRY

Dissertation to Universidade Católica Portuguesa to obtain a Master's Degree in Communication Studies
Specialization in Communication, Marketing and Advertising

By

Marta Maria Baleiras Couto Torre do Valle

Católica Faculty of Human Sciences

September 2022

UNIVERSIDADE CATÓLICA PORTUGUESA

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ABSTRACT

Environmental concerns and the need to incorporate the concept of sustainability into everyday life, have led people and companies to search for eco-friendly ways and lifestyles. The use of sustainable packaging is one of these ways, which has led companies to work on the development of new materials, new shapes, reducing volume and transport, or packaging with multiple uses. Consumers behaviours also demonstrate an environmental concern that leads to more criteria choice of packaging or even the adoption of own packaging usage, namely when buying in bulk.

The grocery retail industry, due to the size, has been pioneers in incorporating these principles of sustainability into its business plan. In recent years in Portugal, private labels sold under the retailer´s brand have started to gain market share and are also incorporating these principles of sustainability. The perception that consumers and companies have of the more sustainable form of production and how this impacts consumer choice are recent areas of study. The present work intends to be a contribution to this analysis by studying both perspectives, consumers, and companies on the perception that each one has about the use of sustainable packaging in the grocery retail market.

The study on consumer´s perception was performed by quantitative methods applying an online survey and the analysis on companies´ perception on sustainable packaging was carried out through in-depth interviews complemented with document analysis. The results gathered suggest that most consumers and companies are aware of environmental sustainability, perceive it as an on-going development, with results already achieved. Both are aligned with sustainability criteria, but there is still room for improvement, both in consumer behaviour and in corporate communication.

Key Words: *Sustainable Packaging; Perception; Consumer's behaviour; Company's strategy;*

RESUMO

As preocupações ambientais e a necessidade de incorporar o conceito de sustentabilidade na vida quotidiana, tem levado consumidores e empresas a procurar formas e estilos de vida *eco-friendly*. Em particular, a utilização de embalagens sustentáveis tem pressionado as empresas a reconsiderar os processos existentes, como o desenvolvimento de novos materiais, novos formatos, redução de volume e transporte, ou embalagens com múltiplos usos. Relativamente aos consumidores, também tem sido demonstrada uma preocupação ambiental através da escolha mais criteriosa de embalagens ou mesmo a adoção de embalagem própria, nomeadamente na compra a granel.

A indústria do retalho, pela sua dimensão, tem sido pioneira na incorporação destes princípios de sustentabilidade no plano estratégico da empresa. Nos últimos anos, em Portugal, as marcas próprias, vendidas sob a marca do retalhista, começaram a ganhar mercado e incorporam, muitas vezes, os princípios de sustentabilidade. A perceção que consumidores e empresas têm da forma de produção mais sustentável e como isso impacta a escolha do consumidor são áreas de estudo recentes. O presente trabalho pretende ser uma contribuição para esta análise, através do estudo das duas perspetivas, consumidores e empresas, na perceção sobre o uso de embalagens sustentáveis em geral e, particularmente, no mercado de marcas próprias.

O estudo da perceção do consumidor foi realizado por métodos quantitativos, aplicando um questionário online e a análise da perceção das empresas sobre embalagens sustentáveis foi realizada por meio de entrevistas complementadas com análise documental. Os resultados sugerem que consumidores e empresas estão conscientes da necessidade de sustentabilidade ambiental, compreendem-na como um desenvolvimento contínuo, com resultados já alcançados. Ambos estão alinhados com os critérios da sustentabilidade, mas há ainda campo para melhorias, quer no comportamento dos consumidores, quer na comunicação por parte das empresas.

Palavras-chave: *Embalagem Sustentável; Perceção; Comportamento do consumidor; Estratégia empresarial;*

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INTRODUCTION

Background

The lack of physical, biological, and chemical capacity to recover from environmental degradation as well as the need to defend environmental balance as a priority, were belatedly perceived by humanity (Duroy, 2005; Omoogun *et al.*, 2016). Sustainability is defined as the maintenance of welfare over an undetermined amount of time (Kuhlman & Farrington, 2010). The preservation of the environment has been increasingly worrying humanity, which has led to in-depth research on the subject in recent years. Around the 1960s, the environmental ideals became intense and from that time on, the awareness about it continued to grow (Duroy, 2005). Environmental awareness has grown to be a significant topic that affects different industries and enterprises with the power to reroute society and the economy in an environmentally beneficial direction (European Commission, 2020).

Grocery industry offers a wide range of opportunities to change current processes into more sustainable offers because of its complexity and relevance. Retailers and customers drive the industry to adopt more environmentally friendly business models (Ruiz-real *et al.*, 2018; Wang *et al.,* 2021). Food business has seen significant changes in recent years, and it is now under increasing pressure to decrease the environmental impact of its activities on both internal and external environments (Naidoo & Gasparatos, 2018). Retailers may play a significant role in promoting sustainable projects by persuading both consumers and employees to become more informed on and knowledgeable of environmental issues (Dal mas *et al.,* 2022). There is growing interest in the environmental impact of packaging as it represents an impressive utilization of materials, water, and energy use, producing considerable waste, pollution, and gas emission (Russell, 2014). At the same time, packaging plays an essential role in the industry as its main functions are containment, protection, convenience, and communication which can be interrelated (Robertson, 2005). Packaging important functions can limit and challenge the development of more sustainable offers (Sonneveld *et al.,* 2005).

The primary means by which human establishes cognitive engagement with the environment is through perception, which develops from an initial type of awareness (Efron, 1969). Additionally, it encompasses the interaction of stimuli and the relationship with memories

during the comprehension of the event as well as the development of a particular lens to view the environment through a filter of sociocultural influences (Mcdonald, 2011). Due to its special and subjective method, the perception of a phenomenon has a unique meaning (Efron, 1969; Mcdonald, 2011). In the perception of a company, the main responsibility of packaging is to be a differentiation aspect of competing products with encouraging innovative solutions to increase the effectiveness and efficiency of supply chains, through their design and innovation (Ambrose & Harris, 2017; Olander-Roese & Nilsson, 2009). Regarding the perception of consumers, packaging enables effective offers with the necessary security, while enabling the identification and recognition of products and brands, as well as differentiation from competitors (Zekiri & Hasani, 2015; Gómez *et al.*, 2015). In case the packaging is well designed and efficient, when a consumer is visualizing the supermarket shelves, one can easily identify a particular product and brand thanks to its unique characteristics (Hasan & Khan, 2009).

Problem statement

Considering the abovementioned, the current dissertation aims to add value to the ongoing research and to the growing consciousness of environmental concerns, namely the need to incorporate the idea of sustainability into daily life, which has led individuals and businesses to adopt more ecologically friendly practices and ways of living. An illustration of this is the use of sustainable packaging, which has prompted businesses to develop new materials, new shapes, decrease bulk and transport, or create multipurpose packaging. Due to the magnitude of its operation, the grocery retail industry has been a trailblazer in adopting these sustainability concepts into its business model, which assumes a crucial position as the primary source of household purchase. Private labels offered under the retailer's name have started to acquire market share in recent years, competing with factory brands and introducing these environmental concerns into business. Recent research has focused on how companies and customers perceive sustainable packaging from private label products in the grocery retail industry and how this affects consumer choice. The present work will be a contribution to the study of consumers and companies' perception on the use of sustainable packaging in the grocery retail industry in Portugal and will compare own brand and private label.

To respond to the research problem, the data collection techniques will be mixed methods. For the analysis of the perception across a wide range of consumers profile, an online survey will be carried out aiming to identify potential common and different perceptions about sustainable packaging. The qualitative methods will incorporate semi-structured in-depth interviews and document analysis and aims to study the main portuguese companies from the grocery retail industry. Semi-structured, in-depth interviews will allow a pre-determined set of open-ended questions, with a range of questions arising throughout the interview. The present study will also complement the in-depth interviews with an analysis of the documentation in order to guarantee a study of market main players, with a deepen analysis of interviewed companies.

Research objectives

The present dissertation intends to contribute to existing research and better understand what consumers and companies recognize as sustainable packaging and what are its criteria, namely, circular economy, resources used in its production and its recyclability. Moreover, it aims to study if consumers are more willing to pay for a product if it has a more sustainable package and if seek for more sustainable packaging according to the product category, either alimentary or non-alimentary. Additionally, it expects to analyse how consumer profile (age, income, purchase habits) impact the preferences on sustainable packaging. Regarding companies, it pretends to analyse if sustainable packaging is part of the company strategy in the grocery retail industry in portugal and if the company's perception towards a sustainable packaging varies depending on the product category.

Outline

The present dissertation is structured by the following chapters: (i) introduction; (ii) conceptual framework; (iii) empirical methodology; (iv) findings and discussion; (v) conclusion. The theoretical framework has three chapters: in the first, the grocery retail sector is studied, its evolution and emergence of private labels, along with the concept of packaging, main functions and materials used. In the second part, the idea of perception is studied from both consumer and company perspective towards packaging, and finally, the third chapter focuses on the environmental sustainability awareness incorporated into sustainable packaging. In chapter III, the methods and techniques used in the investigation

are presented, namely online survey, semi-structured in-depth interviews, and document analysis. Subsequently, in chapter IV, the data collected is analysed and the results are discussed, and conclusions are drawn in chapter V.

I. CONCEPTUAL FRAMEWORK

CHAPTER 1 - GROCERY RETAIL INDUSTRY

The present chapter is divided into two main sub-chapters, the first one aims to describe grocery retail industry and the second one packaging of products. The first sub-chapter focuses on the historical evolution of this industry, the development of private label and its contextualization in the industry. The second part aims to better understand the concept of packaging and its functions. It will focus on packaging materials that can be used aiming to understand its main roles and advantages.

1.1. HISTORY AND EVOLUTION

Grocery retail industry undertakes an essential part as the main wellspring of food and household items at considerable variety and quantity (Keh, 1998; Lagorio & Pinto, 2021). This is a complex and very regulated business, incorporating store networking, request recurrence and times, robust strategies, and challenging prerequisites (Lagorio & Pinto, 2021). Retailing involves "all the activities in selling goods or services directly to final consumers for personal, non-business use" (Kotler & Armstrong, 2012, p. 574). Wholesalers focus on who purchase for reselling or business use (Kotler & Armstrong, 2012).

Throughout the years, supply chains had become more automated and efficient, leading to better product availability and to better inventory management (Shaw, 1912; Salsberg *et al*., 2017). Nowadays, grocery retail industry offers an important refined and streamlined consumer experience. According to Salsberg *et al*. (2017), to better understand todays' innovation on grocery retail sector, it is useful to distinguish the preceding ages of modern retail. In an initial stage, consumer would purchase the groceries immediately withinside the source and would see it before buying it (Shaw, 1912). Consumer would go directly to producer's place, depending on what one would want to buy. For example, to buy milk, eggs and rice, the consumer would go to a dairy, poultry, and rice farming, respectively. Grocery store started to spread with the concept of going to a unique store and being able to purchase various products at once.

In grocery retail industry, Piggly Wiggly was a revolutionary and influential innovator who proposed the first self-service grocery store at the beginning of the 20th century, which Salsberg *et al.* (2017) likewise called Retail 1.0. birth of modern supermarket. In September 1916, Saunders opened his first Piggly Wiggly self-carrier shop characterized by its innovative system which enabled consumers to pick easily from open shelves each product that was price-marked and the consumer could carry it until the available checkout stand (Freeman, 2018; Salsberg *et al.*, 2017). As reported by, when consumers choose each product from the shelves, packaging and brand recognition starts to become critical for manufacturers (Salsberg *et al.*, 2017). In 1917 Piggly Wiggly Corporation patented the successful mechanism which was broadcasted at high speed and impacted the improvement of grocery retail industry (Salsberg *et al.*, 2017). By the year 1923, Piggly Wiggly chain has already sheltered 1,268 shops and turned into the third main retail grocery commercial enterprise withinside the nation (Freeman, 2018).

Some years later, in the year 1963, modern hypermarket emerged which Salsberg *et al.* (2017) defined as Retail 2.0: Hyper-size me. According to Carrefour's website, in the year 1960, the first Carrefour supermarket, testing French-style self-service in a smaller sales area, was opened before launching a more ambitious one (*Carrefour,* n.d.). In 1963, Carrefour opened its first hypermarket in Paris suburbs, inspired by U.S. first Walmart. (Salsberg *et al*., 2017). According to Carrefour's website, Carrefour's hypermarket was the first to open in France with its innovative characteristics at that time, namely, variety of products offered, low prices, considerable sales area (2,500m^2) and free parking areas (*Carrefour*, n.d.). The modern hypermarket was a distinctive transformation leading to gradational changes on the grocery sector, "in terms of space utilization, productivity, efficiency, and cost management" (Salsberg *et al.*, 2017, p.4). In the next years, modern hypermarkets were extended in France, Spain and throughout the world, including emerging markets (Salsberg *et al.*, 2017).

Through the emergence of the World Wide Web, companies had the opportunity to experience a new access (Turban *et al.,* 2018). The main grocery retail companies started to recognize the potential of online platforms as an additional channel to rise sales opportunities in different countries (Mkansi *et al.*, 2018). "Electronic commerce (EC) refers to using the Internet and other networks (e.g. intranets) to purchase, sell, transport, or trade data, goods,

or services" (Turban *et al.,* 2018, p.7). E-commerce brought a new perspective with the opportunity to purchase on the comfort from each customers' house and at the time they prefer (Mkansi *et al.*, 2018). Additionally, it can be done either business-to-consumer (B2C) or business-to-business (B2B) (Turban *et al.*, 2018). In 2021, the retail e-commerce number of sales reached a significant value worldwide, "approximately 4.9 trillion[1] U.S. dollars" (Chevalier, 2022, p.1). Jeff Bezos, who was the president and CEO of Amazon, noticed a great opportunity on internet and turn what could be an ordinary bookstore in a remarkable brand, Amazon.com (Salsberg *et al*., 2017). By 1997, Amazon.com was already a successful brand and e-commerce defined a new era of retail with other creations such as the eBay online marketplace (Salsberg *et al*., 2017). According to Coppola (2021), in 2020, Amazon was the leader on e-retailer in the United States with approximately 386 billion U.S. dollars net profit. In 2021, the worldwide e-commerce sales had a grow rate of 16.8 percent when compared to the preceding year, 2020, which englobed around 20 percent of the total of the global retail sales (Coppola, 2022). The e-commerce is expected to increase by 50 percent over the following four years, "reaching about 7.4 trillion[2] dollars by 2025" (Chevalier, 2022, p.1).

Grocery Retail Industry in Portugal

During the first years of the 21st century, Portugal was a promising country in grocery retail industry when compared to the rest of Europe (Dunnhumby, 2021). Due to pandemic of Covid-19 in the beginning of 2020, this situation has changed, as in the rest of the world. According to a report from INE (2022), in the year 2021 in Portugal, retail sales increased by 4.1%, comparing to the decreased of 3.3% in 2020, standing 0.8% above 2019. Regarding the annual average, in 2021, the variation in employment, wages and worked hours (gross data) was of 0.0%, 3.7% and 2.5% respectively (INE, 2022). As reported by Sonae MC (2022), in the year 2021 the volume of grocery retail industry in Portugal persisted increasing in a context of economic recovery and challenge to normalize consumption, despite the restrictions and an evident uncertainty related to the pandemic. According to ASAE (2021), in the 1980s, Private Label products started emerging in Portugal. Nowadays, Private Labels

[1] Corresponds to 4.9 million million (billion) according to the European Metric
[2] Corresponds to 7.4 million million (billion) according to the European Metric

represent 25% of the market and include a wide range of products – from food related to kitchenware, household cleaners, accessories, and pet supplies (ASAE, 2021).

The latest edition of Portugal Retailer Preference Index (RPI) from September 2020 concluded that most of consumers visit at least four supermarkets with moderately low spent, except for Continente and Pingo Doce with a share of wallet surpassing 25% (Dunnhumby, 2021). Even though Continente, Pingo Doce and Lidl command the market share, Portuguese grocery retail consumers are pleased to change supermarkets according to their necessities (Dunnhumby, 2021). Retail alimentary industry is generally recognized as a competitive sector as it englobes many, national and international, companies and different sizes, either hypermarkets, supermarkets, convenience, discounter, or online stores (Sonae MC, 2021). Portugal RPI study showed results on what influences the most in retailer preference of consumers, designing six pillars from its drivers (Dunnhumby, 2021).

Table 1 - Six pillar and respective drivers influencing retail preferences based on Dunnhumby (2021)

Pillar designation	**Description**
One-Stop-shop	Based on the following preference drivers: to have the precise diversity of goods; to enable buying everything at one supermarket; to propose an extensive range of biological or specific products; to be handy finding the goods
Pricing	Characterized by its lower prices compared to other retailers and to propose reasonable prices on biological and private label products
In-store Experience	Stands for a rapid and uncomplicated pay up, friendly employees, cleaned supermarket with a sophisticated aspect and environment
Promotions	Founded on user-friendly coupons on products that consumers usually purchase and to demonstrate how retailer takes into consideration its clients and compensate them from choosing it
Quality	Stands for offering quality and freshly goods
Own-label quality	Based on offering superior private label products

The study mentioned the brand Continente as the overall winner based on remarkable business performance with strong emotional connexion with their clients (Dunnhumby, 2021). Continente is well-known by its competitiveness and uniqueness value proposal,

which is mainly driven by its focus on innovation, fresh and quality of their products, distinguishable private label products, agility, and digital transformation, keeping in mind several Corporate Social Responsibility initiatives focused on nationality and zero waste (Dunnhumby, 2021; Sonae MC, 2021). Continente sustains its respectable position in consumer preferences with a solid path, marked by reliance and empathy (Dunnhumby, 2021; Sonae MC, 2021). Finally, environment, community and people are the three pillars of action of Continente (Sonae MC, 2021) which are within RPI study from Dunnhumby (2021) designed according to Portuguese consumers preferences.

Following closely to overall winner, the author highlights Pingo Doce, one of the Portuguese market brands that keeps increasing market share for the last years. Focused on its excellence private label products, strong promotional strategy, and emphasis on prices, Pingo Doce was able to obtain a growth of 4.6% in 2021 compared to 2020 which corresponds to significant 4.0 billion[3] euros in sales (Jerónimo Martins, 2022b). Pingo Doce focuses on three priority areas, namely, team recognition which involves the attribution of rewards and salary increases, consumer combining of campaigns that promoted loyalty, price leadership and support to national production, proposing superior private label products, which consequently may have contributed to the increasing weight of private label products on the total amount of sales (Jerónimo Martins, 2022a). Thus, Pingo Doce accomplishes the majority of what RPI study from Dunnhumby (2021) collected as Portuguese consumer´s preferences.

1.1.1. PRIVATE LABEL

According to the Private Label Manufacturer's Association, also known as PLMA (n.d.), private labels offer products sold under the retailer's brand or name created only by that retailer. The products merchandised under the label of a retailer are characterised by its lower price when compared to factory brands. Part of retailers offer branded private labels and may lack the power to enhance a recognized brand on their own (Keller *et al.,* 2020). Aiming to surpass this obstacle, retailers are increasingly integrating category-specific private label

[3] Corresponds to 4.0 thousand million according to the european metric

brands by "opening the umbrella" and integrating them under the same brand name (Keller *et al.,* 2020).

In the beginning, these products were of low-priced and lower quality when compared to other offers in the market (ASAE, 2021). However, from the 1990s onwards, private labels started to emerge globally, especially in Europe and United States (Lincoln & Thomassen, 2008) especially due to different trends, as follows:

a. Technological advance has made production process to became more advanced which then boosted private labels to became more relevant in the marketplace (ASAE, 2021).
b. Less social pressure when compared to previous decades and become more admissible to buy products from a private label without being concerned about losing social status (Lincoln & Thomassen, 2008).
c. Increasing the availability of private label products. When customers do not have their products at disposal, they easily shift among brands, emphasizing the decrease of brand loyalty, according to International Retailization survey done in 2005 by Lincoln & Thomassen (2008).

Regarding private label, most consumers are “price sensitive but not image sensitive, middle-income, and educated” (Ailawadi & Keller, 2004, p. 336). Private label products are particularly significant for low-income family budgets, as they can represent savings of around 30% for consumers (ASAE, 2021) giving “shoppers a choice of different qualities at different prices”, particularly in periods of economic crisis (Lincoln & Thomassen, 2008, p. 331).

Whereas a National Brand is an advertised brand and owned by a business whose focus is production, Private Label are owned by merchants and wholesalers that trade its products only in their stores (Call, 1967; Schutte, 1969). The type of products from Private Labels do not have a high degree of differentiation and remain available for a long time in the market (Call, 1967). Furthermore, products’ design is similar and can even have the same name in an extensive range product within the store, which surely reinforces recognition of the brand and possibly eases the customer decision (Ailawadi & Keller, 2004).

What started to be a more affordable alternative at an acceptable quality has now accomplished a better position in the market (Scaff *et al.*, 2011). Private label owners have been investing in the improvement of their products, namely gaining position in sophisticated markets (Scaff *et al.*, 2011). To enhance shelf availability, retailers organise and present different types of private labels' products according to consumer preferences aiming to rise their sales and incomes (Schnittka, 2015). The three categories are economy, standard and premium, also known as 'good, better, best' private labels (Geyskens *et al.*, 2018). Economy private labels, characterized by its lowest price and satisfactory quality, are more likely to be in a low-priced store satisfying the preferences of customer for affordable products (Geyskens *et al.*, 2018; Schnittka, 2015). Standard private labels are average quality options that evidently replicate recognized companies at inferior prices (Geyskens *et al.,* 2018). Premium private labels distinguish themselves by offering higher and exclusive quality - namely ingredients, flavouring, or packaging - and consequently, being part of a more sophisticated market (Geyskens *et al.*, 2018; Schnittka, 2015).

1.2. PACKAGING

Packaging aims to guarantee a protected travel, from the starting point until the time a product is consumed (Coles *et al.*, 2003; Marsh & Bugusu, 2007). This process takes into consideration the different phases that a product needs to go through – carriage, allocation, storage, and final consumption – and fragility of the product (Coles *et al.*, 2003). Meanwhile, packaging must consider costs, enhancement of societal and environmental awareness and severe guidelines on chemicals (Marsh & Bugusu, 2007). Food packaging focus on reducing expenses related to transport and distribution whereas enlarging sales, and consequently, incomes (Coles *et al.*, 2003).

The main role of packaging is to safeguard products from possible external effects and impairments, to cover food and to deliver the product with the advised properties (Coles *et al.*, 2003). As minor functions, packaging also aims to maintain product identifiable and distinguishable while respecting legislation, while trying to minimize costs and environmental impact (Marsh & Bugusu, 2007).

Packaging can help preventing product deterioration, especially food products, to preserve processing properties, prolong shelf life, and preserve quality and safety of the product

(Marsh & Bugusu, 2007). This protection can be against three different types of external traits: chemical, biological, and physical (Coles *et al.*, 2003; Marsh & Bugusu, 2007). Chemical changes can be generated by environmental effects, namely contact with gases, usually oxygen, humidity, or light. Plastic, glass, and metal are the most common materials used, with plastic container possibly the safest material with more permeable characteristics (Marsh & Bugusu, 2007). Packaging also protects against biological hazards by diminishing contact with microorganisms, pests, gnawers, and other animals, which ensures prevention of possible diseases, integrity, and smell transmission (Marsh & Bugusu, 2007). Finally, physical defence from possible shock, crush and tremor throughout transport and delivery (Marsh & Bugusu, 2007).

As Robertson (2005) presented, the main functions of packaging can be summarized into containment, protection, convenience, and communication which can be interrelated and reflected concurrently.

a) Containment: packaging is essential to contain the product which varies according to physic format which aims at avoiding spilling of product content and refrain from product loses as well as from damage or pollute the environment (Coles *et al.,* 2003; Robertson, 2005);
b) Protection: packaging of products can extend shelf-life and avoid damage from lacking protection, either on storage or transportation which have been named the main causes of food waste (Marsh & Bugusu, 2007); Packaging enables product protection from exterior effects as well as from outside possible damages to the product (Hellström & Saghir, 2007);
c) Convenience: in the last years, there have been some changes regarding suitability of food products (Robertson, 2005). Consumers are looking forward to having packages that allow them to be cooked or reheated and easily consumed during their different activities during the days, namely snacks, pre-prepared meals, or sauces (Robertson, 2005). To empower sales and be focused on satisfying consumer's needs, an important function of packaging is to invest on suitability and convenience (Robertson, 2005);
d) Communication: packaging is essential to provide information regarding legal requisites, ingredients, and usage procedure (Coles *et al.* 2003; Robertson, 2005).

> Packaging is the first impact that the product causes on consumer before buying it, consequently, a different approach on package through material style, figure, dimension, and colour can be part of brand communication and promotion (*Coles et al.,* 2003; Marsh & Bugusu, 2007). Packaging focus on cost and protection while following the marketing strategy of the company and if this alignment is evidently well-defined, packaging can become a competitive advantage by being distinguishable and pioneering (Scharpenberg, *et al.*, 2021). Packaging can be used as a marketing tool particularly when market channels have a considerable competition at the retail point of sale (Hellström & Saghir, 2007).

Packaging can still be classified according to its function in the logistics system with hierarchical levels, named primary, secondary and tertiary (Jönson, 2000; Scharpenberg, *et al.,* 2021). The system aims to distinguish the usual contact between the different levels of packaging and eases the comprehension of their interdependence (Hellström & Saghir, 2007). The primary packaging has direct contact with the product, the secondary packaging is designed to contain several primary packages and can be used in the shelf of the supermarket and tertiary packaging aims to group and carry several primary or secondary packages on a pallet or a roll container (Jönson, 2000). This packaging system can be illustrated into the following figure 1.

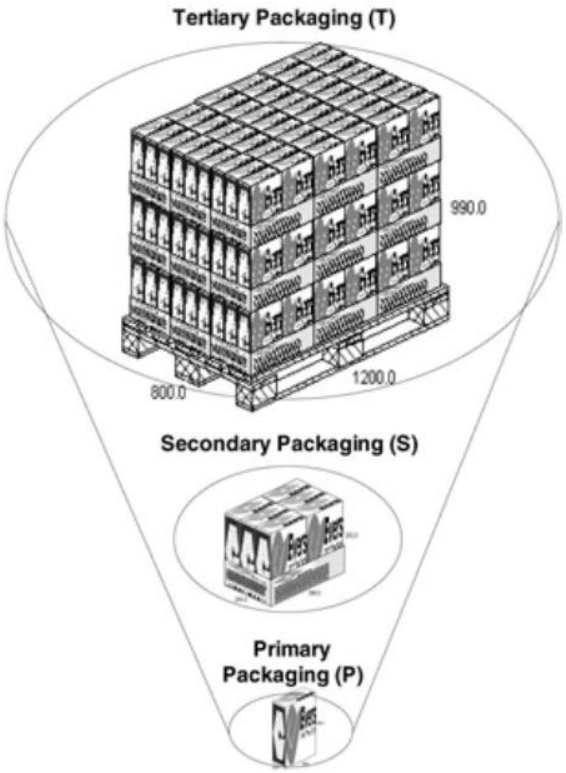


Figure 1 - Packaging system levels on Hellström & Saghir (2007)

According to previous research, this thesis will consider containment, protection, convenience, and communication as the main functions of packaging and will take into consideration primary, secondary and tertiary packaging, with special attention for primary since it can be the one impacting the most consumers perception.

1.2.1. MATERIALS USED

Packaging is continuously evolving due to development of innovative materials, expertise, and technologies (Coles *et al.,* 2003). The correct combination and assortment of packaging resources and technologies directly impacts preservation of excellence and freshness of the good during the long process from production to consumption (Marsh & Bugusu, 2007). Moreover, this incessant improvement aims to full fill basic requirements as maintainer of the product, but also to invest on efficiency of logistics process, to have an improved impact on environment and profitability (Coles *et al.,* 2003). Keeping in mind that a change in materials used might impact customer acceptance (Coles *et al.,* 2003). Nowadays, most of packages mix and encompass different types of materials: glass, plastic, metallic elements,

namely, aluminium, foils and seals, steel coated with tin, paper and cardboard, and different types of plastic (Marsh & Bugusu, 2007; Verma *et al.,* 2021).

Glass is one of the older materials to be used in product package for a wide range of goods, its manufacture includes a mixture of a melting agent with glass former and stabilizers (Marsh & Bugusu, 2007; Ojha *et al.,* 2015; Verma *et al.,* 2021). Due to its manufacturing process and ability to be shaped, glass can take an extensive variety of sizes and usage, corresponding to consumers preferences (Robertson, 2005). Glass packaging allows high resistance and appealing forms that can, possibly, be utilized for marketing strategies (Verma *et al.,* 2021). Moreover, it is inodorous, impermeable and preserves goods freshness and taste for a long time (Marsh & Bugusu, 2007; Verma *et al.,* 2021). Glass package allows transparency which in it turns grants customers to visualize product aspect (Marsh & Bugusu, 2007) and can be used for light-sensitive products by using coloured glass. Finally, it is advantageous regarding environmental concerns because it is reusable and recyclable (Marsh & Bugusu, 2007). On the contrary, glass has its disadvantages as the fact that it is a heavy material, which complicates transportation and increases costs, (Marsh & Bugusu, 2007), as well as difficulties concerning package closure (Robertson, 2005). Another critical aspect is on-going effort to produce thinner glass, to avoid heaviness, compression, crash, or temperature shock (Marsh & Bugusu, 2007).

Paper and cardboard materials are made based on a plant cellulose component from trees (Kirwan, 2003) and, through wool, hay, esparto, and woolen (Ojha *et al*., 2015). Part of its consumption in Europe goes for packaging either at the point of selling, storehouse and/or transportation (Kirwan, 2003). It is a thicker material and allows to explore different designs (Verma *et al.,* 2021). Paper packaging have been utilized in liquids and oily foods package for a long time until introduction of plastic package, when paper-based packages became less important and started to be replaced by other alternatives (Nechita & Roman, 2020). Recently, with strong anti-plastic and green – sustainable - packaging trends, paper seems idyllic with its benefits of high recyclability and biodegradability when compared with petroleum-based packaging (Nechita & Roman, 2020; Verma *et al.,* 2021).

Plastic is "made by condensation polymerization (polycondensation) or addition polymerization (polyaddition) of monomer units" (Ojha *et al.,* 2015, p.242). Plastic packages

are used several times due to its unique characteristics: flowability and manageability in certain circumstances which is useful to the design of package, usually chemically inactive, low cost, lightweight and different possibilities of transparency, colour, and endurance (Coles *et al.,* 2003). Plastic had become part of society lifestyle, providing feasibility, comfort, and safety (de Sousa, 2021). Nevertheless, along with this facility, plastic production has increased meaningfully around the world and had alert for non-negligible amount of plastic waste generated that threaten the balance of ecosystems (Andrady, 2003; de Sousa, 2021; MacLeod *et al.,* 2021).

Metal based packaging offers an outstanding "barrier to light, gas and moisture, recyclability, easy conversion into various shapes, ability to withstand high heating temperatures, rigid structure, transportation to long distances and unique decorating possibilities" (Deshwal & Panjagari, 2020, p. 2378). Metal is an advantageous material for package when it is necessary to block a chemical reaction, to resist processing and external conditions, to have easy opening and can be made from recyclable raw materials (Coles, 2003). Nonetheless, the main disadvantages of this material are higher price when compared to other materials, carbon dioxide release and toxic chemicals damaging, that negatively impacts environment (Deshwal & Panjagari, 2020).

Biobased

The intensive use of petrochemical-based polymers for food packaging has raised concerns regarding the environmental impact which in turn, has led to industry awareness of alternative packaging ideas, using various bio-based polymers (Peelman *et al.,* 2016; Porta *et al.,* 2022). Nowadays, especially for short-term storage packaging, the main materials used are derived from fossil fuels, which represent a severe environmental concern (Porta *et al.,* 2022). Thus, the expected path of packaging would be through renewable resources, preferably biodegradable, probably one of the largest changes in product packaging industry (Petersen *et al.,* 1999; Peelman *et al.,* 2016; Porta *et al.,* 2022). Biopolymer-based biodegradable product package resources can stand as an effective substitute for non-biodegradable plastics being a progression that will certainly accomplish their objective and offer outstanding outcomes (Ahmed, 2018).

The main challenges of bio-based package industry are to balance strength and endurance of packaging and product (Petersen *et al.,* 1999). The main challenge of these materials is to be biodegraded competently while having the same performance of the already used materials, keeping physic and chemical properties during food storage, transportation, and distribution (Mekonnen *et al.,* 2013; Petersen *et al.,* 1999). However, the urgency and advantages of biobased packaging on reducing negative environmental impact from the use of non-biobased materials have increased the interest on the study of diverse substitutes to surpass its obstacles. Restore from fossil fuel-based raw materials and decreasing greenhouse gas emissions can be a significant cost reduction and positive environmental effect (Weiss, 2012). Moreover, biobased materials encourage saving of non-renewable energy and the improvement of fertilizer administration leading to better farming practices (Weiss, 2012).

Bio-based packaging are made from materials arising from fully renewable sources, which means they must be biodegradable at the end of their life (Robertson, 2005). Bio-based materials are often confused with biodegradable materials, which can be fossil-based resources or a mixture of renewable and fossil materials, which must be fully degraded (Reddy *et al.,* 2013). Bio-based packaging aims to waste minimum quantity of material and energy e during product life cycle (Pandit, 2018). According to Wand et al. (2021), bio-based materials embrace bio-based polymers, nanomaterials, fibbers, and their compound (Table 2).

Table 2 - Main biobased materials used in packages, based on Wang et al. (2021)

Biobased Materials	**Example**
Polymers extracted from biomass	• Cellulose is an abounding biopolymer on earth, displaying significant mechanic and chemical properties (Ramos *et al.,* 2018; Wang *et al.,* 2021). This resource can be generated from agronomical wastes and fermentation using microorganisms, which makes it affordable (Ramos *et al.,* 2018); • Hemicellulose is employed from agricultural crop deposits or by low-value effluent, includes 20% of biomass of the majority of plants and it is an

	advantageous substitute for petrochemical (Arfin & Sonawane, 2018; Robertson, 2015); • After cellulose, chitin exists in great quantity, generated from exoskeleton of marine invertebrates and insects (Wang *et al.,* 2021);
Synthetic polymers from biomass monomers	• Polylactic acid (PLA) is the only melt-processable fibre made from an industrialised procedure with sustainable natural materials as cornflour, tapioca, or sugarcane (Pandit *et al.,* 2018); • Biopolyethylene (BioPE) is a relevant material owing to its affordable price, adaptability, chemical stability and as a substitute of petroleum-based material in large-scale applications such as containers, playthings, and housewares (Mendieta *et al.,* 2020);
Polymers produced by microorganisms	• Polyhydroxyalkanoates (PHAs) are fully bio-based and biodegradable, but it has some disadvantages as it is costly, with restricted volume of production, and it is opaque (Ramos *et al.,* 2018); • Bacterial cellulose is a costly material focused on biomedical area and more recently, on food industry (Azeredo *et al.,* 2019; Cazon & Vázquez, 2021). With remarkable characteristics as great clarity, flavour and colour change, adaptability to different shapes and textures (Shi *et al.,* 2014);
Biodegradable polymers synthesized from petrochemical mononers	• Poly(caprolactone) (PCL) is a developing biodegradable polymer that is idyllic for replacing traditional polymers due to its great compatibility with other polymers and miscible nature (Thakur *et al.,* 2021);

	• Poly (butylene succinate-co-adipate) (PBSA) has the tensile strength of polyester decreasing with the joint of the other element – adipate – making Polybutylene succinate PBS the polyester with the most elevated tensile strength (Iwata, 2015); • Poly (glycolic acid) (PGA) has unique features as excellent biodegradability and barrier properties, it is often used for complementing PLA (Jem & Tan, 2020);

Recycled Materials

New techniques for recycling trash, particularly packaging materials, namely paper and plastic, are entering the market as an effort to preserve the environment (Toniolo *et al.,* 2013; Triantafyllou *et al.,* 2007; Zhang & Zhao, 2012). Green packaging materials are those made from recycled materials that have the least negative environmental impact and have the highest usage rates over their entire life cycle (Zhang & Zhao, 2012).

Using recycled materials is the first step in reducing environmental loads and research improving environmental performance, ensuring that these are done in conjunction with certain additives that guarantee the finished product to be recycled (Toniolo et al., 2013). Replaceability of virgin materials is critical to environmental performance as measured by Life Cycle Assessment (LCA) (Huysveld *et al.,* 2022). Performance, economy, and environment must all be considered while implementing a sustainable development strategy (including resources, energy, environmental protection), securing the use of green packaging materials (Zhang & Zhao, 2012).

The basis of green packaging is green packaging material, which not only lessens the pressure on the ecological environment and decreases pollution, but also conserves or replaces some of the more expensive or scarce resources to reuse waste resources (Zhang & Zhao, 2012). Based on the use of packaging materials, environmental performance must be considered a key factor in sustainable development strategies (Zhang & Zhao, 2012). In several European nations, paper and board made partially or entirely from recycled fibbers

are already used in contact with specific foods (Triantafyllou *et al.,* 2007). The life cycle method, which is frequently used to assess environmental implications of recycling and can provide information to put environmental concerns into a wide context, can be used to support choices in the field of waste management (Toniolo *et al.,* 2013). The findings demonstrated the possibility for some pollutants of various sorts and volatilities to transfer to dry foods, for instance, rice, pasta, sugar, salt, and grain (Triantafyllou *et al.,* 2007). A fundamental set of safety requirements must be met by any products that are in contact with food, including recycled fibber-based paper (Triantafyllou *et al.,* 2007). This indicates that recycled paper used in food contact shouldn't cause component migration that might be harmful to people's health (Triantafyllou *et al.,* 2007).

Toniolo et al. (2013) studied how an advanced recyclable packaging is ecologically superior to a substitute that is not recyclable, considering that both are made from reusing post-consumer Polyethylene (PET) bottles. Transport of virgin PET, post-consumer bottles, and materials for packaging of the films are included within the system boundaries as well as treatment of post-consumer bottles to extrusion, package, and transport to the client warehouse (first screen, prewash, organisation, crush, wash, flotation, centrifugation, dry, and second screen) (Toniolo *et al.,* 2013). Post-consumer bottles are processed and recovered in a plastic film for food packaging for creation of both films (Toniolo *et al.,* 2013). For all the examined effect categories, package created using a recyclable mono-material film is more environmentally sound than the multilayer (Toniolo *et al.,* 2013). Nowadays, most plastics are mechanically recycled (MR), but chemical recycling (CR) is a newer technology (Huysveld et al., 2022). Huysveld et al. (2022) study confirms that Thermochemical Recycle (TCR) is a favourable recycling technology for household plastic waste. Thus, aiming to meet Europe increasing recycling targets by 2030, TCR could be a complementing advanced technology to nowadays dominant recycling process (MR), except for PET bottles.

Reusable Packaging

A decline in the use of recyclable packaging and an increase in the consumption of single-use packaging has emerged in recent decades, which has led to a significant increase in environmental challenge due to its material usage, trash generation, and littering, calling for a shift in this trend (Coelho *et al.,* 2020; Mollenkopf, *et al.,* 2005). Thus, some industries are already investing on reusable containers as a rising solution for growing environmental

concerns, particularly in Europe, due to tighter environmental legislation and an increasing awareness from corporate environmental responsibility (Mollenkopf, *et al.,* 2005).

Compared to single-use packaging methods, reusable packaging offers a significant opportunity to keep the product working, while enabling a significant reduction in material consumption and a reduction in harmful environmental effects (Coelho *et al.,* 2020). The use of reusable containers avoids the requirement for recurrent new packaging material, disposal costs, maximize transit cubic efficiency, while frequently decreases expenses associated with logistic operations (transportation and warehouse) and can also offer superior levels of product protection (Mollenkopf, *et al.,* 2005).

Reusable container systems must have a two-way flow system, which gives them a dynamic aspect, incorporating several usage, transposing, and merging actions, and the costs of many of these processes are determined by package features (Mollenkopf, *et al.,* 2005). This is not an innovative practice, it has long been used for a variety of purposes and is still prevalent in both B2B (Business-to-Business) that includes secondary or transport packaging, such as crates and pallets, and B2C (Business-to-Consumer) which includes primary packaging, for example, beer bottles (Coelho *et al.,* 2020).

Primary packaging that can be reused is a newer concept compared with secondary and tertiary packaging (Mahmoudi & Parviziomran, 2020). Reusable third-party packaging ensures large benefits as their standardized dimensions reduce or eliminates injuries from their material and design (StopWaste, Reusable Pallet, Container Coalition (RPCC), 2007). Reusable transport packaging also ensures near-time delivery of finished products, as it provides frequent shipments of similar quantities that can improve ordering processes and inventory tracking (StopWaste, Reusable Pallet, Container Coalition (RPCC), 2007). Close-loop systems are ideal for reusable transport packaging as returnable containers and pallets move across the system and return unfilled to their starting point (reverse logistics) to start the whole process all over again (StopWaste, Reusable Pallet, Container Coalition (RPCC), 2007). Managed open-loop shipping systems require support of an external combining management company to manage the more complicated return of empty transport packaging, by providing various services, namely delivery, gathering, cleansing, and reparation, per figure 2 below (StopWaste, Reusable Pallet, Container Coalition (RPCC), 2007).

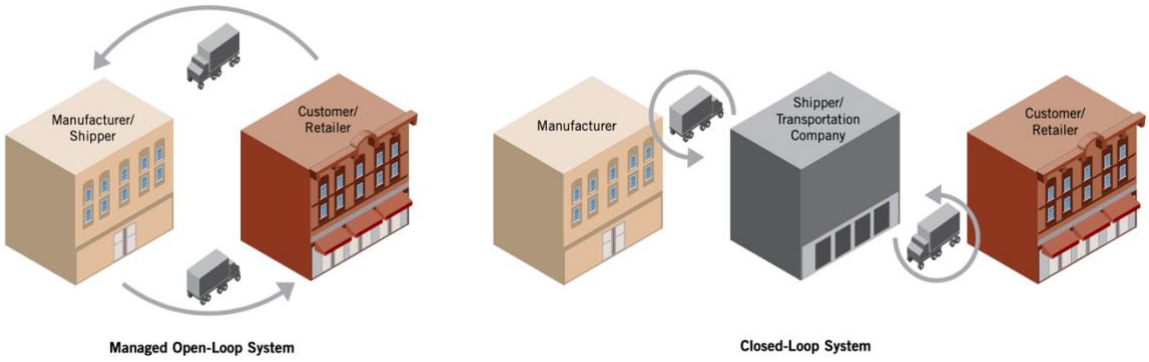


Figure 2 - Open vs closed Loop system on StopWaste, Reusable Pallet, Container Coalition (RPCC), 2007.

Reusable secondary packaging may have common benefits with the tertiary option as it can decrease product destruction with fewer risk of packaging failure during shipping when using reusable containers than when using single-use containers (Mahmoudi & Parviziomran, 2020). Moreover, it can improve the quality of the final product as returnable can offer an increase of shelf life and freshness, a decrease of waste management as there will be less waste that requires managing for recycling or disposal, reduce greenhouse gas emissions and overall energy consumption (Mahmoudi & Parviziomran, 2020). Additionally, using these packaging systems to ship products along a supply chain can result in significant savings, as the cost of reusable packaging can be spread over several years. The initial price of package does not, however, reveal the whole picture, as the cost of reusable packing is always less expensive than single-use container as soon as the initial cost of reusable packaging is amortized over its lifetime (Mollenkopf et al., 2005).

CHAPTER 2 - MARKETING COMMUNICATION OF PACKAGING

The present chapter aims to define perception of marketing communication, specifically directed to packaging of products. The understanding of how packaging can be part of a marketing communication strategy and influence consumer behaviour will be deepened.

2.1. THE CONCEPT OF PERCEPTION

Efron (1969) describes perception as individual's main way to establish cognitive interaction with the environment and as a result from an initial form of awareness. This concept has a distinctive meaning due to its uniqueness and subjectiveness form of observing a phenomenon (Efron, 1969; McDonald, 2011). Perception englobes the combination of stimuli and the relation with memories during the understanding of the occurrence and creating a type of lens to observe environment with a filter of sociocultural influences (McDonald, 2011). According to Hochberg (1956), the percept or perceptual response depends on the definition of contradictory or controversial statements as "(a) psychophysical scaling of experimental situations in terms of the immediacy or perceptual quality of the experiences they arouse; *(b)* the requiring of responses which cannot be made, by the naive subject, in the complete absence of the stimulus" (Hochberg, 1956, p. 404). Studying perception supports the understanding of consumer behaviour and decisions, along with other marketing concepts and the perception of companies, which included in the following factors (Kačániová, 2013):

- Physiological (senses, nervous system, age, and sex) – The centre of figure shows how perception lays on physical characteristics of the individual, as senses, nervous system, age, and sex. Communication managers can study how brain proceeds data, understand the potentials and limitations of each sense, and take advantage from it;
- Psychological – the second ring of the graph, closer to the centre, these elements are aligned into three: mental processes (cognitive, emotional, and motivational), mental states (needs, arousal, stress, attention, mood, and cognitive dissonance) and mental characteristics (attitudes, experience, knowledge, abilities, and interests). This distinction is not absolute, as mental life is in fact undividable, it aims just to simplify the scheme. Mental processes are closer to physiological factors as there are continuously present on the mental background of an individual;

- Social factors – Perception relies on and differs depending on social role, status, or position, for instance, in the process of buying, it varies according to the point of view, either consumer or company;
- Stimulus characteristics – In close connexion to grabbing and preserving the attention of individuals, these can be objective and subjective stimuli characteristics as factors can be viewed as subjectively stimulating and fresh owing to objective aspects namely graphical items or colour contrast;
- Situational factors - Context can impact the perception of communication since it organizes information into a framework which can be also known as framing. Due to this process, some can perceive information as more or less relevant;

For these factors, Kačániová (2013) designed a circular graphical with an arrow crossing, as per figure 3 below, showing all the factors influencing perception of communication indicating the higher degree of interconnection, hierarchy, and relations among them.

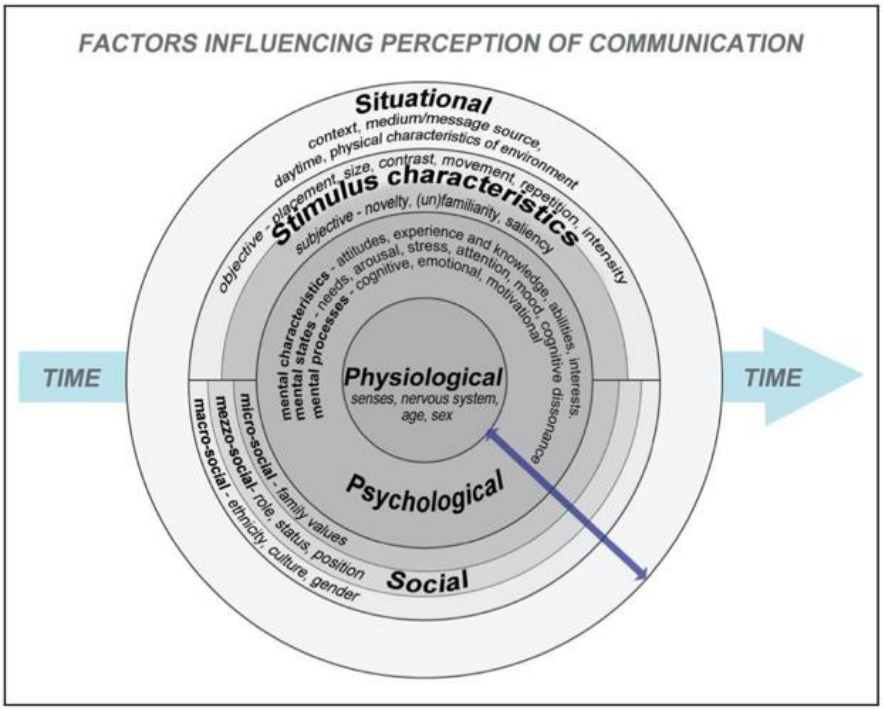


Figure 3 - Factors influencing perception of communication (in Kačániová, 2013)

Perception impacts communication and how people perceive it depending on different aspects, circumstances, and people (Kačániová, 2013). Flusser (2001) predicted the evolution of communication and defended it as an important concept to understand and to

be interpreted. The author claims that the world and life itself are constantly under pressure and being shaped in order to fit to what communication is now, after all, it is something that is continuously changing and needs to be constantly adapted in order to balance all of the transformations (Flusser, 2001). Moreover, Flusser (2001) states that the individual is a solitary animal who attempts to overwhelm his solitude through communication. Since the beginning of mankind, the human being has always searched for understanding the "world", bridging the gap between himself and the "world". This thesis will focus on just one type of communication: marketing communication which can be defined as the way brands inform, make offers, and persuade consumers, either directly or indirectly, regarding their product, services, brand or person (Finne & Grönroos, 2017; Keller, 2013).

Building a strong brand contributes to an increasing marketing communication effectiveness, as consumers seek potency and equity of the promoted brand, they will be more eager for future communications, as well as to hear it more favourably and easily associate previous communications (Keller, 2013). The use of marketing communication impacts the enhancement of brand structure and performance, by building a loyal base of consumers, and consequently, achieves greater market share and profitability (Cvjetković *et al.,* 2021). Marketing communication can be reflected or entrenched in an environment, noticeable or simply in consumer's head, it can englobe experiences or developments triggering value-in-use for the customer (Finne & Grönroos, 2017; Keller, 2013). Instead, brand can be out of the usual path brand to customer and can simply result from portions of the perception tracked in different timeframes and be aligned on the consumers logic (Finne & Grönroos, 2017). Cvjetković at al. (2021) defend that marketing communication has a notable impact on brand recognition and can be used to enhance business performance. In summary, marketing communication can be perceived as a tool that contributes to the consumers enhancement and awareness of the brand, which can lead to significant effect on brand recognition. When a consumer makes initial contact to a product or brand, its values and its products and services, he/she establishes the significance about it through perception. In marketing communication, perception is the process through what consumer manages all the information he/she received, which involves all the senses to receive brand marketing messages. Consumer perceptions can have a dramatic impact on consumer purchase behavior, mainly on brand loyalty. Therefore, positive perceptions of marketing

communication can be the key for building a sustainable, reliable, and growing customer base (Kačániová, 2013).

Over the years, marketing mix definitions have emerged and, more recently, adaptations that include packaging on it. Goi (2009) defends that Borden innovative marketing mix included twelve elements: product planning, pricing, branding, channels of distribution, personal selling, advertising, promotions, packaging, display, servicing, physical handling; finding and analysis, which McCarthy refined in 1964 by combining twelve elements into the 4 P's: Product, Price, Promotion, and Place. Rafiq and Ahmed (1995) analysed the possibility of introducing the 7Ps as a generic marketing mix, by an exploratory survey of United Kingdom and European marketing academics. The outcomes showed a high level of disappointment with 4Ps structure as it is believed to be generally applicable for basic promoting and purchaser advertising (Rafiq & Ahmed, 1995). On the other hand, 7Ps system: Product, Place, Promotion, Price, Participants, Process and Physical evidence, has previously accomplished a serious level of acknowledgment (Rafiq & Ahmed, 1995). More recently, with the deepening of marketing in organisations and a broader diversity of products and marketplaces, some authors sustain the extension of 4 Ps with a fifth P, namely packaging, people or process (Goi, 2009).

Throughout these years, with all the upcoming theories, packaging started to be perceived as a vital piece of current advertising activity apart from protecting, as it enables to make an item promptly sellable, whilst being one of the most significant components of a brand name and promoting elements (Agariya *et al.,* 2012). For Bone & Corey (2000), contemporary packaging is "a cross-functional and multi-dimensional aspect of marketing that has become increasingly important in consumer need satisfaction, cost savings, and the reduction of package material usage leading to substantial improvements in corporate profits" (Bone & Corey, 2000).

Underwood and Ozanne (1998) agreed with the impact of packaging to strengthen brand identity and how it can represent brand qualities through packaging, highlighting the importance of being a congruent packaging to avoid lack of trust. In other words, Underwood and Ozanne (1998) refer the fact that customer frequently feel betrayed by the information and aspect of packaging, this way, it is important to respect one of the packaging objectives named by Agariya et al. (2012), which advises to provide complete and clear information to

consumer, facilitating a long-term relationship. Consequently, marketers should pursue to attract, communicate, and persuade consumers, while respecting the standards of honesty, genuineness, comprehensibility, and legitimacy in product packaging (Underwood and Ozanne, 1998).

The Underwood *et al.* (2001) proposes that impact of packaging is related to product class and type, likewise, packaging and image associated to the product is, by definition, particular to the brand and item classification. The communicative role of product packaging is turning out to be progressively significant as within the same product category, there are similarities, which can naturally confuse consumers that are looking for a distinguishable aspect (Underwood *et al.,* 2001). Henceforth, as the perception of the product can vary according to its category, this thesis will focus specifically on grocery packaging and the grocery retail industry.

2.2. BRAND PERCEPTION OF PACKAGING

From brands' perception, one of the main responsibilities of a package is to lay out a mark of distinction from competitive items by emphasizing and communicating a solid difference in line with its products' characteristics (Ambrose & Harris, 2017). Despite optimistic examples where packaging, its design and innovation are merged and result into the foundation of creative solutions to improve supply chain effectiveness and efficiency, packaging remains an unexplored potential (Olander-Roese & Nilsson, 2009). At that time, Olander-Roese and Nilsson (2009) believed there was a desire to connect packaging and product improvements, but the absence of an integrated process that accepts intra- and inter-organizational interaction, delayed the required innovation.

Packaging was primarily created and developed only to protect the goods and facilitate handling and shipping. However, it has indeed a vital communicative role. Current consumer and industry trends increasingly suggest the importance of packaging as a brand manager's marketing communication tool (Underwood & Klein, 2002). Packaging turns out to be one more approach to conveniently communicate brand's qualities to its potential customers. Branding and packaging design are independent elements, but its successful combination is what brands look forward (Ambrose & Harris, 2017). Some believe packaging is branding, as packaging simply addresses the appearance of the brand, and the company emerges and

is brightened by package, but in the end, for consumer, package is essential, incentives loyalty towards the products, which could positively impact brands' loyalty (Ambrose & Harris, 2017).

The globalisation has influenced and forced companies to revaluate what can make them more competitive, which led some brands to question how can packaging be a distinctive and representative characteristic. For example, Pringles are a great example of packaging innovation as its package is totally different from most competing brands (Rundh, 2005). Packaging can affect directly and indirectly marketing mix by redesigning package with lower transport and storage handling costs, enabling price differentiation, while ensuring product safety and investing on boosting customer value, encourages innovation with new solutions, supports market communication, and ensures product value (Rundh, 2005). According to Deliya and Parmar (2012), packaging has an improved influence than conventional promotion does, since not only advertises and strengthens consumer behaviour at the time of buying, but also every instance that clients consume the item.

Without packaging, numerous food products would lose their unmistakable qualities or nutritional value, and simultaneously food packaging communicates with the customer to inform about its content (Tiekstra *et al.,* 2021). Controlled by the ongoing attitude and necessities of customers as well as arising regulation, food packaging industries are extremely conscious of consumers concerns regarding packaging and its effect on the environment (Tiekstra *et al.,* 2021).

The main objective of packaging as a marketing tool for a company's perception can be the display and promotion of its products on supermarket shelves by attracting consumer's attention and creating a positive impression that invites to purchase the product in a highly competitive environment (Rundh, 2005). Retail packaging is one of the key components that can provide competitive advantage to many consumer products. Rundh (2005) believes that this cannot be underestimated and must be involved in brand's business strategy as a competitive advantage that allows, even with a small investment in changing packaging, to make a difference and yield a significant return on brand sales compared to advertising and promotional efforts, as shown in figure 4 below. According to Hasan and Khan (2009), there

are studies proving that brands are decreasing costs on conventional initiatives with mass media advertising and instead are looking for packaging as a brand message channel.

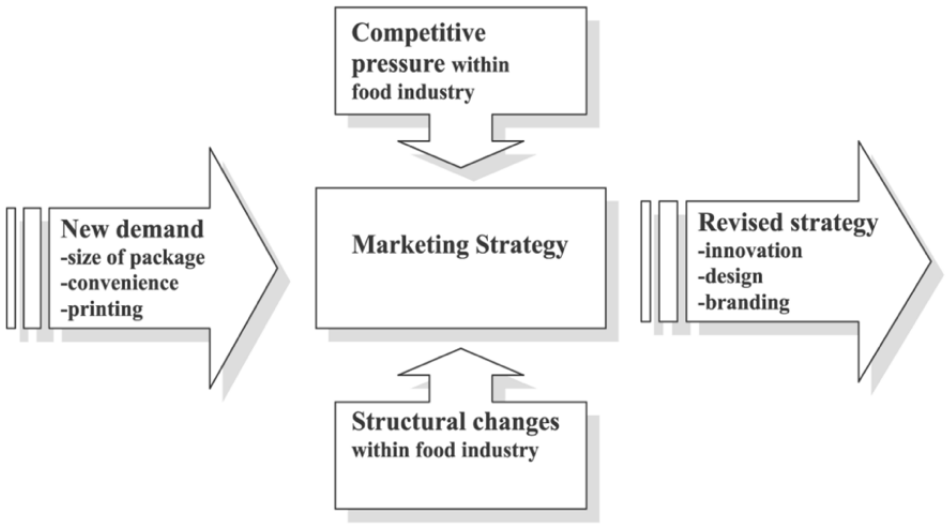


Figure 4 - The need for revising marketing strategy by the strategic tool of packaging on Rundh (2005)

This communication tool should likewise be consistent with the general image defined for the brand, integrating an image of the item on the package, acquiring consideration for the company and furthermore impart its advantage (Underwood & Klein, 2002). Package design aims to secure a positive response from the target customer, making packages with strong appeal with demands for a complete comprehension of branding, language and colour (Ambrose & Harris, 2017). Brands are used to involve specific characteristics or qualities of the product that might highlight what can be seen as the brand competitive advantages, namely, to be superior grade, minimal expense or made of natural ingredients, which are inborn characteristics of the product (Ambrose & Harris, 2017). Moreover, for a company's perception, packaging is an extension of the brand image, which can attract its consumer's attention as well as create a valued imprint for future purchases of the product in a highly competitive environment (Rundh, 2005). Brands seek for packages that can make an impact and present the company in its best light, this implies creating packages that can optimistically communicate and convey positive aesthetic, experiential, useful, illustrative, and/or informational advantages to the consumer (Underwood & Klein, 2002).

Research shows that market demand by small, medium, and large households is requiring the availability of various products in different package sizes (Rundh, 2005). According to

Deliya and Parmar (2012), when a brand offers a product in various sizes, it enables the extension of the product into new target markets as well as to overcome cost barriers. More recently, the growing demand for takeaway food has also impacted many new packaging solutions for consumers, such as for example, products that can be heated directly in the package, which can offer a competitive advantage over products that must be unpacked and transferred to a dish (Rundh, 2005). Illustrations, design, and colour impact and can contribute to success of branding and marketing, which led to increasing interest of brands to understand and study the different features around these elements of packaging (Kauppinen-Räisänen, 2014; Mohebbi, 2014). Colours assume a fundamental part on the perception and vision of individuals centring around the variables affecting their decision and choice for the acquisition of products and brand preference (Singh & Srivastava, 2011). As customers are not conscious of the effect that colour has on their consumer behaviour or brand preference, advertisers ought to be likewise aware of packaging and its colour effects (Kauppinen-Räisänen, 2014)

Besides the perception, utilization of colour is firmly affected by "ones innate physiological and psychological predisposition, personal experiences, age, gender, personality, income, ethnographic and demographic factors that makes its application effective within the domain of marketing all the more cumbersome and challenging" (Singh & Srivastava, 2011, p. 199). Nonetheless, as a promoting variable, the wide variety of possibilities can be a great enticing power. As a practical part of human vision, colour can catch consideration, unwind, or irritate, and influence the clarity of the text (Singh & Srivastava, 2011). Thus, the right tones can engage and guarantee an optimistic outcome of the advertising, product, or brand (Kauppinen-Räisänen, 2014; Mohebbi, 2014; Singh & Srivastava, 2011). Overall, package designers should exploit diverse meanings in illustrating package and consolidating different colours to stand out for consumers (Mohebbi, 2014). The study on the factors influencing consumers perception of each colour, would enable brands to focus on the psychology of colours, along with the context and culture-specific, to enhance product and brand sales (Mohebbi, 2014). The following figure 5 was designed by Mohebbi (2014) based on Singh and Srivastava (2011) and reviews the meanings and implications of each colour in daily basis and mainly in marketing.

Color	Connotation
Red	celebration, purity, passion, strength, energy, fire, love, excitement, speed, heat, arrogance, ambition, leadership, masculinity, power, danger, blood, war, anger, revolution, and communalism
Blue	depression, tranquility, trust, confidence, conservatism, dependability, wisdom, wealth royalty, truthfulness, and creativity
Green	growth, rebirth, renewal, nature, fertility, youth, good luck, generosity, health, abundance, stability, and creative intelligence
Yellow	sunlight, joy, earth, optimism, intelligence, hope, liberalism, wealth, dishonesty, weakness, greed, decay aging, feminity, gladness, sociability and friendship
White	youth, sterility, light, reverence, truth, snow, air, cleanliness, coldness, fearfulness and humility
Black	absence, rebellion, modernity, power, sophistication, formality, elegance, mystery, style, evil, emptiness, darkness, seriousness, conventionality, unity, sorrow, professionalism, and sleekness
Gray	elegance, respect, reverence, wisdom, old-age, pessimism, boredom, decay, dullness, urban sprawl, intense emotions, balance, mourning, and neutrality
Orange	energy, heat, fire, playfulness, gaudiness, arrogance, warning, danger, desire, royalty, and religious ceremonies and rituals
Brown	calmness, boldness, depth, natural organisms, richness, tradition, heaviness, poverty, dullness, roughness, steadfastness, simplicity, dependability, friendliness and aids in stimulating appetite and is popularly used for advertising various bakery products, chocolates, foods and flavors
Pink	gratitude, appreciation, admiration, sympathy, socialism, health, feminity, love, marriage, joy, innocence, flirtatiousness, childlike behavior and symbolizes sweet taste
Purple	nobility, humility, spirituality, ceremony, mystery, wisdom, enlightenment, flamboyance, exaggeration, sensuality, pride, and lavender essence
Indigo	spirituality and intuition
Violet	elegance, grace and artistic creativity
Magenta	artistic creativity
Rose	optimism, hope and love and used in advertising to signify rosy flavors

Figure 5 - The Connotations of Colors in Daily Life and Marketing by Mohebbi (2014)

2.3. CONSUMER PERCEPTION OF PACKAGING

Packaging allows product and brand to be identifiable, recognizable, and distinguishable from the others, while enabling efficient delivers with the safety required (Zekiri & Hasani, 2015; Gómez *et al.,* 2015). Within the different characteristics that evolve a packaging, namely, colour, illustration, and figure, when consumers look at the shelfs of a supermarket,

they can easily distinguish a specific product and brand (Hasan & Khan, 2009). The connection between customer decisions vary according to different market sections and can be a critical question for advertisers of package grocery products to comprehend and foster viable initiatives (Gómez *et al.,* 2015).

Packaging can take different shapes, colours or images and include information regarding what is the composition of the product, how it was produced, how to use it and, if alimentary, information about product shelf life as well as nutritional value (Shah *et al.,* 2013; Zekiri & Hasani, 2015). Nowadays, consumers perceive innovative package design as well as recyclable options, which can generate added value if it meets the consumer preferences (Zekiri & Hasani, 2015). Therefore, packaging is a crucial component of merchandising considering how clients make the buying choices in only a couple of moments and there is a more prominent pattern toward self-service, that almost works as an invisible salesman that impacts consumer behaviour (Gómez *et al.,* 2015). Among packaging and consumer behaviour in food, wellbeing and cosmetic items, the fundamental parts of packaging are visual (illustrations, tones, size, and structure) and useful data (item information and innovation) characteristics (Gómez *et al.*, 2015).

Some of the aspects that impact consumer behaviour regarding package are visual elements, namely, colour, picture, and transparency. The colour used in packaging is significant and differentiates one brand product from other (Deliya & Parmar, 2012; Hasan & Khan, 2009; Shah et al., 2013; Zekiri & Hasani, 2015). Consumer perception of the colour of packaging depends on what tones the consumer find attractive and appealing (Shah *et al.,* 2013). According to Deliya and Parmar (2012), colour can be used to set different moods, for example, on Apple's advertisement of iPod, the company choose a simple pallet of three colours: white, black and a bright background. White and black were opposing and aimed to call consumer attention, while the background was a bright to bring an amusing sense (Deliya & Parmar, 2012). Moreover, colours can be connected to other quality aspects, namely, palate, fragrance, fulfilment, and nourishment levels (Hasan & Khan, 2009). From the results obtained in the study of Zekiri and Hasani (2015) with a sample of 395, about 23% of the consumers strongly agree that the colour influences the consumer behaviour as an impact on buying behaviour, 56% of the consumers agree and only 5% strongly disagree.

Underwood & Klein (2002) developed a conceptual model to illustrate the possible outcomes from the existence or not of an image in the package. The main line and relationship established in the model illustrates how an image in the package likely can have one of the following consequences: attitudes towards packaging, convictions about brand attributes, and an overall measure of brand assessment (Underwood & Klein, 2002). Thus, as per figure 6 below, the impact of the use of a picture in the package design can be dependent on brand familiarity either high or low.

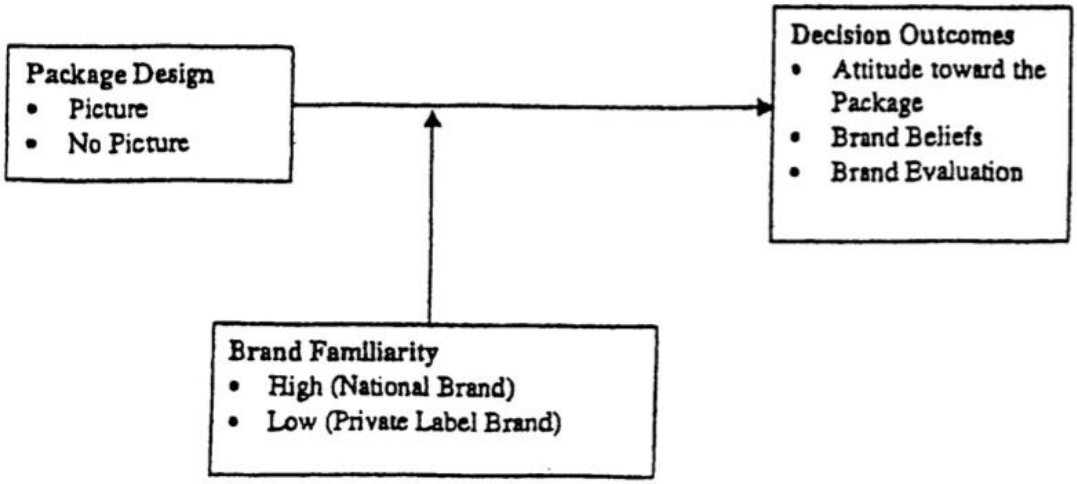


Figure 6 - Conceptual model of package picture effects by Underwood & Klein (2002)

The model proposes that visual package positively impacts and can influence three decision outcomes: attitude, beliefs and evaluation (Underwood & Klein, 2002). The first outcome highlighted is the attitude towards the packaging that are like the attitude towards a promoting activity, then the second is the brand beliefs, which corresponds to the beliefs on brand attributes comprising the ideals consumers have about specific characteristics of the brand, and finally, brand evolution which means the whole attitude customers have regarding a specific brand (Underwood & Klein, 2002). Thus, brand familiarity, that can be variable, either high or low level, is a mediator between package design and the possible outcomes (Underwood & Klein, 2002).

According to Underwood and Klein (2002) study, with a sample of 265 students from a large state university, package design modifies customers attitude towards package, as shown by the critical primary impact of picture, consumers favoured packages planned with pictures ($\bar{x}$=4.52) over those without pictures ($\bar{x}$=3.93). Finally, Underwood and Klein (2002)

analysis showed that the fundamental impact of brand familiarity is notable, showing that customers preferred the more familiar and national brand packages ($\bar{x}$=5.46) over the less familiar brand packages ($\bar{x}$=3.00). Regarding brand beliefs, Underwood and Klein (2002) results showed that buyers accepted that the products would taste better when that package design had an image ($\bar{x}$=4.94) contrasted with the package with no image ($\bar{x}$= 4.61). Regarding last outcome, brand evaluation, the results did show no impact of packages with pictures and the predicted interaction between package image and the mediator, brand familiarity was also not significant (Underwood & Klein, 2002).

The material used for package is a significant component which keeps itens safe but can also contribute to a better consumer perception. The tendency is for consumers to positively perceive excellent material and innovative designs with additional configuration, namely simple open, easy storage, sealing and recyclability (Deliya & Parmar, 2012; Shah *et al.,* 2013). Creative packaging may really increase the value of the item while meeting customer need and endeavours a have package that keeps up with the vital values of the brand (Deliya & Parmar, 2012).

For some products, the possibility of having a part of the package transparent to enable the consumer to see the product before the purchase can make it more interesting and challenging (Hasan & Khan, 2009; Simmonds & Spence, 2017). According to Simmonds and Spence (2017), the use of a picture or transparent designs influences the consumer perception, leading to a purchase intent. The precise choice between transparency and imagery can determine an optimistic consumer perception, which leads to product success (Simmonds and Spence, 2017). Moreover, an approach that join the advantages of each tactic, is to have part of package transparent and the other opaque, which can provoke secret or intriguing perceptions, by offering just a part at the sale, as the examples per figure 7 below (Simmonds and Spence, 2017).

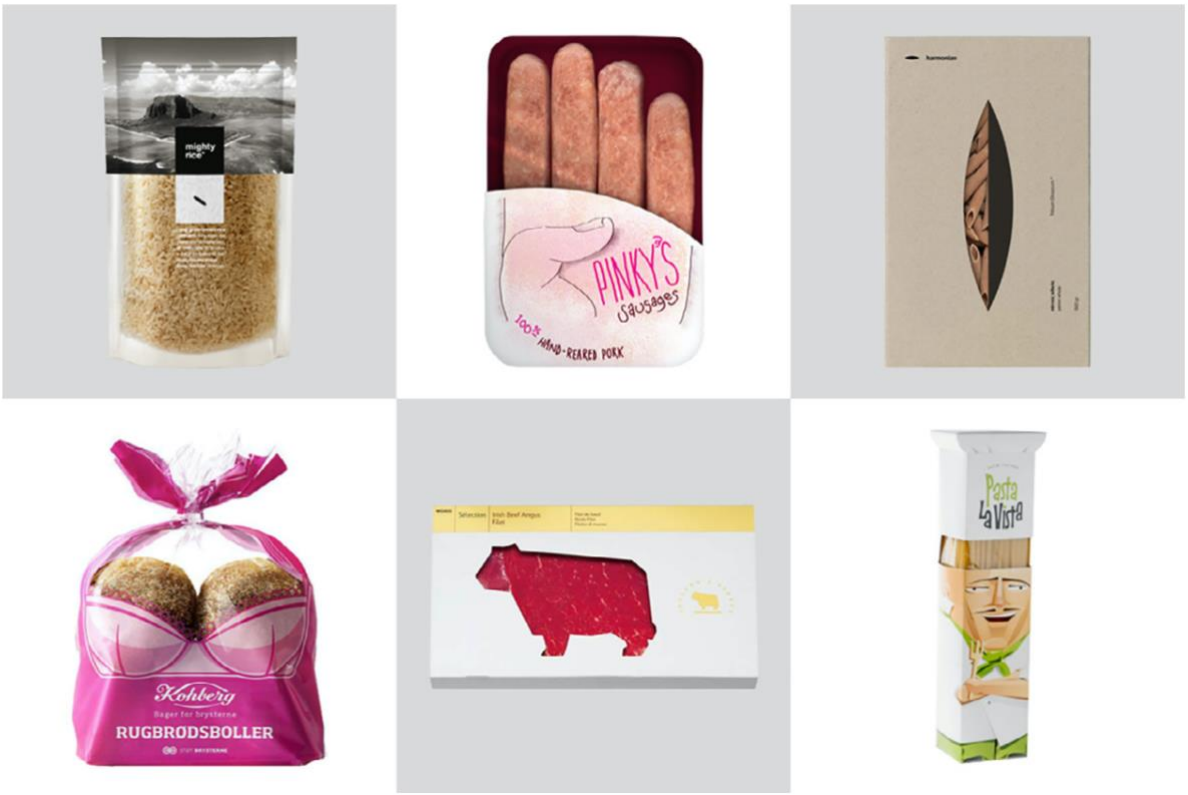


Figure 7 - Examples of innovative transparent packaging design across several FMCG food categories by Simmonds and Spence (2017)

One further perspective that is likewise significant is that the effect of a transparent window is probably going to be shaped by the colour around it (Simmonds and Spence, 2017). For instance, orange-hued heated beans, noticeable through a blue-green holder (similarly as with Heinz items) would probably make the item stand apart more and stand out (Simmonds and Spence, 2017). On the other hand, where the item and the packaging have low difference, for example, pasta in beige package, the impact might be reduced (Simmonds and Spence, 2017).

Packaging provides information regarding product attributes, namely, where it was produced, date of production, what components it encompasses, and if it is the case, how it can be used (Hasan & Khan, 2009; Shah *et al.,* 2013; Silayoi & Speece, 2007). Packaging is likewise a source to provide relevant information about the product components to the consumer and if necessary, directions how to utilize the item (Hasan & Khan, 2009). Customers take the last decision based on these data, in the case of food items, with relevance to information about allergenic components, inappropriate for consumers with certain health conditions that cannot consume specific ingredients, or information about nutritional values,

relevant if consumers want to control the calories consumed per product (Hasan & Khan, 2009).

The tendency towards healthier food habits has featured the significance of labelling and its information, which enables consumers to carefully consider options and decide with the information provided (Silayoi & Speece, 2007). Nevertheless, the information available in the label can create misperception by being either an excess of data or misrepresentative, and to be written in a small font and dense composing styles (Silayoi & Speece, 2007). From the results obtained in the study from Zekiri and Hasani (2015), with a sample of 395 people, 53% strongly agree that printed information benefits consumer behaviour, about 32 % agree with this statement and only 3% of respondents strongly disagree. Usually, informational data on package would worth less, but can be vital when, for the customer, it depends on this message to make a purchase decision (Silayoi & Speece, 2007).

CHAPTER 3 - ENVIRONMENTAL SUSTAINABILITY AND PACKAGING

The present chapter aims to define sustainability and its concept and understand the main fundamentals along with the legislation regarding it, focusing on retail industry. Later, it will emphasise on consumers and companies' perceptions on sustainable packaging in grocery retail industry.

The intensification of environmental ideals started around the 1960s and it has not always been a uniform trend (Duroy, 2005). Duroy (2005), among others, sustained that, to a certain extent, environmental consciousness uttered in emerging nations with more world-wide problems such as climate change, whereas in poorer nations, it was mainly related to local problems such as industrial development that is directly threatening traditional activities. According to Omoogun et al. (2016), to overcome this situation, humankind should avoid acting as the dominant specie, but instead, as part of the planet. Society delayed on stating that protection of environmental balance is a priority and started noticing environmental degradation, as the deprivation of its physical, botanical, and chemical abilities (Duroy, 2005; Omoogun *et al.,* 2016). Sustainability can be outlined as the preservation of welfare throughout an indeterminate period of time (Kuhlman & Farrington, 2010). As the key aspect of environmental sustainability, there is maintance and maximization of natural resources (Olawumi & Chan, 2018).

United Nations presented in 2015 the Sustainable Development Goals (SDGs), also known as the Global Goals, that are a set of universal actions to end poverty, protect the planet and ensure peace and prosperity for all by 2030, represented in figure 8 below (*Sustainable Development Goals | United Nations Development Programme*, n.d.). The 17 SDGs are combined, which means that changes in one of the goals will impact the others which evokes for a balanced social, economic, and environmental development (*Sustainable Development Goals | United Nations Development Programme*, n.d.). Achieving SDGs will require imagination, technology, expertise, and monetary resources of the whole society. (*Sustainable Development Goals | United Nations Development Programme*, n.d.).

Figure 8 - SGDs (Sustainable Development Goals | United Nations Development Programme, n.d.)

In the year 1980, three entities have combined their influence to prepare the World Conservation Strategy which combines theoretical support and a set of practices with the main goal of conserving our planet's limited resources (IUCN, 1980). Taking into consideration that Earth, until now, is known as the only hospitable planet, IUCN (1980) endorses how society should be aware of its capacity and the importance of preserving environment for future generations, providing social and economic wellbeing. To assure the sustainability of ecosystems on which global economy relies on, World Commission on Environment and Development (1987) promotes sustainable development as the capacity of society to benefit from the available tools in a sustainable approach where forthcoming generations meet their own needs. In the late 1980s, this concern influenced the development of the concept of green marketing and consequently, became subject to academic research (Peattie & Crane, 2005).

An environmental education might contribute to a more comprehensive human's point of view towards the interest and necessary actions that need to be taken for the benefit of the planet, heading to harmonize the association between structure and sustainability (Allen & Hoekstra, 1993; Omoogun *et al.,* 2016). Goodland (1995) believes that social, economic, and environmental sustainability might be the support for global sustainability. Consequently, to describe environmental sustainability, it is interesting to differentiate it

from social and economic sustainability. According to Goodland (1995), social sustainability demands the preservation and renewal by common values and equivalent privileges to achieve a society cohesive while economic sustainability requires that economic capital is sustained and established. Environmental sustainability remains on the preservation of natural capital, cultivating human welfare and acknowledge of environment boundaries as the non-renewable goods (Goodland, 1995). More recently, questions are being raised regarding the viability of sustainability's correlated goals: ecological, social, and economic and how can it be a conflict of interests (Spindler, 2013). This sustainable development term has been emergent in business organisations with the objective to understand in what way companies can assume sustainable practices and the reason behind it (de Lange, Busch & Delgado-Ceballos, 2012). Word sustainability should engage a more extensive audience as an ethical purpose, "avoiding the temptation to take it over as an easy way out of facing the conflicts that beset us in other areas of policy" (Marcuse, 1998, p. 111).

3.1. SUSTAINABLE GROCERY RETAIL INDUSTRY

The awareness about environmental equilibrium has become an important subject that addresses different areas and businesses. European Union underlines its capability to re-direct economy and society into a more enviornmental friendly way (European Commission, 2020). Due to its complexity and importance, grocery sector disposes a vast number of opportunities to transform nowadays processes into more sustainable ones. Both retailers and consumers are looking forward to more environmental friendly models for the industry likewise ethical consumerism and increasing importance of corporate social responsibility (CSR) (Ruiz-Real *et al.,* 2018; Wang *et al.,* 2021). Consumers are becoming more and more aware of enviornmental initiatives which enhances CSR importance and impact on brand image and reputation (Wang *et al.,* 2021). By driving sustainable initiatives, retailers can play an important role by influencing both empolyee and consumer into a rising consciousness and engagement on environmental friendly purposes (Dal Mas *et al.*, 2022). European Union appeals for a collective effort to apply sustainable initiatives across sectors, having highlighted the investment on a reasonable, beneficial and sustainable food sector as one of the main aspects of the European Green Deal (Figure 9 - European Commission, 2020).

Figure 9 - The European Green Deal in European Commission (2020)

The food industry has undergone major changes for the past years, and it is progressively being challenged to reduce both internal and external environmental effects of their processes (Naidoo & Gasparatos, 2018). European Green Deal focuses on the challenge of protecting environment from air, water, and soil pollution which becomes even more difficult with the increase of world population (European Commission, 2020). With the growing of global population, it is inevitable the increasing demand for food and rising impact on the portion of land used, which consequently challenges the production of environmentally safe food (Fróna *et al.,* 2019). Moreover, European Union invites food industry to accomplish a circular economy with sustainable iniciatives on the different phases: transportation, storing, packaging and food waste (European Commission, 2020). Increasingly enterprises have been dedicated to developing a close-loop supply chain which stands for recycling, decreasing waste, and reducing pollution strategies (Wang *et al.,* 2021). The European Union aims to encourage affordable and healthy food with concrete actions, such as disabling imported foodstuffs that do not meet the European Union environmental criteria (European Commission, 2020).

EU Legislation

The European Union (EU) is dedicated to enlarging sustainable initiatives in the different areas of grocery retail industry and has admitted this challenge in the Sustainable Development goal especially with the twelfth goal regarding the assurance of a sustainable consumption and production outlines (United Nations, 2015). Through the twelfth goal, EU aims to encourage both company and consumer to incorporate sustainability policies and practices and consequently, support an awareness for sustainable development (United Nations, 2015). According to the European Commission (2020), these sustainable initiatives embrace the different areas, namely, transportation, storing, packaging and food waste. Therefore, aiming to encourage companies and consequently, consumers to have a more sustainable approach, the EU displays a set of legislative proposals, especially directed to the industry, such as for instance (1) directive 94/62/EC, (2) Directive 2015/720, or (3) Directive 2019/904:

(1) In the EU directive on packaging and packaging waste (directive 94/62/EC) it is stated the necessity to prevent the generation of packaging waste and possibly minimize its impact on the environment. EU countries need to increase the portion of reusable packages and plans to reuse packages without compromising food or consumer safety (European Parliament and Council, 1994). The Directive 94/62/EC stated new recycling goals that should be achieved by 2025 and 2030. For 2025, at least 65% by mass of packaging waste must be recycled with different targets for each material, highlighting 25% of wood, 50% of plastic and aluminium, 70% of metal and glass and, 75% of paper and cardboard. By 2030, these percentages will be higher, with at least 70% of all packaging waste being recycled (European Parliament and Council, 1994). The mainly requirements to achieve these goals are the guarantee from EU countries that packaging will have the weight and volume limited while maintaining the levels of safety, will reduce hazardous substances or materials in the packaging and will design reusable or includes design for material, organic or energy recovery (European Parliament and Council, 1994);
(2) The Directive (EU) 2015/720 amends the Directive 94/62/EC, since the existing code did not cover lightweight plastic carrier bags which consumption can be

diminished and avoid the negative impact on the environment. EU countries must implement initiatives that aims to decrease the usage of lightweight plastic carrier bags with three main goals: (a) by 2019, achieve 50% of usage of lightweight plastic carrier bags per person compared to 2010, which can be translated into a maximum yearly consumption level of 90 plastic bags; (b) by 2025, have a reduction of 80% of usage of lightweight plastic carrier bags per person when compared to 2010, which means 40 plastic bags usage per person; (c) by 2018, guarantee that lightweight plastic carrier bags stop being provided free of charge at the point of sale of goods or products (European Parliament and Council, 2015);

(3) The Directive 2019/904 proposes the decreasing effect on the environment from specific plastic products, including prohibition of single-use plastic when there are alternatives available. Single-use plastics are considered the ones made exclusively or partially of plastic which are typically planned to be used one time or for a brief period. This Directive sets a goal for 2026 with 2022 as comparison, to reduce significantly and sustainably the consumption of single-use plastics. Moreover, it encourages the transition to a circular economy which is defined by the EU law as a scheme that preserves the value of materials, constituents, and resources in the economy as much as possible to reduce the waste and promote recycling (European Parliament and Council, 2019);

3.2. SUSTAINABLE GROCERY PACKAGING

Facing the considerable use of materials in the packaging sector, as well as environmental impact and substantial cost, there is an increasing interest on a sustainable development of packaging (Coelho *et al.,* 2020). Packaging important functions, amongst distribution, marketing and guarantee of product safety, can restrict, and challenge the development of sustainable packaging (Sonneveld *et al.,* 2005). The ecological impact from packaging differs according to the material used, its form and concept applied (Otto *et al.,* 2021). The term sustainable packaging is still an ongoing discussion and broad concept, as it does not envelop sociological and economical attributes and it is challenging for consumers to distinguish it from an ordinary package (Boz *et al.,* 2020).

According to Russell (2014), there are several causes beyond the environmental negative impact of packaging production, namely material used, water and energy usage, waste, pollution, or gas emission, which can be improved with reusable materials, reduced air and gas emission or optimization of water and energy. According to the Sustainable Packaging Alliance (SPA) sustainable packaging should verify four principles: (1) effective, keeping social and economic advantages; (2) efficient, by guaranteeing an optimization of the resources (materials, water, and energy); (3) cyclic, which means to be reusable or saveable; (4) clean, by ensuring a non-polluting and non-toxic materials that can guarantee the safety of humankind and ecosystems (SPA, 2007). Regarding the first principle, it ensures the elimination of unnecessary packaging resource and overall cost, providing evidence and guidance on the packaging characteristics and correct disposable (Lewis *et al.,* 2007). Concerning the second, efficiency can result from the decrease of packaging volume, waste and improve energy, water, and transport competence (Lewis *et al.,* 2007). The third principle englobes reusable, recyclable, and degradable packaging technology which has lower ecological influence (Coelho *et al.,* 2020; Lewis *et al.,* 2007). Biologic, degradable and some naming related to ecological benefits should be seriously analysed to guarantee a correct use of this concepts (Russell, 2014). Finally, the fourth principle of SPA defends packaging using cleaning technologies, avoiding harmful materials SPA (2007).

There are several organizations and forums involved in the study and awareness of this topic of sustainable packaging, namely the consumer Goods Forum, the Portuguese plastic pact or the Smart Waste Portugal and Sociedade Ponto Verde. This invite companies to better understand the concept of sustainable packaging and to define objectives to improve their packages. Other organizations aim to certify a package and guarantee the good practices of sustainable packaging.

The Consumer Goods Forum (2022) is an organization that brings together makers and retailers of consumer products on a worldwide scale to work together, as well as other important stakeholders, to build customer trust and promote positive change, including increased efficiency. The Consumer Goods Forum (2022) endorses how this organization allows for a unique position to influence good change and assist in addressing major issues facing the industry, such as environmental and social sustainability, health, food safety, and the accuracy of product data, as per figure 10 below. Thanks to the worldwide presence and

focus on retailer-manufacturer partnership, The Consumer Goods Forum (2022) aims to mobilize resources to create a sustainable future for forests, play a key part in the eradication of marine and land-based plastic trash, reduce retail and consumer food waste worldwide per person, foster global reliance on sustainability norms and ensure that everyone has access to healthy meals.

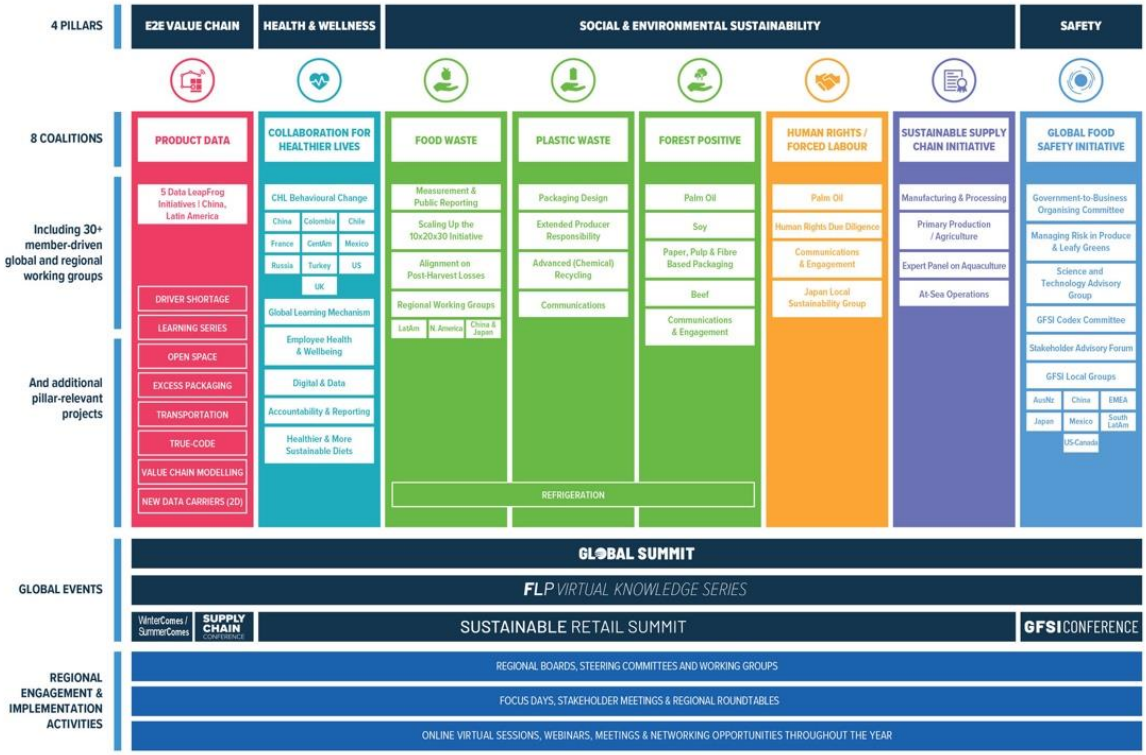


Figure 10 - Eight coalitions & multiple engagement opportunities (in The Consumer Goods Forum, 2022)

The Consumer Goods Forum created the Golden Design Rules to specify which polymers should be used for packaging and design aspects, aiming to decrease plastic waste and raise the value of plastics in the market, collectively covering over 90% of the plastic packaging on the market by 2021 (The Consumer Goods Forum, 2021). Members of the CGF Plastic Waste Coalition of Action have agreed upon Golden Design Rules for package design to, when applicable, enhance the circularity of their packaging portfolios, demonstrating leadership in the development of a circular economy (The Consumer Goods Forum, 2021). To guide the industry to greatly benefit from this collection of voluntary, independent, and time-bound pledges, The Consumer Goods Forum (2021) designed 9 main rules:

1. Increase value in PET Recycling: By using clear and uncoloured PET or transparent blue or green in all PET bottles; Assure that the material, adhesive, and size of the sleeve or label are appropriate for recycling.
2. Remove the following problematic components from packaging: (a) noticeable carbon black which is frequently used in meat and vegetable containers. The elimination carbon black would enhance the volume of recycled plastic while minimizing unwanted environmental effects; (b) Polyvinyl Chloride (PVC) or Polyvinylidene Chloride (PVDC), which might be troublesome in the recycling stream and prevent some plastics from being recycled. It may be found in a variety of plastic packaging, such as meat trays, vegetable packing, and blister packs; (c) Expanded PolyStyrene (EPS) or PolyStyrene (PS), which must be more widespread in the packaging materials stream for recycling to be financially feasible. It is common in yoghurt pots, padding, and takeout food containers and it is rarely separated from domestic garbage and recycled; (d) Polyethylene terephthalate glycol (PETG) which devaluates the recycled PET products. Cooking oil and beverage bottles both contain it. All single-use rigid packaging materials used in the consumer products industry must comply with this aspect; (e) Oxo-degradable plastics also contribute to microplastic contamination and are not suitable for mass recycling, composting, or long-term reuse. Shrink and stretch film, carrier bags, blister packs, bottles, labels, and caps are just a few applications.
3. Eliminate excess headspace to ensure that the maximum headspace is 30% or less throughout the product categories for all flexible pack types.
4. Utilize plastic overwraps just as needed to reduce their use.
5. Recycle PET thermoformed trays and other PET thermoformed packaging at a higher rate.
6. Increased Recyclability of Flexible Consumer Packaging - Convenience food and online shopping are likely to drive the demand for flexible packaging. Although there are several initiatives underway to enhance collecting, sorting, and recycling systems to recycle flexible materials, consumer flexible plastic packaging is not currently recycled in practice or on a large scale.

7. Increasing recycling value in rigid High-density PolyEthylene (HDPE) and Polypropylene packaging (PP) is recycled on a large scale, however there is tremendous room for improvement.

Ellen MacArthur Foundation (n.d.) develops and advances with the concept of a circular economy by presenting evidence-based research on the advantages of it and how it may help address pressing global issues like climate change and biodiversity loss. Ellen MacArthur Foundation (n.d.) examines the prospects across stakeholders and industries and identifies examples where the concepts of the circular economy are now being applied. According to Ellen MacArthur Foundation (n.d.) the successfully transition to a circular economy must involve every component of the system, collaborating with a wide range of organizations and businesses, including corporations, governments, universities, cities, and non-governmental organizations, and producing materials, books, and tools that support the development of sensible regulations, innovative business practices, and superior product design. Ellen MacArthur Foundation (n.d.) network brings together market leaders in business, up-and-coming innovators, affiliate networks, regional and local governments, as well as cities and other locations. Building circular economy capacity, addressing common progress impediments, comprehending the essential enabling conditions, and testing out circular economy techniques are the objectives by exchange experiences and learn from each other members of the network who attempt to adopt the circular economy (Ellen MacArthur Fzundation, n.d.).

Pacto Português Para Os Plásticos can be named as PPP which is a Portuguese Plastics Pact that consists in a collaboration platform, that brings together the different players in the national plastic value chain: Government, producers, retailers, recycling entities, universities, NGOs, associations, and others (Pacto Português Para Os Plásticos, n.d.). The PPP encourages dialogue, partnerships, and collaboration between its members for the development of creative solutions and transition with the main goal of solving the problems associated with plastic from the outset and promoting the circular economy (Pacto Português Para Os Plásticos, n.d.). According to Pacto Português Para Os Plásticos (n.d.), society must utilize plastics more shrewdly, responsibly, and sustainably by renouncing the linear model of consumption and switching to a circular economy logic, which maximizes the value of resources while preventing their loss to the environment. By consuming fewer raw materials

and making better use of the plastics, it is possible to preserve and even improve the quality of life without harming the environment (Pacto Português Para Os Plásticos, n.d.). The Portuguese plastics value chain felt the need to promote a joint and collaborative path in order to accelerate the transition to a circular economy for plastics in Portugal, where they will never be converted into waste, in line with the Sustainable Development Goals (SDGs) and the Ellen MacArthur Foundation's vision of a circular economy for plastics (Pacto Português Para Os Plásticos, n.d.).

Smart Waste Portugal (SWP) is a non-profit Non-Governmental Organization, whose main goal is to create a country wide platform that allows all the related players within the area to exhibit and value waste as a monetary and social resource (Smart Waste Portugal - Business Development Network, n.d). SWP Association intends to enhance Portugal competitiveness, primarily based on a circular economy, figuring out and contributing to create new commercial enterprise and innovation possibilities, taking into account the following objectives: (a) Generate possibilities to the waste area industry; (b) Produce and disseminate expertise withinside the area; (c) Stimulate and highlight the cooperation among the entities working within the waste area; (d) Establish desired contacts with universities, companies, studies institutes and different organizations, public or non-public, and with comparable country wide; (e) Promote speak and involvement; (f) Stimulate the studies and trade of thoughts and projects; (g) Implement answers to the market; (h) Provide assistance and sharing; (i) Have not unusual place functions and motivations; (j) Create reciprocity, blessings and mutual price; (k) Create price and shared skills to compete and win (Smart Waste Portugal - Business Development Network, n.d).

The Forest Stewardship Council (FSC) is a global non-profit organization dedicated to promoting responsible forest management worldwide, with over 25 years of experience in responsible forest management, FSC brings together members of social, economic, and environmental councils (FSC, n.d.). FSC is committed to improving forest management around the world and aims to encourage forest owners and managers to follow best possible social and environmental practices through the certification process (FSC, n.d.). The growing demand of businesses and consumers for FSC certified products demonstrate the preference for products from responsibly managed forests (FSC, n.d.). The incentives have direct benefits for forest areas, such as protection of biodiversity and ecologically and

culturally important areas, but also benefits at the societal level, such as respect for the rights of forest workers (FSC, n.d.). By promoting environmentally and socially responsible forest management, FSC helps local communities and society to reap the long-term benefits of responsible forest management (FSC, n.d.).

Since 1996, Sociedade Ponto Verde ensures the ideal conditions for packaging recycling and an almost infinite cycle of sustainability (Sociedade Ponto Verde, n.d.). This green emblem associated to Sociedade Ponto Verde serves as evidence that the packaging is a component of a national system for the selective collection, recovery, and recycling of packaging (Sociedade Ponto Verde, n.d.). When this symbol is in a package label it does not mean that the package is recyclable, instead it means that it is a contribution to ensure package (Sociedade Ponto Verde, n.d.). Recycling emblem with the three arrows is used for denoting recyclable packaging, is not governed by any organization and it can describe the proportion of recycled materials that made the packaging (Sociedade Ponto Verde, n.d.).

The Sustainable Packaging Coalition (2011), also known as SPC, defines sustainable packaging under eight criteria: (1) to be valuable, safe and healthy for both individuals and groups during the package lifecycle; (2) to match the marketplace principles of performance and price; (3) to be gathered, produced, shipped, and recycled by using renewable energy; (4) to use renewable or recycled resource aiming to maximize and optimize the materials usage; (5) to be produced with the best cleaning techniques; (6) to use beneficial resources during the process from production to shipment; (7) to be designed taking into consideration the physical optimization of resources; (8) to be successfully recuperated and second-handed in organic manufactured closed loop cycles;

Thus, in this study, sustainable packaging will be considered a combination of the following principles:

(1) Guarantee the basic packaging function: to protect and guarantee the safety of the product;
(2) Minimize waste, optimize the resources use (materials, energy, and water) and efficient physical design;
(3) Use non harmful materials and whenever possible renewable resources;

(4) Applies a cyclic path, assuring the recyclability, reusability, and biodegradability of the product;

Greenwashing

From the 1990s, environmental advertising has been arising amongst grocery producers and retailers with consumers being increasingly aware of the ecological impact from their purchases (Northen, 2011). Usually when a product has environmental keywords in its label, the consumer generates a different perception of the value of the product (Northen, 2011). Consequently, an increasing number of companies started being engaged in greenwashing, which consists of misleading customers regarding its environmental initiatives and benefits on a good or service (Delmas & Burbano, 2011). In other words, when there is an incongruity between what the brand communicates and what actions are truly being done at the ecological level (Roszkowska-Menkes, 2020). Along with the increasing interest and demand for eco-friendly products, the possible dishonest or misleading advertisements appear aiming to affect occasional customers of green products (Northen, 2011). To avoid misleading information, some authors defend that government legislation can support the elimination of greenwashing by having authorities certifying the green claims (Peng *et al.,* 2021; Roszkowska-Menkes, 2020).

According to Terrachoice (2010), there are seven sins of greenwashing: (1) sin of hidden trade-off which means to be focused in a specific group of features without englobing other important ecological problems; (2) sin of no proof when dedicated by an eco-friendly statement that cannot be sustained; (3) sin of vagueness meaning that a broad statement leaves the real meaning misunderstood by the consumer; (4) sin of irrelevance which englobes an ecological claim for customers looking for ecological products and even if correct it is not relevant; (5) sin of lesser of two evil which focuses on statements that even if true, may distract the customer from a better ecological influence; (6) sin of fibbing that includes false ecological statements; (7) sin of worshiping false labels that is the use of fake labels to fake a third-party endorsement.

Delmas and Burbano (2011) continued the investigation of greenwashing by designing a typology of companies exploring the different combinations between the two behaviours: good or poor environmental performance – horizontal axis - and optimistic or non-

communication regarding its ecological performance -vertical axis – displayed on figure 11. According to these authors, there are four typologies: (I) the greenwashing company combining concurrently poor environmental performance and optimistic message regarding its ecological performance; (II) vocal green companies which positively communicate its ecological awareness and initiates, through advertising and public relations (PR) campaigns; (III) the silent brown businesses with no communication and poor ecological performers, also known as "brown" corporations; (IV) silent green firms with no communication and respectable environmental performers, also identified as "green" companies. Thus, according to this model, there are two possible ways to turn a non-greenwashing company into a greenwashing: from vocal company, moving from a good to a bad ecological performance, or from a brown firm, investing on a better communication, but maintaining a poor environmental initiative (Delmas & Burbano, 2011).

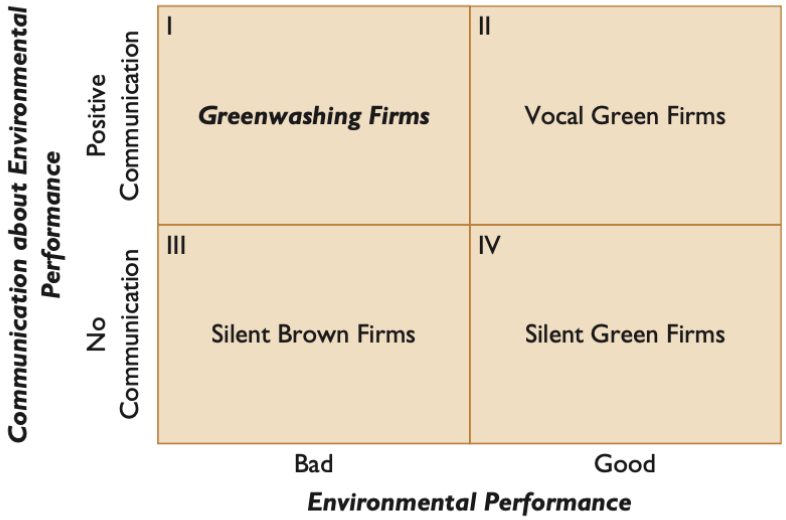


Figure 11 - A Typology of Firms based on Environmental Performance and Communication in Delmas & Burbano (2011)

3.3. COMPANY PERCEPTION

Over the past years, grocery retailer has been facing a shift from the usual method of retailing towards a more sustainable approach, incorporating environmental initiatives (Beitzen-Heineke *et al.,* 2017; Naidoo & Gasparatos, 2018; Tang *et al.,* 2016). Companies are

becoming aware of the sustainability concept and how their attitude towards it can impact share value and brand image (Goel, 2010).

Elkington (1998) raised the idea of reconsidering capitalism creating the Triple Bottom Line (TBL) theory. This model defends that sustainable development holds likewise economic achievement, environmental quality, and social equality which means that "companies aiming sustainability need to perform not against a single, financial bottom line but against the triple bottom line" (Elkington, 1998, p. 397). In other words, TBL theory proposes that firms can have a positive financial impact while incorporating social and environmental responsible behaviours (Gimenez, Sierra & Rodon, 2012). TBL emphasises that values-driven culture is present in all areas, even non-market, and non-financial areas of the company, and what are the outcomes on the company's performance (Goel, 2010). The sustainable corporate performance is measured, not only financially, but also socially and environmentally because it should generate profit, while caring about people and the planet (Fauzi et al., 2010). The three bottom lines are not steady, instead they are in variable fluidity. In the bottom, there is sustainability as it is emerging the theory, with economy hanging on ecosystem and society depending on economy, as figure 12 represents (Elkington, 1998).

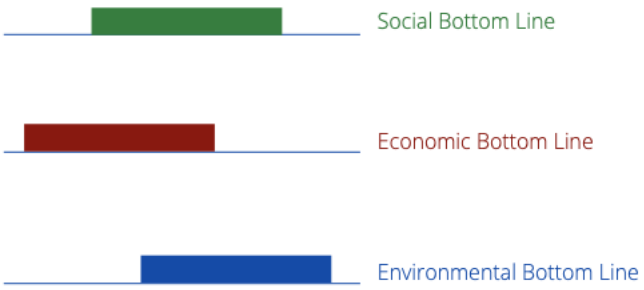


Figure 12 – Triple Bottom Line based on Elkington (1998)

The Social Bottom Line focuses on the impact on labour, social capital and community while embracing society's health, wealth, and education potential (Elkington, 1998). It aims to add value for all stakeholders impacted by business decisions through social initiates that contribute to equitable opportunities, having in mind the importance of encouraging diversity and endorsing quality of life (Gimenez *et al.,* 2012; Miller, 2020). The Economic

Bottom Line is probably the most predictable when studying a company and it is directly associated to profit figure used to analyse the performance of the company (Elkington, 1998). This line connects the evolution and growth of a company to the development of economy evolving support to the surrounding and upcoming generations (Alhaddi, 2015). The success of a company is still often related to the financial performance, pushing strategic plans intended to enlarge profit whereas minimizing charges (Miller, 2020). Nowadays, purpose-driven leaders are figuring out the importance of their company's impact on the earth deprived of impeding the financial performance (Miller, 2020). The Environmental Bottom Line refers to each company's footprint resulting from its operations, namely, waste, contamination, energy consumption, high levels of emissions and usage of toxic materials (Gimenez *et al.,* 2012). The Environmental Bottom Line focuses on initiatives that do not sacrifice the environmental goods for upcoming generations (Miller, 2020). Taking into consideration that companies were considered the main responsible for some environmental issues, they can influence and invest on optimistic changes, namely, optioning for ethically sourced materials (Miller, 2020). Elkington (1998) names the interaction between bottom lines as shear zones and there are three, between economic and environmental, economic, and social, and social and environmental, per table 3.

Table 3 - TBL shear zones based on Elkington (1998)

Shear Zone	**Definition**
Eco-efficiency	The interdependence between economic and environmental bottom lines is relate to concepts as eco-efficiency, ecological charge accounting and Environmental tax reform. This shear zone appeals for companies to offer competitively priced products or services that fulfils its customers whilst gradually decreasing environmental impacts and resources. Finally, it purposes to contribute to a more sustainable and reasonable future.
Environmental justice	The interdependence between the environmental and social bottom line evolves concepts as environmental justice, intra-generational and intergenerational equity. The intra-generational equity is related to equity problems of the current generation, while inter-generational equity consists of the equilibrium between the current generation and

	upcoming generations. This shear zone might be improbable but environmentalist and human rights activists found shared objectives as economically and socially disadvantaged people are more possibly to be environmentally underprivileged.
Business Ethics	The interdependence between the economic and social bottom line approaches ideas as economising, unemployment, minority rights, and business ethics. Ethical behaviour by individuals, organizations, or businesses is considered good, impartial, and honourable. The ethical initiatives focus not only on the own corporate behaviour, but also on the whole industry to which it belongs.

Elkington (1998) compares the three bottom lines to continental plates, as shown in figure 13, as they move autonomously, provoking earthquakes when they go against each other. Most challenges are related to the interdependence of the bottom lines, which the author names as shear zones to illustrate the joint between the variables (Elkington, 1998).

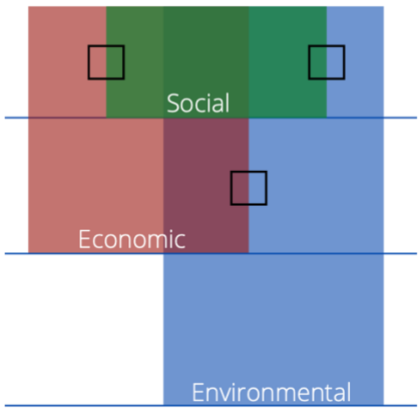


Figure 13 – Shear zones based on Elkington (1998)

Grocery retailers aiming to reduce waste can be seen as a practical example of Elkington (1998) concept of the Triple Bottom Line nowadays. Grocery retailers which are already aware of it, can diminish food waste and possibly progress their performance in the three bottom lines (Atkins *et al.,* 2018). One of the main undesirable aspects of grocery retailing is the food waste, which turns companies' strategy interested in the potential reduction of it (Beitzen-Heineke *et al.,* 2017). Considering the social bottom line, when avoiding food

waste, a company can redistribute the grocery, it can count a remarkable number of portions that can be redistributed with the recovered products, contributing to positive social outcomes (Atkins *et al.,* 2018; Cicatiello *et al.,* 2016). Regarding the economic bottom line, this strategy enables reducing waste and optimizing the companies' resources and usage, reducing costs from both manufacturing and transportation, which combined, can potentiate profit (Kumar *et al.,*2012; Tang *et al.,* 2016). Retailers recognize competitive advantages over its competitors, improving brand image and building loyalty through a circular economy which happens when goods at the beginning end-of-life phase are reimbursed into the supply chain for continuous usage (Vadakkepatt, 2021). Concerning the environmental bottom line, the minimization of the whole value of food waste contributes to the decreasing CO_2 emitted by transportation, saving resources and energy (Atkins et al., 2018; Righi et al., 2013). According to Naidoo and Gasparatos (2018), a sustainable approach should not be undervalued and only considered as a marketing tool. Instead, it should be taken as a possibility to optimize waste and turn it into new resources while promoting efficiency (Naidoo & Gasparatos, 2018).

Most of the companies are aware of the importance of sustainable practices and consumer's demand and exigence for more sustainable alternatives (Wandosell *et al.,* 2021). Moreover, company owners are paying particular attention to the selection of environmentally friendly suppliers in order to gain a competitive advantage (Ecer, 2020). A sustainable packaging is expected to be eco-friendly and contribute to the reduction of packaging waste keeping the safeguardance of the good (Auliandri *et al.,* 2018).

The increasing awareness and interest on reducing food waste implies the research for sustainable packaging designs, by reducing the usage of harmful products but keeping quality (Wandosell *et al.,* 2021). Consequently, the understanding of producers and suppliers about eco-friendly practices encouraged an increasing awareness and investigation, which impacted guidelines regarding its corporate social responsibility and wastage of materials (Ecer, 2020). Focused on how redesign can decrease the ecological impact from product packaging, the study investigates what can inspire an enterprise and what are the opportunities from redesigning packaging and contrastingly, understand what are the likely disadvantages that might come from it and how can the company eliminate it (Gustavo *et*

al., 2018). Therefore, these authors combined different aspects from redesign into three groups: motivations, opportunities and barriers, as per table 4.

Table 4 - Motivations, opportunities and barriers from redesign packaging based on Gustavo et al. (2018)

Aspects of redesigning	**Description**
Motivations	Incorporates the aspiration to associate economic rewards with sustainability and competitiveness. Grocery retail market is a price-sensitive and corporations found in sustainable packaging and redesign a strategy to lower the prices offered and become a top priority in their plan tactic. Redesign can be nowadays considered an innovating approach while generating profit, positively impacting the environment and meeting requirements.
Opportunities	Englobes the chances from redesigning the package, with cost reduction and/or ehnancement of the environmental and social aspects of sustainability. By studying customer purchasing habits, the company can understand what can be updgraded and what are the packaging redesigns opportunities. For example, the size of packaging can be increased since the consumer would prefer a bigger size - familiar - enabling the company to optimize on the process. This means a saving on transportation, storage, raw materials and energy, which would be eco-friendly. Allowing the company to combine economic and environmental gains. Other examples could be explored as the opportunity to reduce the size of the package, refill the product or transform the package into a reusable one.
Barriers and their mitigation	Comprises the uncertainties and barriers that can block the redesigns, associated with questions regarding how consumers from price-sensitive markets will react, how willl the sales be affected or how will a bigger packaging impact the number of consumers' visits. An example of a barrier is the investment from the supplier, covering the total costs from redesigning and without having guarantees of upcoming sales.

With the companie's perception towards the importance of sustainable packaging, zero packaging stores became significant alternatives. Free packaging supermarkets are aware of the importance to positively impact environment by including organic food, moral and local sourcing with reasonable trade (Beitzen-Heineke *et al.,* 2017; Scharpenberg *et al.,* 2021). The packaging free supermarkets present a totally different and disruptive idea of a grocery by rejecting disposable packages and increasing awareness over reusable packaging (Beitzen-Heineke *et al.,* 2017). According to Beitzen-Heineke *et al.* (2017), zero packaging groceries are still a niche concept that can be an example for conservative groceries which can adopt its model or still look for a wide number of opportunities on online shopping. As this is a recent and revolutionary concept, it can lead to insecurity and mistrust from the producers, retailers, and customers (Coelho *et al.,* 2020).

Considering the dimension of the market with conventional supermarkets, it would be a radical path to adopt zero waste packaging models as it was earlier done with biological products (Beitzen-Heineke *et al.,* 2017). This model has two types of stores: (a) 'neighbourhood' stores with a reduced size, similar prices and enhanced eco-friendly ethics and (b) bigger stores which are focused on improvement and influencing suppliers with a wide range of products and low prices (Beitzen-Heineke *et al.,* 2017). Free packaging grocery stores have their opportunities - from (a) to (d) - and barriers - from (e) to (g) - that impact the company's perception regarding this revolutionary concept:

(a) By rejecting the packaging, grocery can save considerable amount of resources and emissions as well as minimize the transport effort by prioritizing local manufacturers (Beitzen-Heineke *et al.,* 2017; Scharpenberg *et al.,* 2021); Therefore, this model can be seen as an opportunity to invest on product customization (Coelho et al., 2020);
(b) Influence their customers and packaging practices of suppliers (Beitzen-Heineke *et al.,* 2017);
(c) With consumers valuing sustainable initiatives, these sustainable practices are a chance to call the attention of new consumers and strengthen relationship and loyalty from the current range of customers (Coelho et al., 2020; Louis et al., 2021);

(d) Improve the companies' image and can be a competitive advantage (Beitzen-Heineke *et al.,* 2017; Louis *et al.,* 2021);
(e) Marketing can be a reason for more material usage than for essential product protection, forcing a deep change of marketing to adapt a zero-packaging grocery and consumer-brand relationship (Beitzen-Heineke *et al.,* 2017);
(f) Enlarged logistic complexity which demands rearranging supply chains to guarantee packaging is accessible and returned with an improved distribution, returns, brand image and loyalty (Coelho *et al.,* 2020);
(g) Establishing in customers trust in food safety and for retailers the demand of added space and cleanliness necessities, since it will be getting and warehousing reusable containers (Beitzen-Heineke *et al.,* 2017; Coelho *et al.,* 2020; Louis *et al.,* 2021);

3.4. CONSUMER PERCEPTION

Environment continues to be one of the main concerns for the customer and consequently, retailer started investing on ecological initiatives aiming to correspond to the interests of the customers (Childs *et al.,* 2019; Godefroit-Winkel *et al.,* 2021; Shamsi & Siddiqui, 2017). Along with it, the growing environmental perception of customers has also impacted the marketing department which started pursuing research regarding green products and the purchase behaviour of consumers associated (Kumar & Ghodeswar, 2015). Consumers are aware and interested on buying and consuming environmentally friendly products due to their awareness of the possible environmental impact (Shamsi & Siddiqui, 2017).

Godefroit-Winkel et al. (2021) studied the perception of the consumers regarding environmental initiates and how these have an impact on consumers' attitudes and loyalty towards the supermarket. Retailers' consumers have optimistic emotions towards the company, namely relevance and pride, when associating environmental corporate social responsibility (Godefroit-Winkel et al., 2021). Moreover, purchase attitude towards a green product demand for a thoughtful assessment of ecological, individual, and social consequences from its consumption (Kumar & Ghodeswar, 2015). Customers look forward to satisfying practical, emotional, and experimental personal requirements which impacts their purchase decision and replicates what is their eco-friendly lifestyle (Kumar & Ghodeswar, 2015).

When a consumer is aware and apprehensive of ecological problems, he practices more optimistic approaches towards the retailer, perceiving that it empowers environmental corporate social responsibility (Godefroit-Winkel *et al.,* 2021). Childs et al. (2019) studied the impact on consumers' perceptions of brand authenticity and attitudes when exposed to messages of distinct brand image (sustainable or disposable). Sustainable brands advantage from Corporate Social Responsibility campaigns and initiatives as there is an optimistic response and influence from customers (Childs *et al.,* 2019).

In the last few years, there has been a growing interest on the ecological consequences of conventional product packaging and the concepts associated (Herbes *et al.,* 2018; Kassaye & Verma, 1992). Perhaps driven by the increasing plastic pollution and its negative impact, consumers are becoming more alert for the use of grocery package and the interest on sustainable packaging has begun to upsurge in contrast to ordinary packages (Otto *et al.,* 2021). Conventional packaging materials have a negative impact on environment regarding carbon footprint, waste, lifetime, and decomposition (Otto *et al.,* 2021). Thus, alternative packages aim to have a better environmental impact while complying the essential functions of packaging: quality, safety, enabling transportation, logistics, and communication (Boz *et al.,* 2020). According to Scott *et al*. (2014), 63% out of 320 customers believe that opting to use eco-friendly packages add quality of life. Herbes *et al.,* (2018) highlights the relevance of the increasing customer awareness and understanding of the biomass manufacturing, taking into special consideration the numerous phases in the value chain: beginning of life, during the product use and the end of life.

Regarding the phase of consumers extraction and beginning of cycle, consumers value the optimization and minimization of the number of resources and materials used to manufacture the package (Jerzyk, 2016). According to Jerzyk (2016) study, most customers respond optimistically to messages in package confirming the usage of recycled materials and the preference on renewable energy sources. Recycling is becoming a widely known and supported movement along with the awareness around the use of resources for its manufacture (Jerzyk, 2016). This way, consumers tend to prefer packages with recycling claimers and information regarding its safety, health, and environmental influence (Jerzyk, 2016). Moreover, still in this initial phase, it is also relevant for customers, the reduction of overpackaging which does not negatively impact the quality and security of the product

(Monnot *et al*., 2015). Bearing this in mind, the elimination of overpackaging is perceived by customers as eco-friendly and convenience package of the product, depending only on the type of private label (Monnot *et al.,* 2015).

Concerning a later phase, while using the product, the environmental initiatives encompass non injurious and safety for human health while consuming the product (Jerzyk, 2016). According to Scott and Vigar-Ellis (2014), 49.2% of respondents agree that eco-friendly packaging is related to non-harmful for humans or environment, particularly when it is discarded. Thus, if a label has non-harmful disclaimers in the package, most customers will feel connected and perceive it as an eco-friendly packaging (Scott & Vigar-Ellis, 2014).

Regarding the last phase, which means the end of the cycle, corresponding to what happens to package after its production and consumption, consumers consider an eco-friendly packaging the ones that can be decomposable, reusable, or recyclable (Herbes *et al.,* 2018; Otto *et al.,* 2021; Scott & Vigar-Ellis, 2014). Customers perceive sustainable packaging when applied a circular economy, with associated terms, namely, recyclability, materials choice, and design (Otto *et al.,* 2021). The willingness to pay for recycling packages is influenced by the consumers' sociodemographic characteristics, namely, age, party-political association, reasons, and barriers for recycling (Klaiman *et al.,* 2016).

Bio-degradable, recyclable, and reusable are terms that customers perceive as eco-friendly packages with 41.2%, 36.5% and 20%, respectively, in a sample of 323 respondents (Scott & Vigar-Ellis, 2014). Consumers have preferences on decomposable packaging produces with non-renewable sources (fossil fuel), rather than non-decomposable packaged produced with renewable resources (Herbes *et al.,* 2018). According to Klaiman *et al.* (2016), average estimate of willingness to pay for recycled package is optimistic for all materials, distinguishing plastic followed by aluminium, glass, and carton. Consumers perceive virgin plastics as the most injurious material for the environment and recycled plastic and bioplastics are considered more eco-friendly packaging (Herrmann *et al.,* 2022). According to Herrmann et al. (2022), there is a positive average of willingness to pay for paper (0.56), recycled plastic (0.59) and non-packaging (1.33) and a negative average of willingness to pay for bioplastic with 75% of answers as in figure 14.

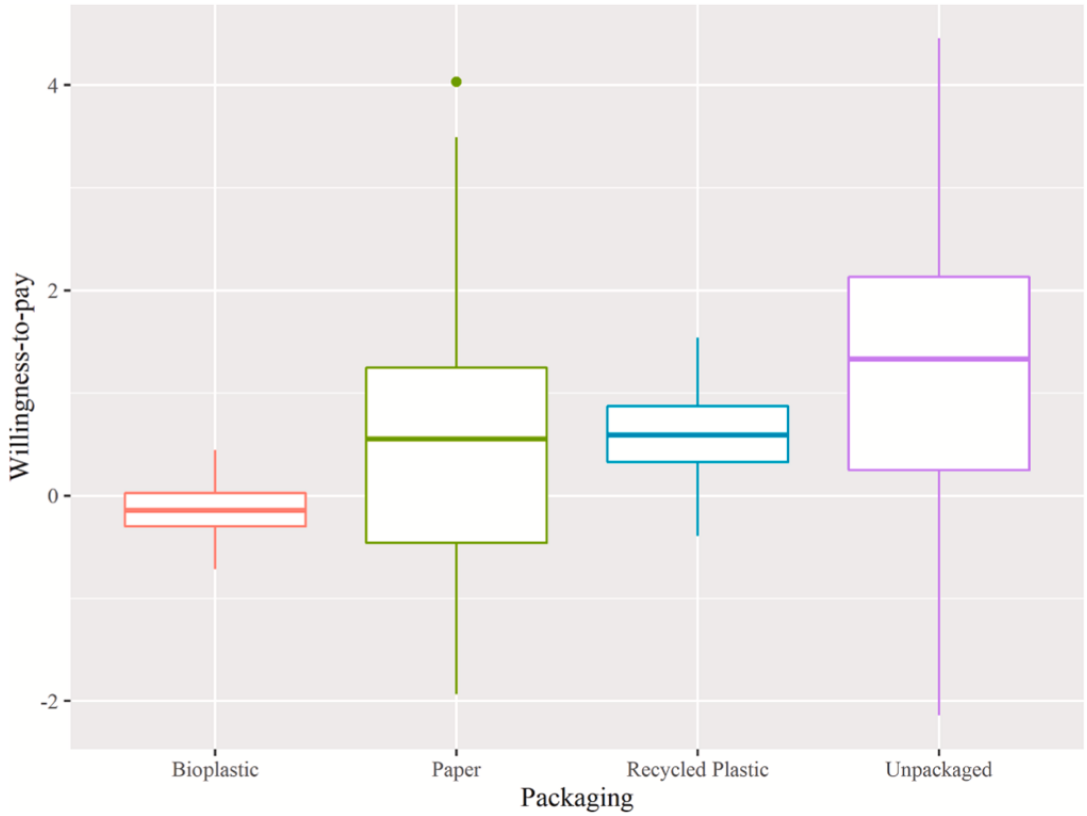


Figure 14 - Individual willingness-to-pay for different packaging substitutes (N= 252) – Herrmann et al. (2022) illustration.

II. FIELD WORK & ANALYSIS

CHAPTER 4 - EMPIRICAL METHODOLOGY

The purpose of this chapter is to identify and justify the chosen methodology, outlining the population, sample, and how the techniques will be conducted. The present study aims to analyse the perceptions of both consumers and companies about sustainable packaging, especially private labels in the grocery retail industry. To this end, an analysis of consumer perception on sustainable packaging was done through an online survey and in-depth interviews were conducted aiming to analyse the perception of companies on sustainable packaging. This research approaches both companies and consumers' perceptions with the main purpose of better understanding each perception and the importance given to sustainable practices.

Considering the main research question as the following: "How consumers and companies' perceptions on sustainable packaging differ?", which are complemented by the following secondary questions: "How does the consumer percept sustainability and how does it impact in their grocery shopping choices?", "How do private labels of grocery retailer's percept sustainability on its strategy specifically in the packing of products?", "How do perceptions differ among consumers? And among companies?" and "How does retail industry work in Portugal towards sustainability, focusing on private labels and its packaging of products?".

Tashakkori and Creswell (2007) defined mixed methods as "research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry" (Tashakkori & Creswell, 2007, p. 4). Mixed method approach offers the benefits of both quantitative and qualitative data for a study, by combining the two methodologies. In this way, a researcher can acquire insights from various levels and types of the study (Creswell & Creswell, 2003). Considering the rising studies of mixed method, it explains the question in shaping the perceived benefit of mixed methods research in comparison to exclusively quantitative or qualitative approach (McKim, 2017). By recurring to the mixed method, a researcher can gather both sorts of data concurrently during just one data collection stage (Creswell & Creswell, 2003). However, given the additional resources, time,

and skill needed to follow a mixed methods study, it is crucial to comprehend the perceived value of merging two different approaches (McKim, 2017).

According to Ivankova et al. (2006), mixed method approach can assume two different paths, either one that connects both approaches by choosing the participants based on the findings of statistical tests and choosing them for the second stage while collecting qualitative data or other that integrates both methods result, whereas studying and comparing the outcomes of the study to sketch propositions. For the present study, the second approach will be taken, by taken both methods simultaneously. Furthermore, online surveys and in-depth interviews will be crossed to conduct the analysis of both perceptions on sustainable packaging in specific private labels. The idea is to discuss the overall results, while combining the findings from quantitative and qualitative methods.

A hypothesis supports the focus on the research object and the proper choice proper emphasis (Milan & Slobodan, 2012). A hypothesis is a potential explanation for a theory that can be explored with further research to decide whether to reject or temporarily accept the hypothesis (Sukamolson, 2007). A theory is a proposition that has already been demonstrated and is typically supported by tested hypotheses which can serve as a springboard for brand-new hypotheses that can be used to support or contradict it, as well as other theories (Milan & Slobodan, 2012). A hypothesis should never be accepted as final because it could subsequently be disproved by additional information (Sukamolson, 2007). A hypothesis is an assumption that, if it is carried out correctly, will result in the expected outcomes specified in the assertion (Milan & Slobodan, 2012). Following all these considerations, the work is guided by the following research objectives:

- Perception of consumers and companies of what is a sustainable packaging
- Consumers' willing to pay for a more sustainable packaging
- Consumers expect more on sustainable packaging depending on product category
- Companies perceive sustainable packaging as part of the company strategy
- Companies perceive sustainable packaging depending on product category
- Generation Z and Millennials are more aware and prefer sustainable packaging

The present study will explore the mixed method, as quantitative and qualitative approaches will be taken into consideration. Regarding the quantitative, an online survey will be conducted focused on the perception of the consumer. This approach aims to gather a bigger number of answers and to reach short and direct answers. In order to complete analysis, a qualitative method will be conducted aiming to study the perception of the company. The qualitative method will be composed by 3 in-depth interviews and a content analysis aiming to collect a deepest analysis of the companies studied.

4.1. QUANTITATIVE METHOD

Quantitative method approach involves five steps: (1) defining simple questionings to be replied by the study; (2) defining contributors withinside the study (population and sample); (3) choosing the techniques to answer to what the study is proposing, through variables, measuring of the variables and overall design; (4) choosing the evaluation tools; (5) studying and analysis the results (Holton & Burnett, 2005). According to Sukamolson (2007), quantitative approach presents a vast number of advantages, namely, the fact that it is beneficial for undertaking target market segmentation, it enables dividing the population into groups even with the particularity of each participant, it is likewise beneficial to quantify opinions, attitudes and behaviours, it empowers the understanding of how the entire population feels about a specific topic and it is particularly suitable as it checks out the hypotheses.

Quantitative research gathers numerical data in numerical form and analysis it by using mathematically based methodologies, this way data must be, also, in numerical form to employ mathematically based approaches (Sukamolson, 2007). This methodology normally evolved from a particular theory, both proposed or formerly developed, which results hypotheses which might be then measured quantitatively and meticulously analysed and evaluated consistent with reputable studies procedures (Holton & Burnett, 2005). On the other hand, for qualitative research this is not possible as statistics cannot be used to examine qualitative data since they are not always or typically quantifiable (Sukamolson, 2007).

Quantitative research assumes different forms, for example, survey research which employs statistically precise questionnaire design and scientific sampling aiming to determine population characteristics (Sukamolson, 2007). Survey research began with telephone

surveys in the 1960s, computer-assisted face-to-face surveys in the 1980s, internet surveys in the 1990s, and related mobile surveys in the 2010s, and has been always aware to new technological advances (Vehovar & Manfreda, 2008). For this purpose, the present study will assume an online survey considering the advantages offered by this method. The main objective of this survey is to analyse consumers perception on sustainable packaging in the grocery retail industry and examine how consumer awareness for sustainability has become progressively impacting and tending their perception to favour companies involved in environmental principles and initiatives. The research method will count with sampling, survey design, survey administration, and data analysis (Sukamolson, 2007). The collection of survey data based on standardized questionnaires sent to samples (or entire target populations) is an important data collection tool in various modern research fields (Vehovar & Manfreda, 2008).

According to *PORDATA* (2022a), resident population means the group of people who, regardless of whether they were present or absent in a particular accommodation at the time of observation, lived in their usual place of residence for a continuous period of at least 12 months prior to the time of observation, or who arrived at their place of habitual residence during the period corresponding to the 12 months prior to the moment of observation, with the intention of staying there for a minimum period of one year. The last information available from INE (Instituto Nacional de Estatística) regarding the resident population of Portugal from 2021 constitutes an ad hoc exercise of estimates of the resident population in Portugal, for December 31, 2020, based on the provisional results of the 2021 Census (INE, 2021). This exercise defends that total resident population of Portugal is 10.344.802 from which 4.921.170 are male and 5.423.632 are female (INE, 2021). According to *PORDATA* (2022a), which published the same estimation as INE (2021), the main age groups are between 0 and 14, 15 and 64 and 65 or more, which are 12,9%, 63.6% and 23,5% of the total resident population of Portugal respectively.

On average, the Portuguese spent on average 3,7 days a year shopping in supermarkets or hypermarkets, with 84% going to at least two of these stores a week (ECO, 2022). Half of those consumers who still prefer physical spaces tend to go at any time, depending on the need, with one in five (21%) enjoying the freest time on the weekend (ECO, 2022). In 2021, Portuguese families spent over 300 million euros on supermarkets and hypermarkets, for a

total of 10.665 thousand million euros which corresponds to a growth of 3.1% compared to the previous year, 2020, the first of the pandemic, in which sales had already shot up 7.4% compared to 2019 (ECO, 2022). The main requirements for respondents to participate in this study is often do grocery shopping in Portugal. This way, considering the population size, a 95% of confidence level and a 5% of margin of error, the sample size calculator from SurveyMonkey recommend that the study should have a sample of 385 respondents (SurveyMonkey, 2022).

Considering that this online survey aims to analyse consumers perception regarding sustainable packaging in supermarkets, the survey will analyse this behaviour in a wide range age description to allow understanding possible differences that can happen between generations. Participation was voluntary and participants were informed about the purpose of the study, the survey was online during a period of 21 days and the sample consists of 583 consumers. This online survey was available in personal social networks such as *Whatsapp, Instagram* and *LinkedIn*, and sampling was conducted using a snowball approach, which means that each person completing the online questionnaire was encouraged to spread and forward the link to some of their personal contacts as well. The survey was simple, well-structured and it will take around 8 minutes to avoid impatient participants that could lead to inappropriate answers. The survey was available in Qualtrics, data will be collected through this online survey tool, and it will have a deepest analysis of the results in MS Excel.

Regarding the structure of the online survey, it begins with a brief introduction, including a description of the study, thanking respondents in advance, appealing to the honesty of their responses, and acknowledging that all responses are anonymous and confidential. The online survey was structured in three groups of questions: (1) Consumer Profile, (2) Visual examples and (3) Sustainable packaging. This can be consulted in Appendix A.

The first group of questions aims to collect the basic information regarding the profile of respondents (from question 1 to 3) and likewise, study the type of consumers (from question 4 to 10). The questions of this group will be mostly closed-ended and multiple-choice questions, aiming to gather the most objective answers. The first three questions of the survey aim to collect basic information about the respondents: age, gender, and nationality. The first question of the questionnaire was regarding the age of respondents and instead of

asking in an open-ended question, receiving the exact number, the questionnaire aimed to already channel consumers into each generation. This way, when in the analysis, by narrowing the age into four groups of ages that correspond to the generations, it will be possible to already study if there is a relation between generation and perception of the respondent. To do so, the generations name and age groups were per the following table 5, which was inspired in Desjardins (Ed.) (2021) who correlates the age groups with the main events in the U.S. History either economic, political, and cultural.

Table 5 - Generation by age in 2022

Generation	**Born within period**	**Age in 2022**
Generation Alpha	2013 - present	9 and below
Generation Z	1997 - 2012	10-25
Millenials	1981 - 1996	26-41
Generation X	1965 - 1980	42-57
Baby Boomers	1946 - 1964	58-76
The Silent Generation	1928 - 1945	77 and over

After collecting the basic information regarding the respondent, survey continues to a question number 4 that aims to evaluate if the respondent fits the criteria: to do grocery shopping in Portugal at least once per month. Followed by questions number 5, 6 and 7 that aim to gather information regarding the gross individual income per month, the number of people household and the average weekly supermarket expenditures, respectively. Then, as this study considers private label products, question number 8 gives a short description of what a private label is taking into consideration, McGoldrick (1984) who refers that private labels should be used to refer generic products and own labels, or retailer brands combined. After presenting the concept to the consumer, it will be asked in a multiple choice what does the respondent usually prefer from private label products: inferior price, better quality, recurs to mores sustainable packaging, an option to rarely buying products from private label and other, leaving space for an open answer.

Then, to understand the importance for the consumer of package when standing in front of a shelf at the supermarket, question number 9 will ask to rank the following characteristics from (1) the most important to (4) the least important: price, quality, package, and nutritional

label of the product. Finally, question number 10 will ask for what is more important in package, when standing in front of a shelf at the supermarket, either visual aspects (colour, material, picture or shape) or general information (name of the product, nutritional information, expiration date or eco-labels). This question was based on the literature review that explores visual and general aspects of the package (chapter II. 2.3. Consumer perception of packaging).

The second group of questions, from question number 11 to 13, aims to analyse the consumer perception regarding what it is a sustainable packaging by showing different visual examples as shown in figure 15 below. Question 11 aims to test how consumers seek the reduction of superfluous and excessive packaging. In this case, it will be used a toothpaste packaging which is usually composed by a carboard box and inside it, the proper plastic stick with the product - option A (Pietro, 2020). Instead, some brands chose to reduce the excess, assumed as the carboard box, and only have the toothpaste bag - Option B (Pietro, 2020). Question 12 aims to test loyalty to bulk sale - option B (NIT, n.d.) - when compared to plastic packaging - option A (DHgate, n.d.) - and mixed paper and plastic packaging - option C (Alibaba.com, n.d.) - all these examples of packaging were given to dry food. Lastly, question 13 aimed to understand what type of material consumers seek as more sustainable: plastic - option A (ILPRA, n.d) -, glass - option B (iStock, n.d.) - and cardboard - option C (Green Packaging, n.d.).

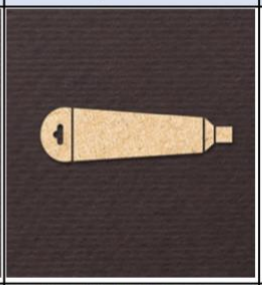
	Option A	Option B	Option C
Question 11			-
Question 12			
Question 13			

Figure 15 - Group 2 and respective visual examples

The last group of questions of the online survey aimed to collect information on what consumers understand by sustainability, eco-friendly consumer, sustainable packaging, sustainable materials and understand Willingness-To-Pay (WTP). The question 14 will have a 5-point Likert scale, asking the respondent to choose on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree) what consumer position do they have related to the following statements:

a) Environmental balance is a priority (Duroy, 2005; Omoogun *et al.,* 2016)
b) It is important to preserve the environment for future generations, providing social and economic wellbeing (IUCN, 1980)
c) Sustainability can be outlined as the preservation of welfare throughout an indeterminate period of time with the maintance and maximization of natural resources (Kuhlman & Farrington, 2010; Olawumi & Chan, 2018)
d) I consider myself an eco-friendly consumer

Likert scale is useful in different conditions, namely, when the idea is to study a belief or opinion, when the idea cannot be tested definitely and precisely and finally, when the idea is measured as sensitive which can lead to respondents to avoid the answer, except within bigger series (Chimi & Russell, 2009). According to different authors, part of the above statements (a, b, and c) are definitions of sustainability, and this question aims to map consumers position and opinion. Last statement (d) aims to measure the perceived environmental friendliness of respondents.

The following question 15 aims to test what consumers knowledge regarding the ecological symbols is available in the packages. The markets (?) are becoming more competitive and the importance of environmental friendliness of each product is impacting consumer behaviour, hence, eco-labels are designed to clearly communicate basic information about recyclability, harmful substances, and the origin of raw materials (PCC, 2022). This way, this question will show four eco-labels, asking for its meaning which were confirmed at PCC (2022) article. Each eco-label will match one of the following options, having 2 points with no correspondence to a label: (1) recyclable (Sociedade Ponto Verde, n.d.), (2) packaging contributes financially to Sociedade Ponto Verde (Sociedade Ponto Verde, n.d.), (3) reusable, (4) Organization that ensures that world's forests are responsibly (FSC, n.d.), managed (5) compostable (European Biplastics, 2019) and (6) biodegradable. Consider the following figure 16 which represents the correct association between the meaning and the correct symbol:

	Option A	Option B	Option C	Option D
Meaning	Recyclable	Organization that ensures that the world's forests are managed responsibly	Compostable	The packaging contributes financially to Sociedade Ponto Verde
Symbol				

Figure 16 - Eco-labels meaning

From question 16 to 18, the main objective is to measure the perceived environmental friendliness of different criteria that can assume environmentally friendly packaging options. To do so, in all questions it was used a system of ranking from fours options what the respondent perceives as (1) most sustainable packaging to (4) least sustainable packaging. Question 16 will be to rank between the following options: (a) mono-material packaging, (b) recyclable packaging, (c) reusable packaging and (d) biodegradable packaging. Question 17 was more focused on the production, and the following options: (a) made from recyclable materials, (b) minimized waste and optimize the resources used, (c) whenever possible applied a circular economy and (d) preference on renewable energy sources during the package production. Finally, question 18 is focused on the materials used, which lead the respondents to rank the following materials: (a) glass, (b) plastic, (c) paper and (d) metal.

Question number 19 aims to understand the consumer behaviour when comparing two similar products and at the same price, one has a more sustainable packaging than the other product. This question will have a 5-point Likert scale, enquiring the respondent to select on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree) what consumer position do they have related to the following statements, indicating how they agree: (a) I would buy product A as it has a more sustainable package than product B; (b) I would buy product A as it has higher quality over product B; (c) In case the product is categorized as alimentary, I would buy product A and (d) In case the product is categorized as non-alimentary, I would buy product A. This way, it is possible to collect how the consumer would behave, if it would buy as it has a more sustainable packaging or as it has higher quality or depending in its category either alimentary or non-alimentary. Question number 20 uses a simple close-ended question to understand if the consumer would buy the product with a more sustainable packaging for a slightly higher price. If the answer is yes, question number 21 will appear and ask for price difference (5%, 10%, 15% or higher) the consumer would consider paying. This last question aims to gather information regarding WTP towards products with more sustainable packaging. Finally, last question of the online survey, question number 22 aims to understand in which area the consumer seeks for more sustainable packaging, either alimentary, non- alimentary or both.

4.2. QUALITATIVE METHOD

Nonetheless it ought to be perceived that a comprehensive meaning of qualitative method is challenging to accomplish, there are a variety of approaches and convictions it covers (Ormston *et al.,* 2014). This way the authors collect the following common characteristics to describe qualitative method:

- "In-depth and interpreted understanding of the social world of research participants by learning about the sense they make of their social and material circumstances, their experiences, perspectives, and histories." (Ormston *et al.,* 2014, p. 4).
- "The use of non-standardised, adaptable methods of data generation that are sensitive to the social context of the study and can be adapted for each participant or case to allow the exploration of emergent issues." (Ormston *et al.,* 2014, p. 4).
- "Data that are detailed, rich and complex (again, the precise depth and complexity of data may vary between studies)." (Ormston *et al.,* 2014, p. 4).
- "Analysis that retains complexity and nuance and respects the uniqueness of each participant or case as well as recurrent, cross-cutting themes." (Ormston *et al.,* 2014, p. 4).
- "Outputs that include detailed descriptions of the phenomena being researched, grounded in the perspectives and accounts of participants." (Ormston *et al.,* 2014, p. 4).

For the qualitative method, the current study will recur to in-depth interviews and document analysis. Semi-structured in-depth interviews are for the most part coordinated around a group of predetermined open-ended questions, with different questions arising of the interview among questioner and interviewee (DiCicco-Bloom & Crabtree, 2006; Showkat & Parveen, 2017). Semi-structured in-depth interviews are the most generally used in a qualitative approach for subjective examination and can happen just directed once for an individual or groups and require between 30 minutes to a few hours to finish (DiCicco-Bloom & Crabtree, 2006). Participants on in-depth interviews are urged and elevated to talk and deepen in the subject under study, aiming to search for a foster connection with the respondent to accomplish a total comprehension of their viewpoint and allowing the author

to investigate ideas for additional examination and enlightening investigation (Showkat & Parveen, 2017).

Regarding the document analysis, report examination is a qualitative methodology for analysing or assessing reports that can be both printed and electronic materials, these can take a variety of forms, namely, organisational, or institutional reports (Bowen, 2009). The current study purposes to complement the in-depth interviews with the analysis of documents and references that could be made in the interview or independently of the references, documents from the grocery retail brands that were not interviewed. Organizational and institutional reports have been a staple in qualitative approach for a long time and increasing, but what has been fairly evident is the deficit of adequate detail in many reports tracked down (Bowen, 2009). That is why this method will be used as a complementary analysis of the in-depth interviews to study the perception of companies.

The main purpose of this in-depth interview is to analyse the perception of companies regarding sustainable packaging and how it can be integrated in their strategy. In this phase, the study will collect information through 3 n-depth interviews to some brands that have grocery stores, supermarkets, or hypermarkets in Portugal, which it will be the main requirement. For this research, the sample will be intentionally chosen allowing a cross information between quantitative and qualitative methods and between consumers and companies perspective. The sample was purposely selected taking into consideration the first chapter of the literature review. As previously studied, there are different dimensions in the industry and for this sample, this was considered and deliberately to have at least one player representing a smaller, medium, and larger dimension.

The in-depth interviews were done with a single company at a time and with the respondents that the company deemed as most appropriate. Because of the current situation of Covid-19 pandemic in Portugal, the in-depth interviews were done through an online platform, namely Zoom and MS Teams which allows an easy and affordable way to do a video communication. The in-depth interviews will take from 30 to 60 minutes, most significant statements will be gathered from the questioner, and if possible, it will be recorded in audio and later transcribed for most profound analysis and understanding. These interviews will be studied and analysed through an interpretative examination. With respect to

confidentiality and ethical considerations, the companies will have the option to remain anonymous and after the in-depth interviews, questioner will do a debriefing of the interview to avoid false statements.

The companies were contacted through an e-mail and as it will be a semi-structure interview, they will access the pre-designed questions to guide the conversation and to possibly prepare the interview with proper and exact data. Through the in-depth interview, the questioner will be able to add new questions according to the flow of the interview and the answers of the participant. This will allow a more adaptable and a benefit for the review since it would permit the presence of emergent subjects and if some answer was unclear, ask for an explanation and understanding the reasons behind certain answers.

These interviews will be divided into 2 groups. Firstly, the questioner will do a brief description of the subject under analysis and thank in advance for the availability of the respondents. The second part will follow the script that is available in the appendix B. The first question will be asked with the purpose of getting an overview of the strategy and point of view of the company regarding sustainability and sustainable packaging in the grocery retail industry in Portugal. This question will be sub-divided into three questions to understand if the company seeks that most companies are already adept of sustainable practices, if sustainability and sustainable packaging are emerging subjects that society is becoming aware in recent years and if there is still room for measures to be taken that guarantee a path to a more environmental world that respects sustainable practices. Then, the second question aims to collect information and understanding regarding the principles that the company considers that ensures a sustainable packaging. This will involve the type of materials preferred, if it involves optimisation of the resource, whenever possible reduction of superfluous packaging and if possible, the application of a circular economy. This way, the question will be divided into 2 sub-questions to explain and support the main question by asking the type of materials used and resource optimization (energy and natural resources).

Afterwards, focusing on its private label, the question number 3 aims to study what the positioning of the company in Portugal is regarding sustainability and especially in the use of sustainable packaging in their products. This question aims to filter the type of perception

and strategy of the company in the industry, to better understand the initiatives implemented towards sustainable packaging. This question is divided into 3 questions to understand if it is a zero-waste packaging, the percentage of sustainable packaging that is used by the private label and what measures to combat the use of single-use plastic have been implemented. To complement the understanding of the positioning of the company, the questioner will ask regarding the perception of the usage of sustainable packaging incorporated and taking into consideration the strategy of the company. This question deepens into the understanding of measure and initiatives that are being implemented to promote the use of sustainable packaging, which will enable the gathering of more concrete actions that demonstrate the perception of the company.

To study if company perception regarding sustainable packaging differs according to the category of products, question number 5 asks about the importance of the use of sustainable packaging in food products and compares it with non-food products. And still invites the company to expose the percentage of sustainable packaging that is used by the private label in alimentary and non-alimentary products. Finally, question number 6 aims to understand what the company perceives of consumer behaviour towards sustainable packaging and if this can be translated into more WTP for products with sustainable packaging. In the end of the interview, the respondents will be asked if there were no other topic that would like to be covered and it would be relevant to address to the study, ensuring that the interview gathers as much information as possible.

CHAPTER 5 - FINDINGS AND DISCUSSION

This chapter has two main goals to describe the findings gathered and to elaborate a discussion based on this collected. The purpose of the first part is to expose and describe the collected data from the online survey, in-depth interviews, and documents study. Then the second part aims to deepen analyse the gathered information and highlight the main assumption that can contribute to a better understanding of the perception of companies and consumers regarding sustainable packaging.

Online Questionnaire

Out of the total of 583 responses that the online survey collected, only 401 answers were validated, considering the two criteria that each answer had to meet and be considered a confirmed reply:

- To answer all the question in the questionnaire
- Not to answer "Never" in the question regarding the frequency of doing grocery shopping in Portugal.

Taking this into consideration, from the total of 401 validated answers, 31% belongs to Generation Z, 24% are Millennials, 23% is from Generation X, then 20% fits into the Baby Boomers and only 1% from the Silent Generation, as in figure 17. The questionnaire was available in personal social networks and sampling was conducted using a snowball approach, which leads to the expected result that most responses were in generation Z and Millennials as they include the closest ages to the first contacts made.

Most of the respondents were female (63%), 36% were male and the remaining 1% were either non-binary or preferred not to say. This corresponds to 146 male, 253 female, 1 non-binary and 1 that preferred not to say. Moreover, when combining these two variables, data shows that most of female answers are of women with 10 to 25 of age, belonging, therefore, to Generation Z with 42%, and that most male answers are from Millennials generation with 40%. Baby boomers is the most balanced sample with 46,3% respondents being male, 52,4% female and 1,2% preferring not to say.

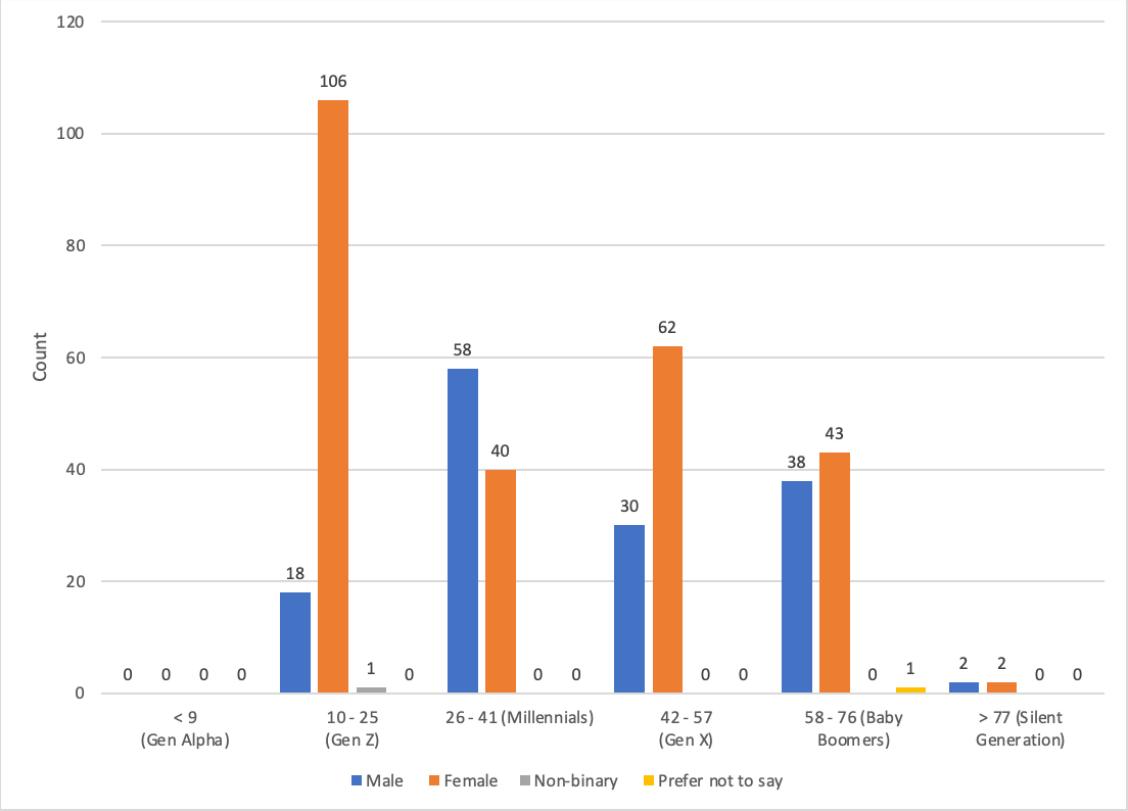


Figure 17 - Number of responses per age and gender

Regarding the nationality, only a minority of 5% was not Portuguese as figure 18 shows. Thus, 379 people that answered correctly to this questionnaire were Portuguese. These answers can, nevertheless, give a hint on differences in knowledge and interpretation of the sustainable concept for Portuguese and foreign people. As expected, in all the ranges of ages, the majority are Portuguese.

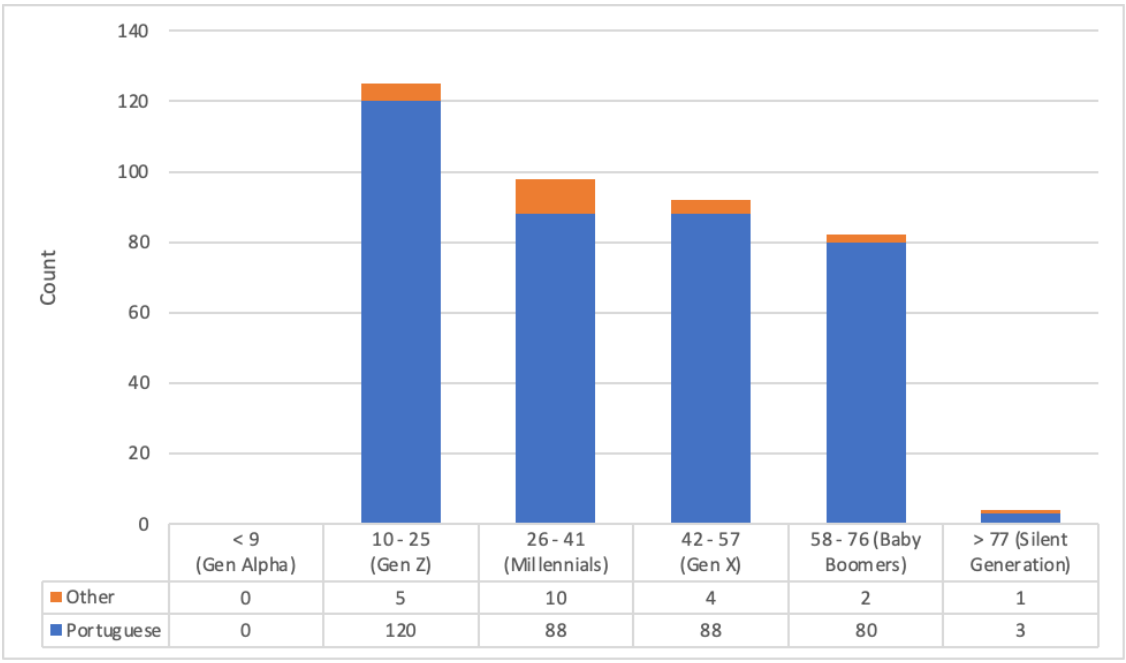


Figure 18 - Responses per nationality and age

Figure 19 represents the frequency of grocery shopping according to the genders and results show how the behaviour does not differ between genders. The least common is to do it just once to twice per month with 20% of respondents, followed by 36% doing it three to four and finally, 44% doing grocery shopping more than four times, that corresponds to 82, 143 and 176 respondents respectively.

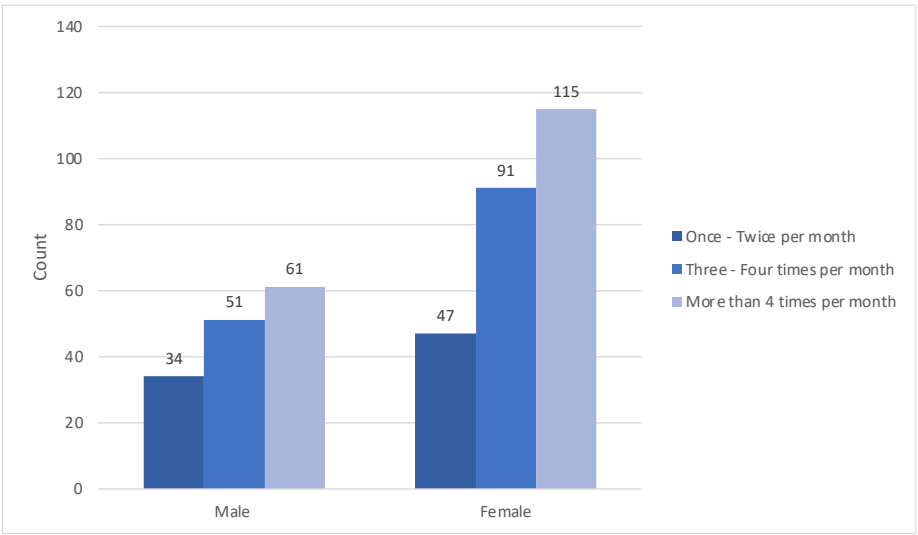


Figure 19 - Number of responses per frequency of doing grocery shopping in Portugal and gender

Considering the gross individual monthly income displayed in figure 20, 72 respondents do not receive an income, which corresponds to 18%, while 61 respondents receive below 1.000€ that corresponds to 15%, while 29% corresponding to 116 people have an individual income between 1000€ and 2000€. Finally, most of the answers (38%) correspond to a monthly gross income higher than 2000€ which matches to 152 respondents. In the figure below it can be observed that most of the people (86%) who do not have an income belong to Generation Z. As the interval of income increases, there is a decrease in the weight of generation Z, which is expected as people of this generation start entering the job market, thus with lower incomes. On the other hand, there is an increase in the percentage of millennials, generation X and baby boomers as these intervals of income are increasing.

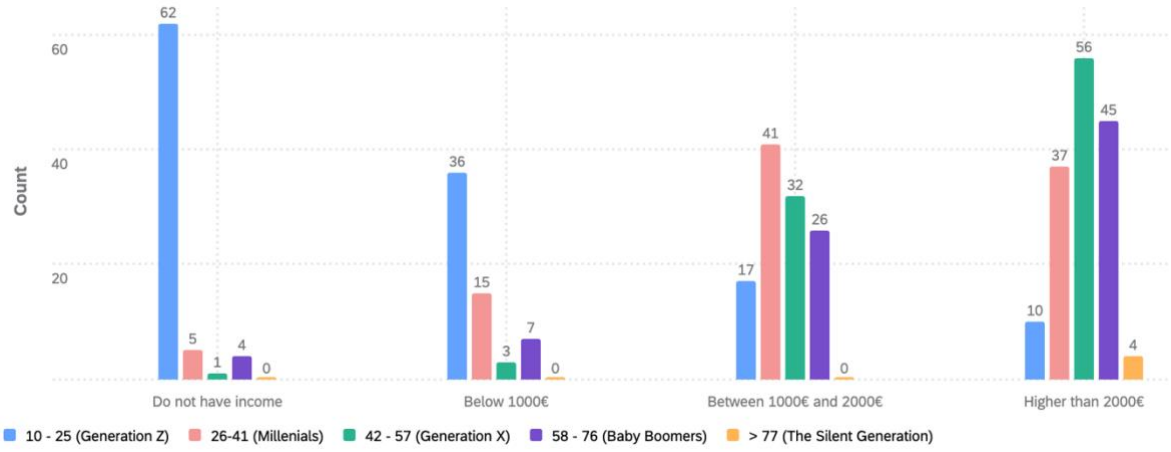


Figure 20 - Number of responses per monthly gross individual income and generation

Regarding the people household shown in figure 21, 39% is between one and two, 45% is between three and four, 14% is between five and six and the remaining 2% is 7 or more. Most people (41%) answered that their average weekly supermarket expenditures are between 50€ and 100€, followed by 26% of respondents expending between 100€ and 150€, 19% spending less than 50€ and 15% spending more than 150€. As in figure 21, many respondents answering that they spend less than 50€ a week have one to two people belonging to the household, which corresponds to 51 respondents over 75. Most of respondents belonging to a one to two people household have an average weekly supermarket expenditure between 50€ and 100€. Most of respondents that have three to four people belonging to the household, usually spend between 50€ and 100€. Then, the respondents with five to six households, mostly spend between 100€ and 150€.

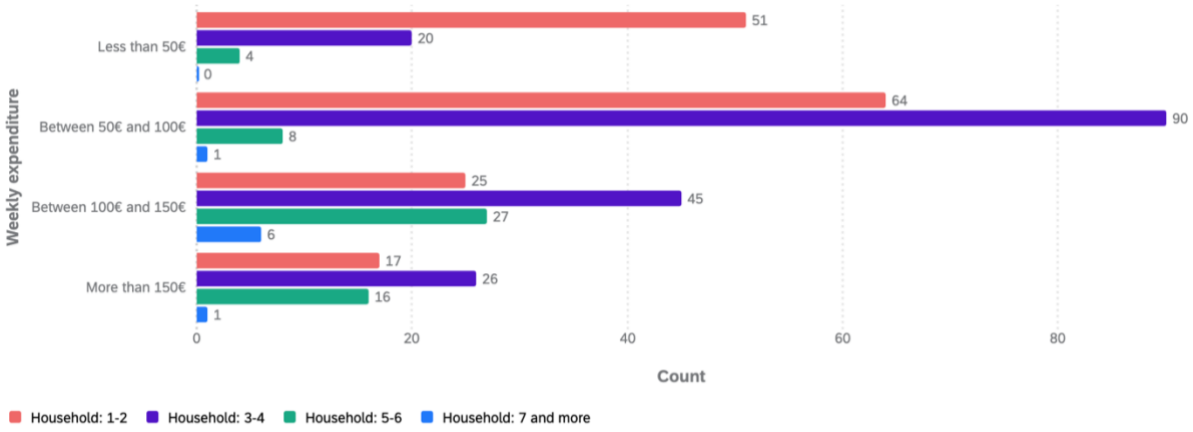


Figure 21 - Number of responses per weekly expenditure and household

Regarding the question about the gross individual income, it would be interesting to cross this variable with the average weekly supermarket expenditures, demonstrated in figure 22. Regarding people receiving a gross individual income lower than 1000€, 28 respondents out of 61 spend less than 50€, corresponding to 46%. Regarding the group of respondents who receive between 1000€ and 2000€ as well as the group receiving more than 2000€, there is a similar scenario, where the majority spend between 50€ and 100€ and followed by expenses between 100€ and 150€. Regarding the group of people that do not receive any income, it was expected to have the majority having the lowest level of expenditures. However, there is an alike distribution of responses for all ranges of weekly supermarket spendings. Probably, the respondents considered the weekly supermarket expenditure as the one in charge of the entire household supermarket shopping.

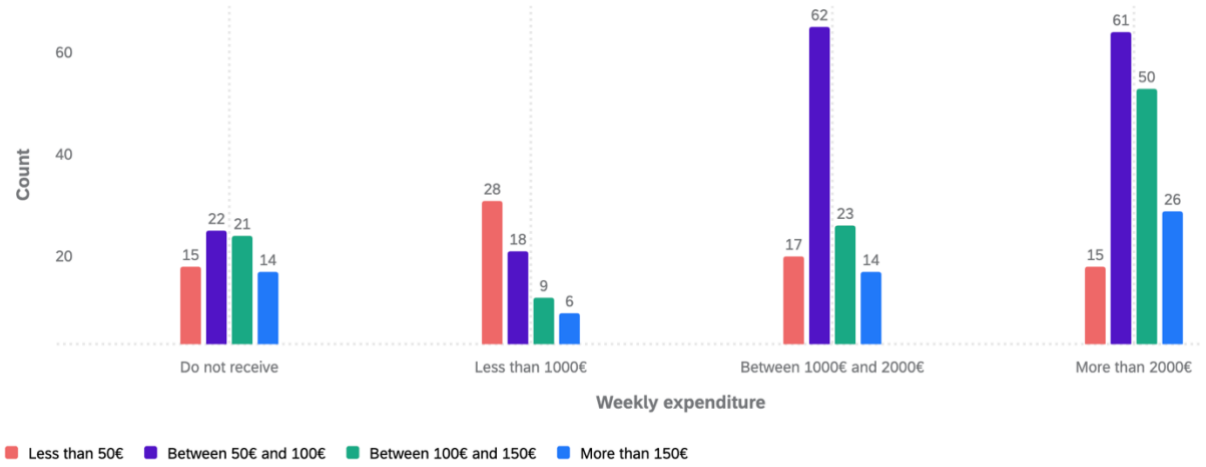


Figure 22 - Gross individual income and weekly expenditure

In question number 8 of the questionnaire, most of the respondents (51%) considered the price as a determining factor in the choice of a product when comparing similar products, followed by quality, for a quarter of the respondents (25%). In the total sample, around 17% of people mentioned that they rarely buy private label products and only 16 people mentioned other reasons for purchasing private label products, as shown in figure 23. When answering last option: "other, please specify", three respondents revealed that their choice is not for the private label as there is loyalty to the brand, two answered that it depends on the private label, another argued that it varies between product category, another defended that it depends on the brand awareness, another indicated that price is crucial if quality is not a differentiating aspect and another one defended that it depends on a good price-quality ratio.

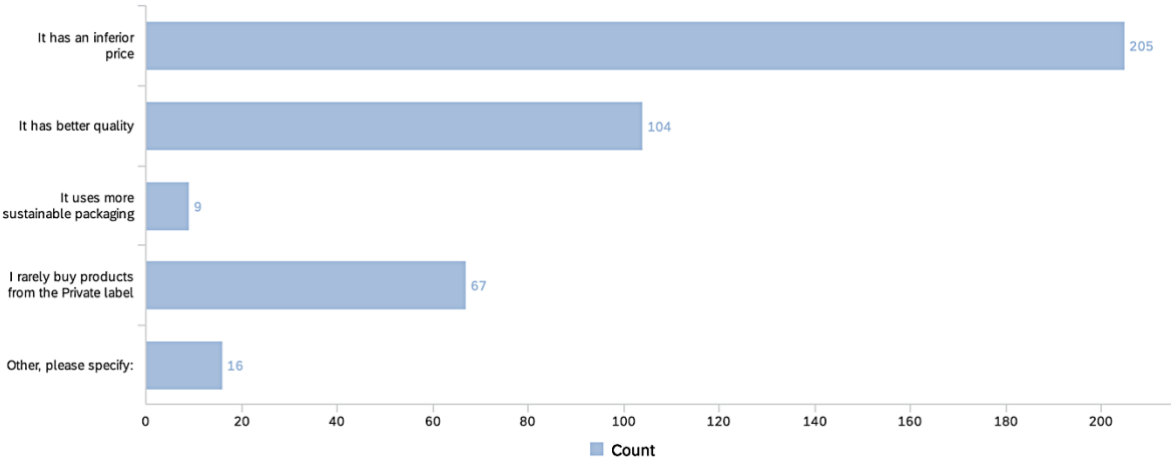


Figure 23 - Number of responses per reason of preference between brand and private label

In question 9, considering 1 as the most important and 4 the least important, quality of the product was considered the most important characteristic for almost half of the answers (48%). Followed by the price of the product which was the most important for almost 40% of respondents, a similar percentage, as the second characteristic. Of the four hypotheses, the package of the product, for about 58%, is the least important, as it can be seen in the figure 24 below.

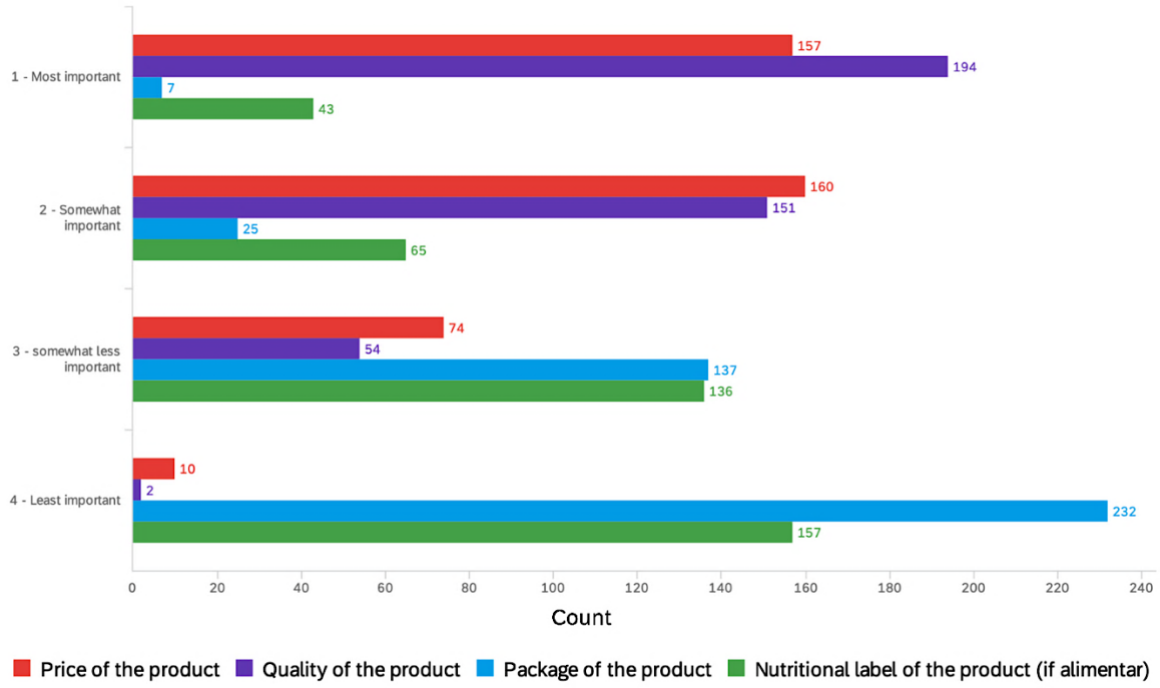


Figure 24 - Number of responses per product characteristics ranking from the most important (1) to the least important (4)

Regarding question 10, asking what was most important in the packaging, general information was pointed out as the most important, with71% of respondents. Interestingly the visual aspects only accounted for less than 29% of the choice as in figure 25.

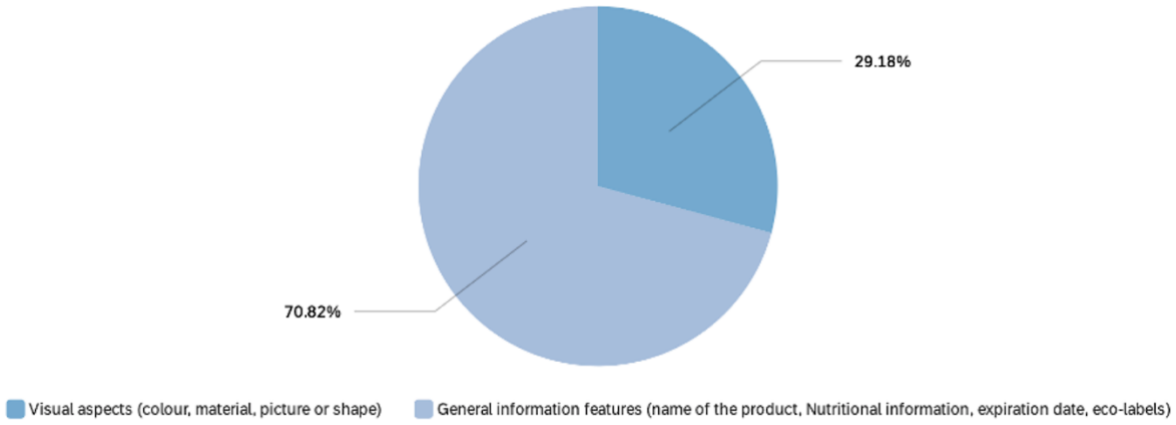


Figure 25 - Percentage of responses on the importance of visual or general aspects in the packaging

The second part of the questionnaire was to evaluate the perception of consumers on sustainable packaging, particularly the characteristics of the packaging that are considered to be sustainable. Results in table 6 showed that in question 11, it is evident that most respondents choose the second packaging option as the most sustainable (90%), and the first option with only 10%. The percentages of answers gathered for question 12 demonstrated how the most sustainable packaging was the package from the second image with the cotton bag for the dispensers. Then, 31% of respondents chose image 3 with a mixed packaging of paper and plastic and finally, 4% of respondents consider package 1 to be the most sustainable. In question 13, when observing 3 package options, 56% of respondents chose package from image 2 with the glass yogurt container and 40% of people preferred the mono carton package. The use of plastic in packaging was considered the least sustainable (4%). The information gathered from both question 12 and 13 demonstrate consumers hostility to plastic and preference for the other materials.

Table 6 - Percentage of consumer choice as the most sustainable packaging

	Option A	Option B	Option C
Question 11			-
% of responses	90%	10%	
Question 12			
% of responses	4%	65%	31%
Question 13			
% of responses	4%	56%	40%

The third part of the questionnaire intended to understand the perception of the consumer regarding the concept of sustainability and sustainable packaging, what makes a package more sustainable, how the consumer is aware of the current supply and what is their WTP for products with more sustainable packaging.

Regarding question 14, faced with the statement whether environmental balance is a priority, 71% of people totally agreed. About the importance to preserve the environment for future generations, 84% of people strongly agreed, as shown in table 7 below. Regarding the third statement, 69% strongly agree with the statement and when asked if the respondents consider themselves an eco-friendly consumer, 18% strongly agree, with 52% of respondents opting for the somewhat agree answer.

Table 7 - Respondents per agreement of four statements

#	Field	1. Strongly disagree	2. Somewhat disagree	3. Neither agree nor disagree	4. Somewhat agree	5. Strongly agree	Total
1	Environmental balance is a priority	1.25% 5	2.00% 8	2.99% 12	22.69% 91	71.07% 285	401
2	It is important to preserve the environment for future generations, providing social and economic well-being	0.50% 2	0.75% 3	2.24% 9	12.47% 50	84.04% 337	401
3	Sustainability can be outlined as the maintenance and optimisation of natural resources	1.00% 4	1.50% 6	2.74% 11	25.94% 104	68.83% 276	401
4	I consider myself an eco-friendly consumer	1.75% 7	8.73% 35	19.20% 77	52.37% 210	17.96% 72	401

Regarding question 15, in the first symbol, 74% of the sample manifests knowledge of the symbol by answering Recyclable and 19% considered it as a reusable symbol (table 8). In the second symbol, 19% considered it reusable and 73% of respondents answered that was the symbol of FSC, which means that the majority got it correctly. The third symbol, compostable, was identified by less than half of the people (45%), with 26% of people replying as Biodegradable. For the fourth symbol, only 29% of the sample answered correctly as Sociedade Ponto Verde, with 33% falling on reusable, 21% answered that it was a recyclable symbol and 9% answered biodegradable. In general, respondents know the meaning of 3 out of the 4 symbols, with Sociedade Ponto Verde the less known.

Table 8 - Number respondents per choice of the symbol's definition

Meaninng / Symbols	Recyclable	Packaging contributes financially to Sociedade Ponto Verde	Reusable	Organization that ensures that the world's forests are managed responsibly	Compostable	Biodegradable	Total
	74.06% 297	3.24% 13	18.70% 75	0.50% 2	0.75% 3	2.74% 11	**401**
	0.75% 3	11.22% 45	3.99% 16	72.82% 292	5.24% 21	5.99% 24	**401**
	0.50% 2	5.99% 24	7.48% 30	13.97% 56	45.14% 181	26.93% 108	**401**
	21.45% 86	29.43% 118	33.17% 133	2.74% 11	3.74% 15	9.48% 38	**401**

When interpreting the answers collected in question 15 and contextualizing according to the respondent's generation, as shown in table 9 below, it is possible to visualize how the majority the correct answers were done by Generation Z and Millennials. In the first symbol that represented the recyclability of the packaging 30% of the correct answers were made by Generation Z, 28% by Millennials, followed by Gen X with 24% and Baby Boomers with 18%. Regarding the second figure, 34% of the correct answers were from Generation Z, followed by 23% from Millennials, 22% from Generation X and 21% from Baby Boomers. In the third sign, Millennials were leading with 29%, followed by generation Z, generation X and baby boomers with 26%, 25% and 18%, respectively. Finally, regarding the fourth that had the least corrected answers in total (118), it had Millennials foremost with 31%, Generation Z with 26% and Generation X with 25% and finally, baby Boomers with only 17%.

Thus, regarding Generation Z, 70% answered correctly to the first symbol, 80% to the second figure from FSC, only 38% answered properly to the compostable image and 25% of the sign representing Sociedade Ponto Verde. Concerning people from 26 to 41 years old, Millennials, 85% answered accurately to the first symbol, 67% to the second, 54% to the third and 38% to the fourth. About Generation X, responded accurately 76%, 68%, 50% and 32% to the first, second, third and fourth symbol, respectively, which demonstrates once again the lack of knowledge regarding the symbol corresponding to Sociedade Ponto Verde.

Finally, Baby boomers answered precisely 68%, 73%, 39% and 24% to the first, second, third and fourth symbol, respectively, showing that the symbol that Baby Boomers are most aware is FSC. From these data it is evident how the symbols of recyclable and FSC are mainly understandable by generation Z, while compostable and Sociedade Ponto Verde symbols are mostly understood by millennials generation.

Table 9 – Relation between age and knowledge of symbols

Metrics	< 9 (Gen Alpha)	10 - 25 (Gen Z)	26 - 41 (Millennials)	42 - 57 (Gen X)	58 - 76 (Baby Boomers)	> 77 (Silent Generation)	Total
Respondents per generation	0	125	98	92	82	4	401
Recyclable	0	88	83	70	54	2	297
% correct answers per generation	**0.00%**	**29.63%**	**27.95%**	**23.57%**	**18.18%**	**0.67%**	**100.00%**
FSC	0	100	66	63	60	3	292
% correct answers per generation	**0.00%**	**34.25%**	**22.60%**	**21.58%**	**20.55%**	**1.03%**	**100.00%**
Compostable	0	47	53	46	32	3	181
% correct answers per generation	**0.00%**	**25.97%**	**29.28%**	**25.41%**	**17.68%**	**1.66%**	**100.00%**
Sociedade Ponto Verde	0	31	37	29	20	1	118
% correct answers per generation	**0.00%**	**26.27%**	**31.36%**	**24.58%**	**16.95%**	**0.85%**	**100.00%**

According to table 10 below and considering 1 as the most sustainable packaging and 4 the least, the most sustainable packaging chosen by 50% of respondents was reusable, followed in the second place, by the recyclable packaging with 43% of the answers, then in third place there recyclable packaging (42%) followed by biodegradable (33%). Finally, in fourth, it is the mono-material packaging with 78% of answers. In this question it was expected to have reusable packaging in first place, followed by a tie between recyclable and mono-material packaging, as when considering the production of packaging these two characteristics are essential to reduce the impact on environment. Finally, biodegradable and compostable packaging as this still needs an improvement in the preparation of nowadays recycling system. In question 17, considering table 10, most of respondents chose the following ranking: (1) Whenever possible applied a circular economy with the highest percentage (42%), (2) made from recyclable materials 130 answers, (3) Minimized waste and optimize the resources used with 36% and (4) preference on renewable energy sources during the package production with 183 responses corresponding to 46%. Regarding question 18, the material considered the most sustainable was glass (56%) followed by paper (42%), metal with 225 answers and plastic as the least sustainable packaging with 71% people agreeing.

This demonstrates once more sample's disapproval regarding plastic as a sustainable material.

Table 10 - Consumers ranking sustainable packaging from 1 (most sustainable) to 4 (least sustainable) of question 16, 17 and 18

Question	Metrics	Mono-material packaging	Recyclable packaging	Reusable packaging	Biodegradable packaging	Total
Question 16	1 - Most Sustainable	20	36	199	146	401
	%	4.99%	8.98%	49.63%	36.41%	100.00%
	2 - Somewhat sustainnable	35	172	104	90	401
	%	8.73%	42.89%	25.94%	22.44%	100.00%
	3 - Somewhat less sustainable	33	174	62	132	401
	%	8.23%	43.39%	15.46%	32.92%	100.00%
	4 - Least sustainable	313	19	36	33	401
	%	78.05%	4.74%	8.98%	8.23%	100.00%

Question	Metrics	Made from recyclable materials	Minimized waste and optimize the resources used	Whenever possible applied a circular economy	Preference on renewable energy sources during the package production	Total
Question 17	1 - Most Sustainable	154	43	167	37	401
	%	38.40%	10.72%	41.65%	9.23%	100.00%
	2 - Somewhat sustainnable	130	124	76	71	401
	%	32.42%	30.92%	18.95%	17.71%	100.00%
	3 - Somewhat less sustainable	79	143	69	110	401
	%	19.70%	35.66%	17.21%	27.43%	100.00%
	4 - Least sustainable	38	91	89	183	401
	%	9.48%	22.69%	22.19%	45.64%	100.00%

Question	Metrics	Glass	Plastic	Paper	Metal	Total
Question 18	1 - Most Sustainable	223	15	146	17	401
	%	55.61%	3.74%	36.41%	4.24%	100.00%
	2 - Somewhat sustainnable	133	26	169	73	401
	%	33.17%	6.48%	42.14%	18.20%	100.00%
	3 - Somewhat less sustainable	26	77	73	225	401
	%	6.48%	19.20%	18.20%	56.11%	100.00%
	4 - Least sustainable	19	283	13	86	401
	%	4.74%	70.57%	3.24%	21.45%	100.00%

Table 11 crosses the answers collected in question 16, 17 and 18 with the answers gathered in question 14, to understand the level of agreement classifying from 1 (strongly disagree) to 5 (strongly agree) specially to the fourth sentence "I consider myself an eco-friendly consumer". Considering what the majority defined from most to least sustainable packaging in the previous table, this analysis aims to verify if the respondents considered themselves as eco-friendly consumers. There is clear evidence that most people choosing this ranking order also somewhat agreed that they are eco-friendly consumers as well as that 210 out of 401 people consider themselves eco-friendly consumer.

Table 11 - Rankings defined by respondents in question 16, 17 and 18 (1 -most and 4 – least sustainable packaging) with the question 14 measuring the level of agreement of respondents to "I consider myself an eco-friendly consumer" from 1 – strongly disagree to 5 – strongly agree

Question	Metrics	1 - Strongly Disagree	2 - Somewhat disagree	3 - Neither agree nor disagree	4 - Somewhat Agree	5 - Strongly Agree	Total
Question 14	I consider myself an eco-friendly consumer	7	35	77	210	72	401
Question 16	1 - Reusable packaging	4	17	33	119	26	199
	%	2.01%	8.54%	16.58%	59.80%	13.07%	100.00%
	2 - Recycable packaging	3	13	35	92	29	172
	%	1.74%	7.56%	20.35%	53.49%	16.86%	100.00%
	3 - Biodegradable packaging	3	8	24	76	21	132
	%	2.27%	6.06%	18.18%	57.58%	15.91%	100.00%
	4 - Mono-material packaging	6	27	60	177	43	313
	%	1.92%	8.63%	19.17%	56.55%	13.74%	100.00%
Question 17	1 - Whenever possible applied a circul	3	17	27	91	29	167
	%	1.80%	10.18%	16.17%	54.49%	17.37%	100.00%
	2 - Made from recyclable materials	6	9	27	63	25	130
	%	4.62%	6.92%	20.77%	48.46%	19.23%	100.00%
	3 - Minimized waste and optimize the	3	15	26	65	34	143
	%	2.10%	10.49%	18.18%	45.45%	23.78%	100.00%
	4 - Preference on renewable energy sc	3	20	31	93	36	183
	%	1.64%	10.93%	16.94%	50.82%	19.67%	100.00%
Question 18	1 - Glass	5	17	45	117	39	223
	%	2.24%	7.62%	20.18%	52.47%	17.49%	100.00%
	2 - Paper	2	15	35	86	31	169
	%	1.18%	8.88%	20.71%	50.89%	18.34%	100.00%
	3 - Metal	2	24	43	120	36	225
	%	0.89%	10.67%	19.11%	53.33%	16.00%	100.00%
	4 - Plastic	5	28	56	155	39	283
	%	1.77%	9.89%	19.79%	54.77%	13.78%	100.00%

Figure 26 shows that more than half of respondents reported that they would purchase product A as it has a more sustainable packaging. The quality factor would be decisive in the purchase for 47% of respondents. This can also be interpreted as people considering the packaging sustainability as part of the quality. As for the fact that it is a food product, 50% would opt for the most sustainable packaging. The less important factor was if it was a non-alimentary product.

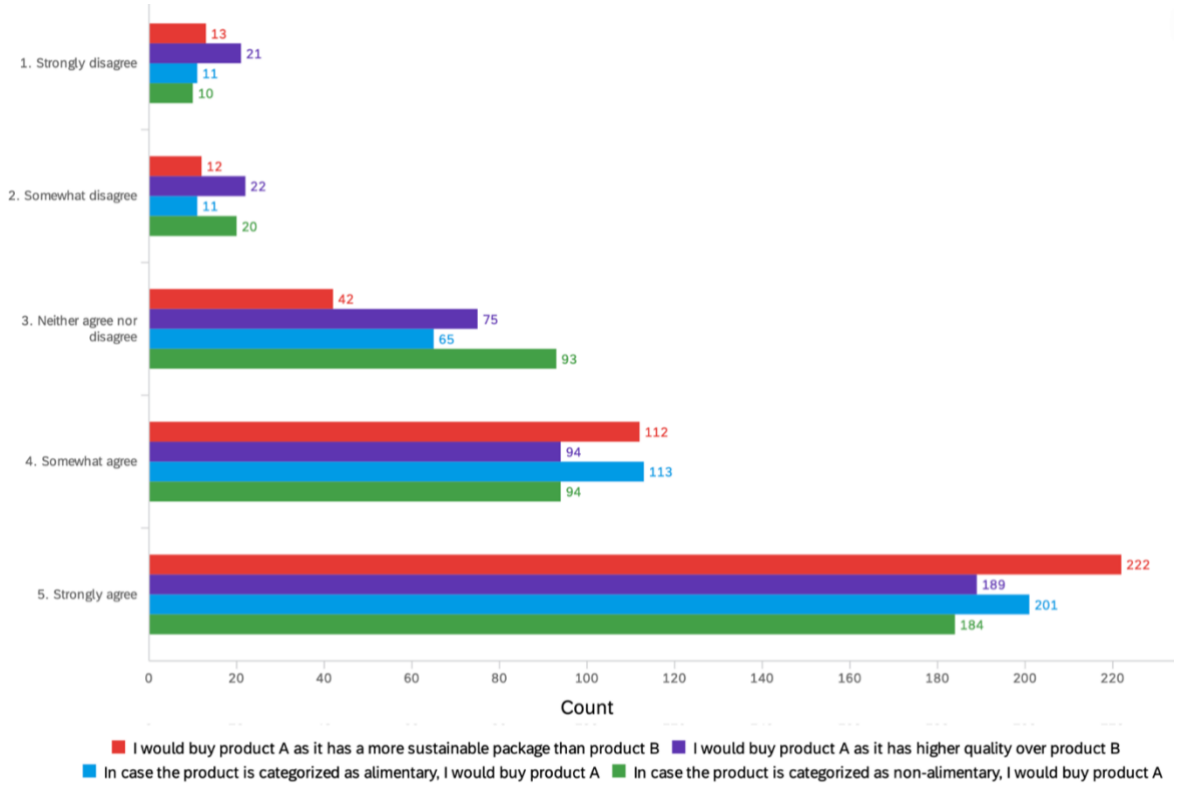


Figure 26 - Number of respondents per level of agreement

In question 20, it was clear that most respondents (61%) would pay a slightly higher price if packaging were sustainable, as in figure 27 below. Answering "yes" in question 20, respondents would access next question, asking about the price difference they would be willing to pay. It was clear that most respondents (59%) would pay a +5% over the price, 30% would pay a +10% over the price and then, 10% would pay +15% or more over the price. This question aimed to understand the willingness to pay for products with more sustainable packaging and the price difference, that was expected to be the lowest (+5% over the price of Product B) with the higher number of respondents.

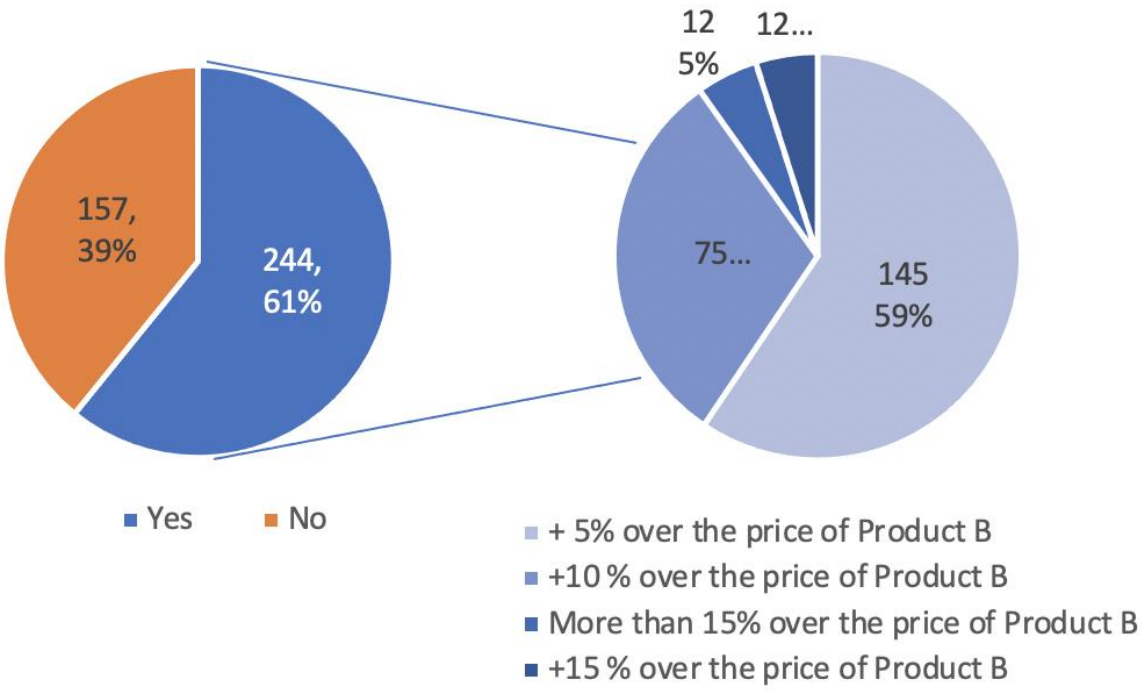


Figure 27 - Number of respondents that would pay a price difference and what percentage

In question 22, it was clear that most respondents (76%) seek for more sustainable packaging in both category of products, only 16% seek for more sustainable packaging in food products and 9% seek for more sustainable packaging in non-food products, per figure 28 below.

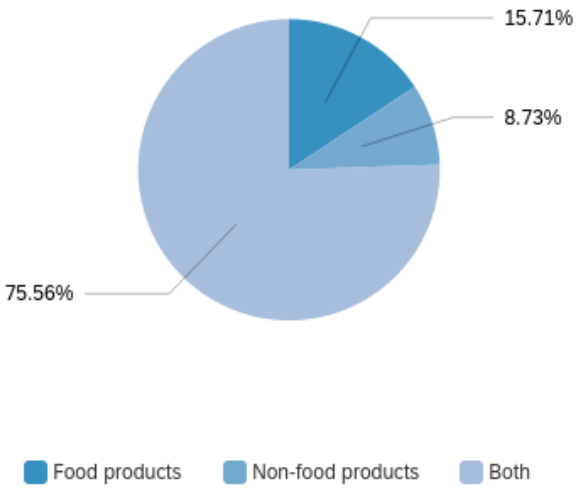


Figure 28 - Percentage of respondents seeking for sustainable packaging per product category

In sum, the present findings from the online survey show how consumers seek private label products mostly due to their lower price and better quality and do not recognize it as offering

products with more sustainable packaging. Moreover, regarding the product, price and quality are the two main characteristics when a consumer does grocery shopping. Concerning the packaging, it is the general information that is presented in it (name of the product, nutritional information, expiration date and eco seals) the most relevant. Consumers showed that they are aware of the importance of environmental sustainability and perceive this as an urgent topic that can impact the future. Additionally, when asking if they consider themselves eco-friendly, the majority chose the option "somewhat agree" what can be a sign of a recognition of this subject importance but assuming that there are still aspects that can be improved.

Regarding used materials, consumers showed their aversion to plastic and preference for glass and paper. This can be due to the high pressure from media and law to reduce single-use plastic and virgin plastic, which is impacting the consumers perception towards plastic. As well as preference for reusable packaging, recyclable packaging, circular economy, and packaging made from recyclable materials are of great importance. Considering the symbols and their meaning, mostly were corrected linked, however there is still opportunity for education and campaign promotion and information, with the younger generation showing a higher awareness of the labels and respective meaning. Consumers perceive products with more sustainable packaging as a good that has higher quality. Most consumers are willing to pay for a product that has a more sustainable packaging, specially, when it is only 5% over the price compared to a less sustainable packaging.

In-depth Interviews

The information on who were the respondents of each company for the in-depth interview is presented in the following table 12. For Jerónimo Martins (Pingo Doce), there were two employees from the marketing department of the private label (a coordinator and a manager) and two employees from the department of Environmental Projects of Jerónimo Martins (a manager and a Senior Manager). Then in the Sonae MC (Modelo Continente) interview, there were an employee from the commercial direction of the Private label with a special focus on the environment and an employee that was a project manager of the freshest of the Private label with a special focus on the environment and is now working in sustainability

of Sonae MC. For the interview with Maria Granel, the respondent was the founder, Eunice Maia.

Table 12 - Company and Job description from the interviews

Company	**Job description**
Jerónimo Martins (Pingo Doce)	• Coordinator Packaging Private Label • Marketing Manager- Private Label • Environmental Projects Manager • Environmental Projects Senior Manager
Sonae MC (Modelo Continente)	• Commercial direction – Environment - Private label • Environmental department of Sonae MC
Maria Granel	• Founder (Eunice Maia)

The in-depth interview with Jerónimo Martins (Pingo Doce) could not be recorded and lately transcript in its entirely, consequently the main ideas of each answer will be now exposed. Regarding question 1 about the point of view of Pingo Doce regarding sustainability and sustainable packaging in the retail in Portugal, the coordinator of packaging from the private label explained the importance of Pingo Doce being a retail group leading the market and how they must be an example of good practices. Alongside with their dimension, Pingo Doce has the responsibility of ensuring a sustainable supply chain and promoting the good practices for both production and consumption. This englobes the different steps of a supply chain, from the development of raw materials, chosen transports, supplier selection, store operation until the last selection of to the final product that is exposed in the shelfs of their supermarkets to their consumers. This ideology is reflected in the variety of practices of eco-design implemented directed to consumers and store operators, it can be more deepen studied in the finding subchapter dedicated to document analysis.

These practices can be translated into the incentive of reutilization, promote recycling and when developing products for the private label, take into consideration the reduction of superfluous materials or change to more sustainable materials, namely, the incorporation of recycled plastic or the use of FSC paper. The implementation of the following practices

enables and aims to reduce the Environmental impact when producing private label packaging, reduce the costs associated with the production and management of waste, as each production of packaging has an associated cost of waste management at Ponto Verde, and optimize the supply chain itself, namely transport costs as they manage to reduce packaging, the costs associated with weight and dimension for transport also reduce. As a large group, it has to act in several spheres and look at the whole supply chain, having a critical analysis at all stages, focusing on how it can increase efficiencies.

Regarding 1.1., the company preferred not to answer, as it is part of their ideology to not comment on their competitors. Then regarding question 1.2. and 1.3., Jerónimo Martins has a dedicated team of sustainability that periodically has a meeting to monitor the objectives established with different companies taking into consideration the initiatives and agreements that are involved and committed with. For example, Ellen MacArthur Foundation, CGF, PPP, World Business Council for Sustainable Development (WBCSD) and Smart Waste Portugal. Jerónimo Martins believes that sustainability is an ongoing project with room for progression. Each year, there is an analysis of the packaging used in products from the private label, where it is studied and examined if there is room for optimization and improvement. Then, this is monitored in the selection of supplier companies and audits, to better understand if the practices implemented meet the objectives established.

Regarding question 2, Jerónimo Martins developed an internal document to define a manual of sustainable packaging (eco-design) with 21 criteria that can be grouped in five phases of the life cycle of the product: manufacturing, packaging, distribution of the packaged product, how it is consumed by the customer and end of life meaning where the consumer dispenses it, namely, common trash or recyclability. This can be translated into eliminating superfluous components, aiming to minimize the material used for the packaging guaranteeing the fulfilment of its functions. A practical example of this is the packaging of their private label toothpaste which they managed to eliminate the superfluous packaging, in this case, the cardboard box and just have the stick directly available to the consumer. Moreover, it can be critical the material selection, either mixed or mono-materials, and if mixed, carefully work to develop and easily detachable, for example, plastic and paper, in order to guarantee the correct recyclability of the products. Additionally, promotes recycling, reuse, and circular economy, avoiding the use of virgin materials. These initiatives need to take into

consideration how important is to have a strong and robust packaging to fight direct waste. Jerónimo Martins distinguishes how the use of biodegradable plastics is still an ongoing study and the compostable plastics (accelerated and controlled process of degradation) are still not a prioritized strategy while the Portuguese structure and municipal infrastructures are not yet prepared. On the other hand, Biedronka, part of the group Jerónimo Martins at Poland, already takes compostable materials as a strategy, because there is already an available and prepared system.

Regarding question number 3 and the respective sub-points, Pingo Doce aims to demonstrate an ongoing strategy linked to sustainability and sustainable packaging that embraces all products from different categories. By disposing an eco-design "stain" along the shelfs, without forgetting how packaging is a way of communicating and emphasizing to the consumer to opt for products from private label, especially the ones with the eco-design stamp. In the Pingo Doce website, there is a report available with the sustainable good practices, that will be explored in the sector of document analysis, aiming to be a didactic and communication material regarding sustainability, sustainable packaging, and eco-design program. In the Pingo Doce website, when a consumer searches for a specific product, there is a dedicated section linked to this project, that describes the materials used in the packaging and how this should be recycled. This is still an ongoing project, so it is still not available for all the products, but there are already some available. As per figure 29 below, this is also a didactic material that promotes awareness and knowledge to correctly recyclable a package, that in this case is not mono material.

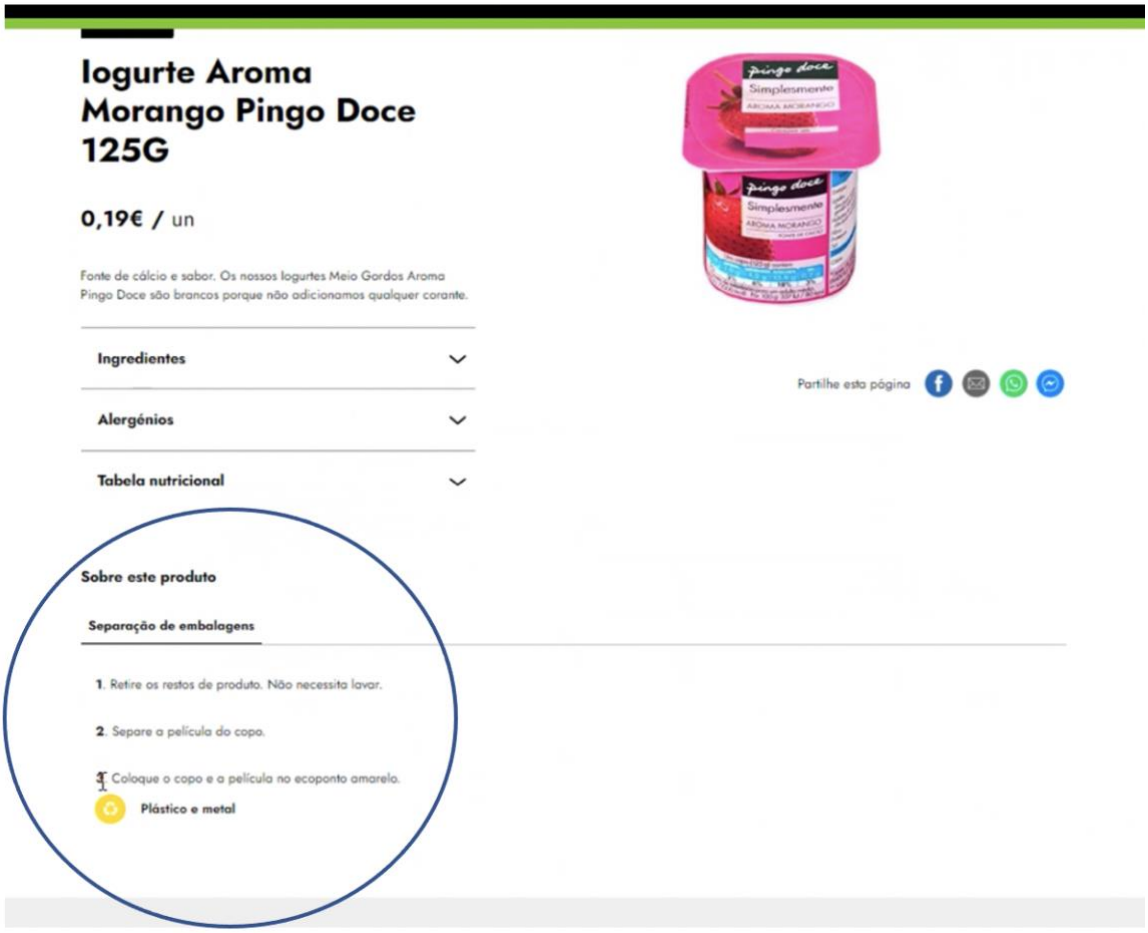


Figure 29 - Example of information available on Pingo Doce Website (https://www.pingodoce.pt/produtos/marca-propria-pingo-doce/pingo-doce/iogurte-aroma-morango-pingo-doce-125g/)

Since question 4 was already answered in the previous question, the questioner jumped into question 5. Regardless the product category, whenever possible Jerónimo Martins focuses on mono material packaging, the objective is transversal and common to all. However, it is necessary to take into consideration the restrictions and legal requirements of each product. For example, milk requires an opaque packaging to protect the liquid inside. The non-alimentary products allow the incorporation of recycled plastic in the packaging. Moreover, in terms of communication, some categories have more impact than other, for example, detergents. Finally, regarding question number 6, the company perceives that there cannot be done a generalization regarding consumers awareness, in fact, customers do not have all the same level of consciousness for sustainability and possibly, younger people are more aware than older. There is an increasing concern regarding sustainability and consumers expect companies to assume their important role and to have a sustainable positioning. This

way, the respondent defends that there should be a balanced communication to the consumer on how the company is offering a more sustainable options without falling in the incorrect type of communication. Regarding the WTP, the respondent understand that the consumer looks for more sustainable options, but it is still an unclear WTP for more sustainable products.

Then the questioner added a question if the visual and informative elements impact the consumer behaviour towards the products and if they seek craft packaging as more appealing. Firstly, the cartoon with the FSC stamp or craft packaging (brown/natural tones) can be used when the products ask for pastel tones and the packaging highlights the product, for example, if it is natural remotes to its origin - nature. At the same time, there are some products from other categories, for example, cookies that ask for stronger colours. This packaging choice must be articulated with both environmental and quality areas, taking into consideration the communication and the message that the consumer should receive. Regarding the visual elements, the company understands that consumers look for packaging with pictures when it is an alimentary product, and it shows a presentation suggestion. This means, the product already cooked, and it comes up a food appeal. On the other hand, for non-alimentary products, in the case of detergents for example, consumers seek for pictures that illustrates the product efficiency and technology and the colour can be used according to aroma of the detergent.

The in-depth interview with Sonae MC (Continente) will be now exposed with the main ideas of each answer not in its entirely as it could not be recorded. Regarding the question number 1, the respondent believes that most of the companies belonging to the grocery retail industry in Portugal are already conscious about the importance of sustainability. The growing concern in recent years is a reflection of current society and the general panorama, that leads also to the company's increasing awareness towards sustainability and sustainable packaging. Sonae MC (Continente) was the first Portuguese company to sign the pact with the Ellen MacArthur Foundation, but nowadays most of them already signed it. Moreover, some Portuguese companies are also committed to the PPP, which must be a primordial focus of all the companies in the market that recognize the advantages of plastics and are aware of how it should be used in a more rational, responsible and sustainable way.

Moreover, there is also a legislative pressure that accelerates the process, having some companies in line with the strategy and ambition and others in legislative compliance. Regarding the measures that can still be taken, Sonae MC (Continente) considers that there are still room for improvements. Post packaging is a crucial period in sustainable impact, to improve it, customers' needs to be more aware and responsible for a correct recycling as well as the recycling organizations can still be developed. As a retail company and as it is responsible for a large amount of packaging in the houses of Portuguese families, the Sonae MC (Continente) also know its role in recycling and how it can incentivize and educate their consumers to learn and recognize their responsibility on recyclability.

To do so, Sonae MC developed a specific ethnography that is present in their private label packages to inform its consumers what they should do regarding each package. This iconography is a stamp present in the package that identifies the package component, package material and what should be done with the package to correctly recycle it. For example, the small milk packages that have a straw attached, this symbol shows how the straw should be put inside the package in order to avoid that it will get lost in the triage cycle as it is so light or in case of the usual milk packages, the package must be spilled, flatten, put the lid on and put it in the yellow trash, per figure 30 below.

Figure 30 - Example of Continent Product package with iconography (based on iconography https://plasticoresponsavel.continente.pt/novos-icones-ajudam-a-separar-embalagens/)

Regarding question number 2, when thinking about plastic packaging, Sonae MC (Continente) considers the Golden Design Rules when structuring a package, considering the two main goals at that moment: by 2025, to have 100% recyclable, reusable or compostable packaging and incorporate 30% recycled plastic into packaging. Whenever possible, invest in mono material packaging, the reduction of material and reduction of microns. It anticipates recyclability, but there is still no flow for everything, upcycling than downcycling.

Moreover, the company considers, if possible, the use and inclusion of recycled materials and for paper packaging opt for the ones that have the FSC stain that guarantees a sustainable exploitation of the forest. Sustainable packaging is a working progress, and it is still a recent study and technique. Sonae MC (Continente) has the support of Sociedade Ponto Verde to better understand the guidelines that validate a matrix of recyclability, support in the technical understanding of types of material and the right combination of types of plastics.

Regarding question number 3, the whole secondary packaging, used for the exposure at the grocery shop, is recycled, having partners that collect and return to the warehouse. Whenever possible, there are secondary package that are reutilized, for example, chep ifco boxes that are collected, taken to the warehouses and then, transported again with fresh products to the grocery shop. Moreover, regarding secondary and tertiary packaging, trash bags are an example of circular economy since Continente produces and entirely manufactures through 100% recycled packaging through the plastics that were collected by its partner from the grocery store and warehouses, and later on, uses the gathered plastic to produce the plastic trash bags. Another example of a packaging optimization is the case of the toothpaste that had 2 different packages and by discarding the cardboard box, there is a significant package reduction.

Then, regarding the percentages, in 2021, Sonae MC (Continente) had 74,7% of its packages that could be recyclable and 11.8% of plastic packaging available was already produced from recycled plastic. The water bottles from the private label have the bottle caps domed to guarantee that the cap does not get lost and pollute the earth. Afterwards the orange juice bottle incorporates 100% of plastic recycled, it has the bottle caps domed as well and it is a reusable packaging. The coffee capsules from the private label had the plastic as the material to cover it and now, it was replaced to paper certified by the FSC. At the bakery, Sonae MC (Continente) provide the cloth bag for customers to use it as a reusable package whenever consumers go to the bakery.

Regarding question 4, Sonae MC (Continente) become part of the international “goodbag” network, which is a shopping bag with an exclusive design and 100% organic cotton, with an embedded mini chip that helps the planet each time they are reused. For each goodbag purchased, a tree is planted in the customer's name, and plastic is collected from the ocean. Among the different initiatives already presented in the interview, there is still the Continente ECO brand that was designed and developed to offer products made with ecological and sustainable raw materials, ensuring full effectiveness at affordable prices for everyone. Regarding question 5, alimentary sector has added higher challenges, for example, a stricter legislation, can have shorter shelf life and not respecting these rules can lead to food waste. This way, alimentary can have more obstacles and relinquish food security than other categories. Moreover, the improvement of the packaging for alimentary goods needs

to consider food safety and avoid food waste. Finally, regarding question number 6, Continente believes that customer is not yet at the level of having WTP and it is still very residual.

The in-depth interview with Maria a Granel was recorded, and the main ideas will be now exposed. Regarding the first question, the founder started to present Maria a Granel as it was founded in the retail food distribution. It was clear from the beginning how Maria a Granel had the responsibility to act in the industry. Considering that half of the biocapacity is used for food production, it was essential to promote a more organic food and bulk sales, dispensing entirely the use of packaging. Moreover, it was clear how this should be balanced with the fight of food waste and encouraging waste prevention. This comes from the message that the grocery shop transmits by itself by asking their customers to use the containers they already have (bags and bottles). All the products are based on criteria of social responsibility, by supporting local and national producers, by displaying workshop with a didactical approach and when forced to import, guarantee a fair-trade seal, considering the emissions associated with transportation.

Regarding question 1.1., Maria a Granel believes that we all bring the shared memory of sustainable practices, though the society has rapidly changed and somehow started forgetting these older practices. At the same time, there is a strong consumer pressure and progressive awareness which are in some way forcing the incentive for sustainability initiatives. Concerning question 1.2., being in the market for a while, Eunice Maia perceives that since 2018 the market has been changing and consumers are adopting a more conscious attitude. However, this takes time and the speech do not always go together with the action. Moreover, media insist on bringing up the topic more often as well as stricter legislatives that defend more sustainable practices, namely the European Union Legislatives. Regarding question 1.3., there is still room for improvement and implementation of more sustainable practices. At that moment, Maria a Granel was part of a pressure group fully dedicated to bulk sales and associated with the government, Associação Ponto Zero, DECO, investigators of Aveiro university and zero waste lab. This aims to take into consideration the examples of Europe, especially in France, the regulation incentives the bulk sales by inscribing it in the consumer code, encouraging it and from the point of view of taxation as well. This group project aims to understand how Portugal can also implement regulation that guarantee the security of

products while voting for the good practices of bulk sale and incentivising both consumers and companies.

Regarding question 2, as this is a zero-waste packaging store, the respondent was asked to focus on the secondary and tertiary packaging. This way, for the online store, it was studied the possibility of having a reusable program, by collecting and sanitizing the containers. However, when putting this in consideration, in the long term, it would be extremely costly and not sustained. Thus, whenever possible and if it is an order from a usual customer, use the containers they have in store. In alternative, Maria a Granel uses recycled paper bags or if the products ask for another type of containers, they opt for compostable bags done by their partner, vegware, responsible for alternative and eco packaging, which can later be compostable in a domestic environment. The company still perceives how can this still have room for improvement, knowing that some people will still not be aware or will not be able to do the compostable in the domestic environment and will end up throwing the bag in the indifference trash. However, this is an ongoing process.

Regarding question number 3, as Maria a Granel still do not have a private label, the focus was the brand itself. Regarding national producers, Maria a Granel implemented a circular program, for example, the shop receives the product in 5kg buckets and then it is returned to the producer. Whenever this is not possible, for example, opt for bags with a bigger size to ensure a more balanced ratio of product and package. In the case of cereals and flour, the material usually used is paper with the fairtrade certification, guaranteeing that companies use paper from certified and sustainable sources and plastic.

Regarding question 4, the main idea is to reuse. Then, offer in-store initiatives to promote their ideology, for example, 100% plant-based brunch and music, linking culture and environment, offering macrobiotic courses, a course to do collage using only waste, learn how to do natural dyeing, cosmetics, or detergents. Maria a Granel is also involved in an environmental education program called “Programa Zero” implemented in 3 schools to calculate and control waste production during a year and then present ideas and initiatives to reduce waste. Regarding question 5, Maria a Granel offers just some alimentary products as there is a high restriction and legislation of the alimentary products that can be sold in a bulk system. Finally, regarding question 6, Maria a Granel perceives that this type of store

is being widespread, and it is a less niche as it used to be. When the consumers choose this store, the customer is already making a choice for a more sustainable offer. Consumers prefer to buy more sustainable products with sustainable packaging when there is this possibility. For example, with the current economic crisis, Maria a Granel already notices a decrease of WTP.

In summary, the companies interviewed recognize the urgency of environmental sustainability and the impact of using more sustainable packaging. Table 13 summarizes the data obtained by in-depth interviews and gives a comparative positioning of retail grocery Pingo Doce, Continente and Maria Granel.

Table 13 - Comparative positioning of retail grocery Pingo Doce, Continente and Maria Granel

Topic	**Pingo Doce/Jerónimo Martins**	**Continente /Sonae MC**	**Maria a Granel**
Sustainable packaging positioning of the industry in Portugal	Alongside with the company's dimension, it seeks sustainable supply chain and promoting the good practices for both production and consumption as a responsibility. It has a dedicated team of sustainability that periodically monitors the objectives established and it is committed with different organizations: Ellen MacArthur Foundation, CGF, PPP, WBCSD and Smart Waste Portugal. Jerónimo Martins perceives sustainability as an ongoing project with opportunities for progression.	Believes that most companies belonging to the industry are already conscious about it and that the legislative pressure could have accelerated the process, with aspects that can be improved. The company recognizes its impact on a large amount of packaging in the houses of Portuguese families and signed the pact with the Ellen MacArthur Foundation, PPP. Give special importance of end-of- life of a product and respective packaging - disposable and recyclability.	There is a strong consumer pressure and progressive awareness which are in some way forcing the incentive for sustainable initiatives. There is still room for improvement and implementation of more sustainable practices. The company works as bulk sale and, in this way, encourages consumers to be aware just for offering this format. Offer in-store initiatives to promote sustainable ideology.

Criteria for ensuring sustainable packaging	It developed an internal document to define a manual of sustainable packaging (eco-design) with 21 criteria, namely: • Eliminating superfluous components • Minimize materials used • Sever material selection • Preference for mono-materials, when using mixed materials develop it to be easily detachable • Promotes recycling, reuse, and circular economy, avoiding the use of virgin materials.	For plastic packaging, it considers the Golden Design Rules and for paper packaging opts for the ones that have the FSC stain. Whenever possible, invests in: • Reduction of material and microns • Mono-material packaging • It anticipates recyclability, but there is still no flow for everything, upcycling than downcycling • Use and inclusion of recycled materials The company has the support of Sociedade Ponto Verde to validate a matrix of recyclability, support in the technical understanding.	As it still does not have a private label, the focus will be the brand itself: • Implemented a circular program with producers • Certified paper and plastic • Reduce waste • Reduction of CO2 emissions
Perception of the use of sustainable packaging on the strategy	The company perceives sustainability and sustainable packaging as part of the company strategy, embracing all private label products. This strategy can be translated into different initiatives:	The company perceives it as part of the company and offers different initiatives as: • Specific ethnography to inform package component, material and how to recycle it. • "Goodbag" network, to plant a tree and collect	Focusing on the secondary and tertiary packaging, for the online store, it was studied the possibility of having a reusable program, by collecting and sanitizing the containers. Thus, whenever possible and if it is an order from a usual customer, the use of containers in store

	• Eco-design "stain" • Report available with the sustainable good practices, didactic communication • Section per product on the website explaining the materials used and how it should be recycled.	plastic from the ocean every time the consumer goes shopping • Continente ECO brand • Reusable secondary packaging • Circular economy with trash bags • 74,7% of its packages can be recyclable and 11.8% of plastic packaging available is already produced from recycled plastic.	are encouraged. In alternative, the company uses recycled paper bags or if the products ask for another type of containers, opt for compostable bags done by their partner, vegware, responsible for alternative and eco packaging, which can later be compostable in a domestic environment.
Alimentary vs non-alimentary products on sustainable packaging	The objective is transversal to the product category, however, there are more restrictions and legal requirements for alimentary products.	Alimentary sector added higher challenges with stricter legislation. This way, alimentary can have more obstacles and relinquish food security than other categories.	Maria a Granel mentioned the high restriction and legislation of the alimentary products that can be sold in a bulk system.
Perception of the consumer behaviour regarding products with sustainable packaging	The company perceives that these cannot be generalized, as customers do not have all the same level of consciousness for sustainability. Possibly, younger people are more aware. There is an increasing concern and consumers expect companies to assume their role. Regarding the WTP, it is still unclear if consumers	Continente believes that consumers are not yet at the level of having WTP for products with more sustainable packaging and if so, it is still very residual.	Consumers that visit Maria a Granel prefer to buy more sustainable products with sustainable packaging when this is possible. With the current economic crisis, Maria a Granel already notices a decrease of WTP.

	are willing to pay for products with more sustainable packaging.		

Document Analysis

This section will be dedicated to exploring available materials that can complete and support what was already collected in the online survey and in-depth interviews and study the companies that was not possible to interview. To deepen analyse the different players, this section will embrace Jerónimo Martins (Pingo Doce), Sonae (Continente), Auchan, Aldi and Dia Group (Mini preço).

Jerónimo Martins launched a good environmental practice of Pingo Doce (2022) having in mind the importance of the choice of a product and its impact on promoting local suppliers' community, encouraging more sustainable production practices or valuing animal welfare. In this guide, Pingo Doce (2022) presents practical information with examples of private label products to assure that consumer can make a more informed choice when shopping at Pingo Doce, guidelines to increase the circularity of packaging and properly discard them once the products are consumed. Pingo Doce (2022) offers a summary of the different sustainability seals available to easily identify the environmental characteristics that differentiate their products, as shown in table 14:

Table 14 - Pingo Doce packaging seals and its meaning

Symbols	Meaning
	• Easy package to recycle • Suitable with recycling containers from Pingo Doce

	• Reformulated, using renewable resources (such cardboard and biodegradable/compostable polymers) instead of fossil components (like plastics)
	• To encourage a circular economy, as it incorporates and uses recycled materials
	• Since the packaging is concentrated, it minimizes its weight and transportation fuel usage
	• Demonstrate the presence of environmental and/or social standards in manufacturing and that have been confirmed by outside, independent organizations
	• Durable enough to be used again or accompanied by refills
	• Adhered to the Eco-design principles of Pingo Doce

The program Eco-design aims to continuously improve products and packaging, guaranteeing that when a consumer chooses products with the Eco-design seal, they are making a more environmentally friendly choice (Pingo Doce, 2022). This program defends and promotes recycling of packaging materials, reduces the consumption of natural

resources, reduce greenhouse gas emissions by reviewing and improving packaging and products, recurring to environmental criteria and principles to offer environmentally friendly products and packaging. In addition to these commitments, the group has defined goal of at least 12% of packaging of private label products to be included in the eco-design project by 2023, compared to the 2020 assortment (BCSD, 2021). Pingo Doce (2022) invests on prevention, minimization, and recovery of generated waste, defending the 3 R's:

1. Reduce – to minimize the consumption of natural resources, to do so it offers bulk products, packaging with less amount of material used and concentrated packaging products; Between 2011 and 2020, Pingo Doce revised 317 packages through the Eco-design program, which allowed to avoid 4,235 tons of carbon dioxide in transport and 21 thousand tons of packaging materials.
2. Reuse – aiming to decrease the consumption of resources, Pingo Doce defends the importance of reusable packaging, suggesting the use of reusable bags for transport shopping, reusable bags for fruit and vegetables and reusable boxes for fresh produce. Between 2018 and 2020, Pingo Doce managed to avoid the use of 163 tons of single-use plastic. A product that represents this initiative is the exclusively service of refilling reusable plastic water bottles that Pingo Doce launched as well as the reusable fresh food soup packaging that can be reused and it is made of recyclable plastic. The use of recycled plastic saves around 1,500 tons of virgin plastic per year.
3. Recyclable: for the packaging that cannot be either reduced or reused must be correctly separated to guarantee a new life to the materials. Pingo Doce collects more than 300 tons of waste from customers each year (used cooking oil, coffee capsules, waste electrical and electronic equipment, fluorescent lamps, and batteries). This company highlights the advantages of separating and recycling used packaging: lower usage of virgin resources used, which allows for a protection of natural resources, lower amount of waste deposited in landfills or sent for incineration and incentive for greater circularity meaning that the materials are reintegrated into new products, instead of the conventional packaging life cycle that considers all stages of the value chain, from the extraction of natural resources to the end of life of materials.

In line with these principles, the Group has made a commitment that all private brand packaging will be 100% recyclable by 2025, anticipating the alignment with the European

Plastics Strategy and Directive (EU) 2019/904. The company is one of the founding members of the Portuguese Plastics Pact and the Polish Plastics Pact (through Biedronka) and it has also joined the New Plastic Economy Global Commitment, in which it is commited, by 2025, to eliminate problematic components from private brand plastic packaging, promote production and consumption models based on reuse practices, ensuring that all private brand plastic packaging is reusable or recyclable, incorporate at least 25% recycled content into plastic packaging, reduce plastic consumption by 10% compared to 2018 and reduce by 15% compared to 2018, the total amount of virgin plastic in Private Brand packaging, service packaging, palletizing film and box bags (BCSD, 2021).

These Pingo Doce documents along with the in-depth interview demonstrated the high concern of the company regarding sustainability and sustainable packaging. This is an ongoing process, and the company perceives it as so. It also demonstrates a meaningful evolution and significant effort to offer and invest in better environmental practices.

Regarding the annual report of Modelo Continente (MC) of 2021 available, it presents the educational program called “Escola Missão Continente”, that was created in 2016 and aims to impact younger students from Basic Education, teachers, parents, and the entire school community, by alerting to healthy eating and lifestyles and education for conscious and sustainable consumption (Modelo Continente Hipermercados, S.A., 2022). Throughout the school year, Modelo Continente provides materials, educational activities, challenges (with associated prizes), educational play materials and field visits to catch and incentive the community (Modelo Continente Hipermercados, S.A., 2022).

Moreover, this report alerts for the importance of innovation and circularity projects, to combat food waste and how these initiatives made it possible to avoid more than 37 M€ of waste in 2021 (Modelo Continente Hipermercados, S.A., 2022). The reuse and redistribution of food items is part of the daily routine of Continente stores: fruit and vegetable boxes Zer0% Waste that aim to prevent breakage by disposing a 5 kg boxes with fruits and vegetables that are close to exceeding the expiration date of consumption, the pink stickers as the strategy implemented for more than 10 years in Continente stores that represent fast depreciation labels that communicate a price reduction in products that are approaching the end of their shelf life and donation of surplus food for social solidarity institutions, animal

support associations and employees in the social areas of stores and warehouses (Modelo Continente Hipermercados, S.A., 2022).

Regarding the Sustainable Plastic Commitment sector, circularity is a cross goal, translated into the way Modelo Continente develops packaging and products and how it is managing their operation and organization (Modelo Continente Hipermercados, S.A., 2022). Over the last few years, Continente has been significantly improving packaging, having in consideration the principles of eco design, focused on eliminating the unnecessary use of resources, incorporating recycled material, and designing the packaging to ensure its recyclability (Modelo Continente Hipermercados, S.A., 2022). In 2019, MC became the 1st Portuguese retailer to join the New Plastics Economy Global Commitment, joining a group of entities from different sectors that share a common vision for a circular economy for plastics. Since then, it has annually reported on its progress towards the ambitious goals it has set for its plastic packaging and to which it is deeply committed, namely ensuring that by 2025 its private label packaging is recyclable, reusable or compostable. This is an ongoing path that through different changes currently translate into a 74.7% recyclability rate for its plastic packaging (Modelo Continente Hipermercados, S.A., 2022).

The annual report illustrates these ideas with two examples: coffea from the exclusive Continente system and the water bottles (Modelo Continente Hipermercados, S.A., 2022). In 2021, coffee had new packaging more compacted and made of 100% recyclable cardboard, allowing a saving of 26 tons of plastic per year (Modelo Continente Hipermercados, S.A., 2022), with the replacement of approximately 3.5 million coffee packages in 2021 from a non-recyclable multi-material bag (plastic and aluminum) to a mono-material package (cardboard from responsibly managed forests) (Modelo Continente Hipermercados, S.A., 2022). Additionally, since it is more compressed, less raw materials are required and the carbon footprint of transportation is reduced because more capsules may be delivered per carriage (Modelo Continente Hipermercados, S.A., 2022). Continente modified the composition of its own brand water bottles, integrating 25% recycled plastic in each, which will eliminate 400 tonnes of virgin plastic per year (Modelo Continente Hipermercados, S.A., 2022). Private label water bottles are now made with 25% recycled plastic. In addition to lowering the use of virgin raw materials, it promotes a genuinely circular economy because the company reuses the plastic from recycled Continente water

bottles when making new bottles (Modelo Continente Hipermercados, S.A., 2022). The campaign on Continente's Responsible Plastic website called "Fora da Caixa" invites Portuguese speakers to recommend changes for the packaging of private label goods, intending to to educate and engage Continente clients, and Sociedade Ponto Verde participated and supported it at its inception (Modelo Continente Hipermercados, S.A., 2022).

In summary, this annual report is aligned with the information collected in the in-depth interview and shows the high level of awareness and perception of the importance of sustainability and sustainable packaging. This is seen as an ongoing path with different objectives stablished to guarantee better environmental offers in the future, focusing also on the education of future generations.

For Auchan, sustainability and the promotion of an economy that is more environmentally friendly are essential concepts. Therefore, the company has long been practicing an environmental management (Auchan Retail Portugal, 2022). Thorough action along the value chain, based on a logic of minimization and circularity, involving procedures of redesigning goods and their packaging, proper handling of trash and the dedication to its reduction and forwarding for recovery is required for an effective management of resources (Auchan Retail Portugal, 2022). With the creation of a strategic package management project and the adoption of a policy to combat plastic pollution, the year 2021 marked an important turning point in the systematization of Auchan strategy in this area (Auchan Retail Portugal, 2022).

Auchan Retail Portugal (2022) outlines two main objectives in this area for the decade 2025: make all private label packaging 100 percent recyclable, biodegradable, or reusable (in the context of home composting) and whenever it is practicable, remove plastic packaging from fruit and vegetable stands and fresh produce counters without affecting the quality or safety of the food or causing food waste. With the help of these and other contributions, as well as the work that has previously been done in this area, Auchan was able to produce and introduce more than 90% of packaging for products of the private label from Auchan in Portugal by the year 2021 (Auchan Retail Portugal, 2022).

Auchan have endeavoured to several options aiming to reduce the use of plastic and resources in general throughout time, but notably since late 2018 (Auchan Retail Portugal, 2022). Its journey has been guided by the vision "Less Plastic Better Use," which is based on a complete circularity model and entails implementing the 6 R's, where recycling is only one component of the solution (Auchan Retail Portugal, 2022). Auchan Retail Portugal (2022) presents this model that acknowledges that as a society, we have a responsibility to reduce waste and it aims to contradict the linear model of extraction, manufacture, and disposal, which is still too generalized, unsustainable, and severely detrimental to ecosystems.

1. Refuse: discard any packaging or supplies that are unneeded
2. Reduce: packaging simplicity for simpler recycling and use of less raw materials solutions that promote reuse, hence reducing the need for packing
3. Recycle: by using recycled materials and advancing recycling, the circular economy is promoted
4. Reuse: Reusable solutions that promote the reduce the need for packing
5. Recommend: educate and inform consumers on package recycling and reuse
6. Rethink: Using materials other than plastic in goods that are single-use and difficult to discard

Through a systematization of transversal KPIs for tracking Auchan package management and the usage of plastics, it was feasible to grasp the 2021 landscape for the regulated flows and comprehend the level of achievement of the 2025 targets (Auchan Retail Portugal, 2022):

- Reusable, recyclable, and compostable packaging is used for national private label items
- Reusable and recyclable box bags are used for fresh products service packaging
- Nine tons of single-use plastic were discarded
- Packaging for national private label goods and services included 29% recycled plastic
- Paperboard from sustainable forests incorporated into national private label goods packaging and service packaging is 19%

- 91% of the packaging of national private label products is recyclable, compostable, or both
- 70% of the service packaging for Fresh Products is biodegradable, recyclable, and reusable
- 100 percent of box bags are reusable and recyclable

According to ALDI annual report of 2021 (2022), the private label products, which consist of 80% of the marketed goods, are the core of company product lines. The SDGs of the United Nations are being endorsed as part of the strategy aiming to encourage responsible consumption, ensure that private label assortments are developed sustainably along the whole value chain, and ensure that all the business procedures make effective use of resources (ALDI, 2022). That is why ALDI (2022) defends the circular economy, that provide their consumers with a growing selection of sustainable items, employ cutting-edge technology to lower energy usage in their stores, and minimize the materials required in the packaging of ALDI own brand products.

For ALDI (2022), sustainability is an increasingly important topic and as an international retailer, reaching a significant amount of people of different ages, social classes and levels of education, ALDI wants to potentially make a positive contribution to sustainability and enable all customers to consume responsibly and affordably. The company is constantly expanding their range of sustainable products to avoid food waste, reduce packaging and use less resources while focusing on a circular economy (ALDI, 2022).

ALDI (2022) considers plastic to be a valuable raw material as it maintains product quality and has a wide range of uses. However, whenever product protection and quality requirements allow, ALDI avoids plastic packaging, works systematically with the suppliers and purposes to follow circular economy principles (ALDI, 2022). In November 2021, the sales department started offering a workshop called “Packaging Lab” to systematically improve their private label packaging (ALDI, 2022). This workshop analysed problematic types of packaging within the ALDI product group regarding recyclability and identified optimization potential. In addition to optimizing the recyclability of packaging, they focus on reducing the amount of plastic in their own brand packaging. ALDI (2022) defends that the company responsibility for packaging does not end with the final sale of the product, as

the brand must inform the end user the correct disposal of packaging materials. In Portugal, ALDI waste separation and recycling instructions are printed on all packaging of its private label products aiming to educate and prevent further incorrect disposables (ALDI, 2022). Thus, the annual report from ALDI (2022) regarding the year of 2021 manifests the consciousness for these urgent changes for more sustainability practices and establishes the importance of investing in new environmental commitments as well as making consumers aware of correct disposal.

Following circular economy principles, Grupo DIA is committed to limiting resource consumption, minimizing waste, giving fragile materials and products a second life (Dia group, 2022). As a result, in 2021, Dia group had reduced material usage in nearly all major consumable categories and paper cases can be outlined as the consumption is decreasing by 11.6% due to the spread of e-flyers (Dia group, 2022). Dia group (2022) increases the usage of paper made from recycled materials to approximately 72% of the paper used and also, enables the reducing of the use of film in logistics companies by about 30%, saving about 675,000 kg of plastic. In 2021, Dia group (2022) has reduced paper usage by 11.6%, foil usage by 30% more sustainable packaging environmental responsibility, and still working on eliminating redundant packaging with the main goal of achieving more sustainable packaging - 5,452,255kg (Dia group, 2022)

From used new plastic, Dia group (2022) is committed to eliminating redundant packaging and achieving more sustainable packaging, aiming to improve recyclability and reduce the use of virgin plastics. To address this aspect, in 2021, for the first time, Dia group (2022) characterized packaging based on recyclability and plastic content and publish a “Packaging Sustainability Guide” summarizing each type of packaging and application potential that needs to move forward. Sustainable packaging is increasingly respecting eco-design measures to reduce weight and environmental impact and the use of recycled materials as a rule. It allows the reduction landfill disposal by approximately 40% compared to 2020 (Dia group, 2022). To achieve this, Dia group launched a new management model (to be gradually implemented across all platforms) that separates potential second life products from sources. Under this premise, in 2021 Dia group had reduced its waste generation by more than 8,500 tons (approximately 7%) and landfilled by nearly 9%. (Dia group, 2022).

CONCLUSION

The current dissertation aimed to study the environmental concerns focusing particularly on sustainable packaging implemented by private label companies in the grocery retail industry. This intended to be a contribution to the current analysis on the topic and to study both perspectives, consumers, and companies on the perception of the use of sustainable packaging, aiming to have a more macro analysis. The study of the perception of consumers was performed by using quantitative methods applying an online survey, aiming to investigate the behaviour in a wide age range. The perception of companies was granted by in-depth interviews, complemented with document analysis, aiming to guarantee a study of the industry main players.

In summary, most of the companies studied either in the in-depth interview or through the document analysis showed that environmental sustainability is fully integrated in the company´s strategy. This way, the industry itself is aware and willing to improve, but is already collecting results from the effort that has been made to make the packages more sustainable. This topic is not recent, sustainability has already become a concern for some years, and most companies can already present results of reduction and improvement of packaging. Consumers are aware of the importance of environmental sustainability and perceive it as an on-going process, with aspects that can still be improved. Consumers are averse to plastic and companies try at most to reduce single-use plastic and virgin plastic. Both consumers and companies consider reusable packaging, recyclable packaging, circular economy, mono-material packaging, and packaging made from recyclable materials as criteria for a sustainable packaging.

Younger generation tends to be more aware of this subject which can be due to school addressing this topic. Moreover, transversal to all generations, current media explores it frequently and law presses for changes such as the example of the prohibition of single-use plastic when there are alternatives available. There is still opportunity to disseminate more educational materials that embrace current symbols, terms, and recycling systems, to continue to generate awareness, as well as to produce laws that press both consumers and companies to meet the established goals. Grocery retail companies play an essential role as the main source of household shopping which instils an extra responsibility to offer more

environmental options. Due to the size and responsibility of the grocery retail industry, private label brands should continue to have sustainability as a pillar of its strategy, produce different educational materials and advertise them to reach each consumer. This way, private label brands should continue creating awareness not only in younger generations (Generation Z and Millennials), but also in older ages. Moreover, the government and Sociedade Ponto Verde can play a significant role in improving the recycling system and alerting society to have better recycling practices. Meaning an effort on guaranteeing a good recycling system in the different locations of Portugal as well as having the brown recycling bin for organic garbage available in a greater number of locations.

The main limitations of this dissertation were the low availability of companies to accept doing an in-depth interview. This was a challenging work as this is a recent topic with recurrent scientific literature being published and still leaving space for future research. For upcoming studies, it could be interesting to deepen understanding how the process of sustainable packaging could be simplified into a general and common language, meaning, ecological seals. Labels with key ecological words and seals can positively impact consumer decision if he/she has the knowledge and consciousness regarding it, but it can also become a crowded package and difficult to understand. Therefore, investing in reducing the number of symbols and simplifying them, and investing in the production of awareness and information campaigns, would be excellent ways to increase environmental awareness, and in particular increase the preference for sustainable packaging. Additionally, it would be interesting to better understand how the consumers perceive companies' actions towards the offer of more sustainable packaging.

APPENDICES

APPENDIX A: QUESTIONNAIRE

Part 1: Consumer Profile

Question Number 1: What is your age?

- < 9 (Generation Alpha)
- 10 - 25 (Generation Z)
- 26 - 41 (Millennials)
- 42 - 57 (Generation X)
- 58 - 76 (Baby Boomers)
- 77 (The Silent Generation)

Question Number 2: What is your gender?

- Male
- Female
- Non-binary
- Prefer not to say

Question Number 3: What is your nationality?

- Portuguese
- Other

Question Number 4: How often do you do grocery shopping in Portugal?

- Never
- Once - Twice per month
- Three - Four times per month
- More than 4 times per month

Question Number 5: What is your gross individual income monthly?

- Below 1000€

- Between 1000€ and 2000€
- Higher than 2000€
- Do not have income

Question Number 6: What is the number of people household?

- 1-2
- 3-4
- 5-6
- 7 or more

Question Number 7: What is your average weekly supermarket expenditures?

- Less than 50€
- Between 50€ to 100€
- Between 100€ to 150€
- More than 150€

Question Number 8: Please consider that private labels offer products sold under the retailer's brand or name. When comparing two similar products, I usually prefer the products from the private label, because:

- It has a lower price
- It has better quality
- It uses more sustainable packaging
- I rarely buy products from the Private label
- Other, please specify:

Question Number 9: When standing in front of a shelf at the supermarket, please rank the following characteristics from (1) the most important to (4) the least important

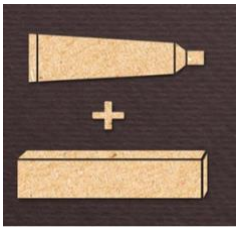
- Product price
- Product quality
- Product package
- Product nutritional label (if alimentary)

Question Number 10: When standing in front of a shelf at the supermarket, what is more important in the packaging?

- Visual aspects (colour, material, picture or shape)
- General information features (name of the product, Nutritional information, expiration date, eco-labels)

Part 2: Visual examples

Question Number 11: What do you consider to be the most sustainable packaging?

- A. 
- B. 

Question Number 12: What do you consider to be the most sustainable packaging?

- A. 
- B. 

- C. 

Question Number 13: What do you consider to be the most sustainable packaging?

- A. 
- B. 
- C. 

Part 3: Sustainable packaging

Question Number 14: On a scale of 1 (Strongly Disagree) to 5 (Strongly Agree), please indicate how you agree with the following statements:

- Environmental balance is a priority
- It is important to preserve the environment for future generations, providing social and economic well-being
- Sustainability can be outlined as the maintenance and optimisation of natural resources
- I consider myself an eco-friendly consumer

Question Number 15: Please choose the option that better describes the symbol:

Symbols:

1. 
2. 

3. 
4. 

Meanings:

- Recyclable
- The packaging contributes financially to Sociedade Ponto Verde
- Reusable
- Organization that ensures the world's forests are managed responsibly
- Compostable
- Biodegradable

Question Number 16: Please rank between the following statements what you perceive as (1) most sustainable packaging to (4) least sustainable packaging

- Mono-material packaging
- Recyclable packaging
- Reusable packaging
- Biodegradable packaging

Question Number 17: Please rank between the following statements what you perceive as (1) most sustainable packaging to (4) least sustainable packaging

- Made from recyclable materials
- Minimized waste and optimize the resources used
- Whenever possible applied a circular economy
- Preference on renewable energy sources during the package production

Question Number 18: Please rank between the following statements what you perceive as (1) most sustainable packaging to (4) least sustainable packaging

- Glass
- Plastic
- Paper
- Metal

Question Number 19: Consider product A and product B, both are similar and are at the same price. Product A is considered to have a more sustainable package than product B. On a scale of 1 (Strongly Disagree) to 5 (Strongly Agree), please indicate how you agree with the following statements:

- I would buy product A as it has a more sustainable package than product B
- I would buy product A as it has higher quality over product B
- In case the product is categorized as alimentary, I would buy product A
- In case the product is categorized as non-alimentary, I would buy product A

Question Number 20: Consider product A and product B. Both are similar, but Product A is priced slightly higher than product B. Also, Product A has a more sustainable package over product B. Would you consider paying more for product A over product B?

- Yes
- No

(Depending on "Yes" in question number 20) Question Number 21: What difference would you consider paying?

- + 5% over the price of Product B
- +10 % over the price of Product B
- +15 % over the price of Product B
- More than 15% over the price of Product B

Question Number 22: In which category do you seek for more sustainable packages?

- Food products
- Non-food products
- Both

APPENDIX B: INTERVIEW SCRIPT

1. What is the point of view of the company regarding sustainability and the use of sustainable packaging in the grocery retail industry in Portugal?
   1.1. Does the company consider that most companies are already adept of sustainable practices?
   1.2. Does the company consider there is an increasing concern regarding this topic in recent years? What are the main drivers?
   1.3. Does the company consider that there are still measures that can be taken?
2. What does the company consider as criteria for ensuring sustainable packaging?
   2.1. Type of materials used (organic, recyclable, or biodegradable materials)
   2.2. Resource optimization: energy and natural resources
3. Taking into consideration the private label, what is the positioning of the company regarding sustainability and the use of sustainable packaging, in the grocery retail industry in Portugal?
   3.1. Is the company considered a zero-waste packaging brand/store?
   3.2. What percentage of sustainable packaging is used on the products from the private label?
   3.3. What measures is the company implementing to reduce the use of single-use plastic?
4. What is the perception of the use of sustainable packaging in the company's strategy?
   4.1. What measures and initiatives to promote the use of sustainable packaging have been implemented?
5. How do companies perceive the importance of sustainable packaging in alimentary products, when compared to non-alimentary products?
   5.1. What percentage of sustainable packaging is used in products from the private label in alimentary and non-alimentary products?
6. How do companies perceive the consumer behaviour regarding products with sustainable packaging?
   6.1. Do consumers have more WTP (willingness to pay) for products with sustainable packaging?

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