The Ecological Redesign of Household Surface Cleaning Sprays

A study on consumers characteristics, drivers, and barriers to purchasing in the Portuguese market.

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ABSTRACT

Plastic is a packaging material preferred by many companies. Its durability, strength, and low cost are just some of the factors that highlight its advantages. As a result, the demand for plastic packaging is only estimated to increase. Nevertheless, plastic packaging causes significant negative externalities on the environment, and consumers are not oblivious to these issues, demanding "greener" options. Companies, in turn, are redesigning their products' packaging to be more ecological.

This dissertation focuses on household surface cleaning sprays redesigned to a concentrated format to be diluted in a refillable spray container, in the Portuguese market. The research questions aim to understand the product's consumer and their main purchasing drivers and barriers. Through a literature review followed by a qualitative analysis, hypotheses were created to answer these questions. A quantitative analysis was then performed to verify the hypotheses.

In conclusion, regarding the consumers' personality, the importance of equality in one's life, awareness of Earth's limited resources, and the impactful outcome of waste-related actions increase purchasing interest. Furthermore, knowing that science without conservation is not the solution for every environmental issue, but believing in technology as the solution, increases interest. Lastly, the product's packaging recyclability and its association with a known, private label or not, brand to assure efficacy, are purchasing drivers. In contrast, lack of product awareness, time and effort preparing the product, and expected higher prices due to the product's innovative factor, are purchasing barriers. Additionally, product usage amount is expected to be the same as for traditional sprays.

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SUMÁRIO

O plástico é o material eleito por muitas empresas no fabrico de embalagens. Durabilidade, resistência e custos reduzidos, são algumas das vantagens. Consequentemente, a procura pelo plástico estima-se que continue a aumentar. No entanto, este material apresenta externalidades negativas para o meio-ambiente. Os consumidores, conscientes, procuram opções "mais verdes" e, em resposta, algumas empresas estão a redesenhar embalagens para serem mais ecológicas.

Esta dissertação analisa sprays de limpeza de superfícies para casa, redesenhados num formato de um concentrado para diluir em embalagens spray reutilizáveis, no mercado Português. Este estudo tem como objetivo perceber as características do consumidor e os motivos e barreiras para comprar. Através de uma análise da literatura disponível, seguida de um estudo qualitativo, foram criadas hipóteses posteriormente verificadas por um estudo quantitativo.

O consumidor que apresenta maior interesse em comprar, atribui importância ao valor da igualdade, está ciente dos recursos limitados da Terra, acredita que a ciência sem conservação não consegue resolver todos os problemas ambientais, e que ações de tratamento de lixos tem um impacto mundial. No entanto, também acredita na tecnologia como a solução para muitos dos problemas ambientais. Adicionalmente, oferecer o produto num formato reciclável e associá-lo a uma marca conhecida, "branca" ou não, aumenta o interesse de compra. Em contraste, a falta de conhecimento sobre o produto, o tempo e esforço para o preparar e a expectativa de preços mais elevados devido ao fator inovador, diminuem o interesse. Para concluir, a quantidade usada de produto é estimada ser igual à do produto tradicional.

Título: O *Redesign* Ecológico de Sprays de Limpeza de Superfícies para casa: Um estudo sobre as características do consumidor e dos motivos e barreiras para comprar.

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Palavras-Chave: Recargas | Ecológico | Redesign | Embalagem Eco-design | Sprays para limpeza de superfícies para casa | Recargas de Concentrado | Pastilhas Efervescentes de Concentrado | Cartuchos de Concentrado | Sustentabilidade | Consumidor Sustentável | Amigo do Meio-Ambiente | Redução de plástico | Reutilização | Mercado Português | Interesse em Comprar | Motivos para Comprar | Barreiras para Comprar

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CHAPTER I – INTRODUCTION

1.1. Background

The growing demand for plastic packaging is expected to increase over the coming years, with a predicted 318 million tonnes of plastic packaging being produced annually by 2050 (World Economic Forum, 2016), quadruple of the current production and more than this industry's current total volume.

Additionally, the current COVID-19 pandemic lead to an increase in consumption of single-use-plastics. To slow down transmission rates, individuals are advised to use personal protective equipment such as masks and gloves, which can only be used for a few hours. Preference for purchasing goods wrapped in plastic increased for the same reason, having demand for overall plastic packaging increased by 40% (Patrício Silva et al., 2021).

However, plastic packaging has negative externalities. Every year, a minimum of 8 million tonnes of plastics enters the ocean through leakage, resulting in over 150 million tonnes in 2016, expected to increase. To illustrate, at this rate by 2050 the ratio of plastic to fish in the ocean is expected to be >1:1, by weight, i.e., more plastic than fish (World Economic Forum, 2016).

Consumers' growing awareness regarding the impact of conventional product packaging has led to a search for "greener" options and companies are finding innovative ways to supply them (Harke Group, 2020; Herbes et al., 2018; The Nielsen Company, 2016). This dissertation focuses on a new product innovation that hopes to combat some of these issues: eco-friendly designed packaging.

In this case, the segment analysed is household cleaning products, specifically spray surface cleaners, known for using single-use plastic packaging.

1.2. Problem Statement and Research Questions

PS: The following dissertation focuses on analysing consumers' traits, drivers and barriers when purchasing a more sustainable product-design for a conventional product. The objective is to study these consumer's factors in the case of concentrated surface cleaning product refills to be diluted in a refillable spray container, in the Portuguese market.

RQ1: Who are the main users of concentrated surface cleaning product refills to be diluted in a refillable spray container, in the Portuguese market?

RQ2: What are the main drivers for consumers to purchase concentrated surface cleaning product refills to be diluted in a refillable spray container, in the Portuguese market?

RQ3: What are the main barriers for consumers to purchase concentrated surface cleaning product refills to be diluted in a refillable spray container in the Portuguese market?

1.3. Relevance

As mentioned by many, the managerial benefits of having a green-oriented company are positive. Research shows that a company's green orientation translates into higher financial gains and market share, higher employee commitment levels, increased firm performance and greater customer satisfaction (Gleim & Lawson, 2014; Luchs et al., 2010; Moser, 2015).

1.4. Scope of Analysis

This research analysis focuses on the Household Surface Cleaning Supplies market, specifically on products sold to be diluted in refillable spray containers. Textile cleaning products are excluded from this study and any other types of concentrated cleaning products that are to be diluted in non-sprayable containers.

To understand the Portuguese consumer main characteristics, drivers, and barriers of this new sustainable product design, only brands available in Portugal or that can be shipped to Portugal will be studied, except one, the Blueland company. The focus will be on the general product itself, with no association to a specific brand.

1.5. Outline

The dissertation is organised in five chapters. The first chapter is the Introduction, where the product in question is presented, as well as the problem statement and research questions. A Literature Review addressing relevant topics and previous research corresponds to the following chapter, where hypotheses for the research questions are also created. Chapter III addresses the methodology and data collection methods of qualitative and quantitative research used to verify such hypotheses. Furthermore, the qualitative analysis insights are in this chapter. The results for the quantitative research are present in Chapter IV. The final chapter includes the conclusions, limitations and managerial implications.

CHAPTER II – LITERATURE REVIEW

2.1. Market Overview

2.1.1. The traditional market of household cleaning products

The household products market can be segmented into "textile washing products, paper products, dishwashing products, air fresheners, insecticides, toilet care, scouring products, furniture & floor polish, shoe polish" (MarketLine, 2020, p. 9), all sold at retail. Household surface cleaning products are present in this market. The European household products market is growing, with an expected value of $60,639 million by 2023, an increment of 16,5% since 2018. The expected growth is supported by a growing population and increasing disposable income (MarketLine, 2020).

Procter & Gamble is the European market leader with a 13.8% market share in 2018, followed by Henkel AG & Co. KGaA with 11.0%. Reckitt Benckiser Group plc and Unilever have, respectively, the third and fourth-largest market shares with 7.2% and 6.5% in 2018 (MarketLine, 2020).

In a general analysis, consumers of the daily household product segment, specifically, the household cleaning product segment are tendentially female based, a gender bias noticeable in the grocery shopping segment (Mortimer & Clarke, 2011; Moser, 2015; The Nielsen Company, 2016). However, the percentage of males is increasing (The Nielsen Company, 2016). Additionally, based on Moser's (2015) study, most people responsible for purchasing these products are of more mature age, with a medium to high income.

Regarding cleaning product attributes, the most important are efficacy, previous experience, trust in the brand name, and good price/value. Additionally, combining efficacy with innovation is a win-win solution for consumers. More concretely, package size and eco-friendly are secondary attributes highly valued (The Nielsen Company, 2016). In a Nielsen study, 29% of respondents value "packaging that is easy to use and store" (e.g., refills and concentrates), and "24% say that environmentally friendly/sustainable packaging is very important" (The Nielsen Company, 2016, p. 17).

However, an industry as large as this one is bound to have some negative repercussions.

2.1.2. The use of plastic in this market

Most household cleaning products are sold in plastic packaging, its majority using a type of plastic resin called high-density polyethylene (World Economic Forum, 2016). This plastic option is mainly justified by its durability, an essential factor for storage, transportation, protection of contents and safe user-usage (Lingle, 2019). Additionally, it is also low weight, low cost, and versatile (World Economic Forum, 2016). Chemicals can also be present in most common cleaning supplies, making plastic a reliable choice that storages the product safely throughout time (Lingle, 2019).

However, these plastic containers generate negative externalities “in three areas: degradation of natural systems as a result of leakage, especially in the ocean; greenhouse gas emissions resulting from production and after-use incineration; and health and environmental impacts from substances of concern.” (World Economic Forum, 2016, p. 13).

As stated by Laroche et al. (2001, p. 514), “both willing and unwilling consumers are preoccupied by the severity of ecological problems”. The demand for plastic packaging is only expected to increase in the next few years, further aggravated by the COVID-19 pandemic. This increased consumption is leading to a global concern and interest to find more sustainable options. Consumers are searching for better alternatives, and companies are designing new and innovative ways to provide them, considering the entire lifecycle of their products (Klaiman et al., 2016; The Nielsen Company, 2016).

2.1.3. The Product

The following study will focus on analysing perceptions and purchase intentions of concentrated surface cleaning refills diluted in a refillable spray container. By redesigning the traditionally bulky single-use plastic packaging of household cleaning products, companies are now offering a more sustainable option for this market. The product itself comes in a concentrated formula, in a water-less format, either in a liquid or dehydrated-tablet form. Consequently, while still maintaining its active ingredients, the product amount sold in one-unit decreases, creating the possibility for package downsizing since 90% of a traditional cleaning product is water (EMAF, 2019). The consumer needs to add water to this concentrated formula in a bigger container, achieving its traditional format. The user can repeat this final step with the same bottle. Each brand has different offerings, varying in factors like designated surface (Kitchen, bathroom, multi-surface, …), fragrance (scented and/or non-scented), and formula (toxic, non-toxic, and/or organic). The product’s overall idea is to reduce single-use plastic in the household cleaning supply market. Indirectly, by providing the formula in a concentrated format, companies save on water-usage and transportation costs. For example, one truck can carry more products at once. Additionally, companies have also considered the packaging of the concentrated product, making it recyclable or biodegradable.

2.1.3.1. Companies in the Portuguese Market

After analysing the availability of this product to the Portuguese consumer, six main companies were identified: Cif with Cif Ecorefill Power and Shine, CleanPath, Jaws with their Just Add Water System, Lysol with Lysol Smart, Clorox with their Cleaning System Starter Kit, and W5 from Lidl with their Ecoclear Refillable Tablets. The Blueland company, while not available for the Portuguese market, was also a good reference to study concentrated dehydrated tablets.

Cif and W5 are the only available brands at retail. The remaining brands can only be purchase by a Portuguese consumer in the brands own online store and/or through other online stores like, for example, Amazon. Regarding price, the refills, per 750ml, vary approximately between 2.38€ and 3.49€ for a cartridge and between 1.69€ and 2.15€ for a tablet. Appendix 1 presents these brands claims and key product information. Additionally, Appendix 2 offers a list of each product's most advertised attributes, which were used as a starting point to identify the most important drivers and barriers for consumers to purchase these products. These possible drivers and barriers, supported by literature, generated hypotheses that answer the research questions.

It is important to mention that W5 Ecoclear Refillable Tablets are, according to an employee working at Linda-a-Velha Lidl, on a limited-stock base, and will not be restocked. Furthermore, JAWS, Lysol, and Clorox, all only available through Amazon, are out of stock, and the webpage states that it does not know when or if they will be restocked.

2.2. The Sustainable Consumer

The term *green consumption* has been attributed various definitions, and extensive research has been done on this matter (e.g., Gilg et al., 2005; Lin & Chang, 2012; Moser, 2015; Pickett-Baker & Ozaki, 2008). One approach is to aggregate all products, services and activities related to green consumption and define them as *sustainable consumption* in general (Gilg et al., 2005).

It is necessary to understand who buys the product in questioning, the "sustainable consumer". There are three main groups of variables that seem to be influential when classifying this consumer: "environmental and social values, socio-demographic variables and psychological factors" (Gilg et al., 2005, p. 2).

There is still not much research in the <u>social and environmental values and concerns</u> area regarding sustainable consumerism, but some relevant information has been found. Firstly, having values that consider the natural environment highly important in one's life, is strongly linked to high levels of environmental activism and behaviours (Gilg et al., 2005; Pickett-Baker & Ozaki, 2008). Additionally, environmentalists tend to be more: altruistic, collectivistic, open to change, non-materialistic, and frugal. Furthermore, sustainable consumers tend to present ecocentric and biospheric values (Gilg et al., 2005; Laroche et al., 2001; Moser, 2015).

Based on socio-demographic research, certain variables tend to characterise typical sustainable consumers. These consumers are described as matured-age females who are well educated, liberal and have a medium/high income. This description matches the typical consumer of household products segment, stated at the beginning of this chapter. However, there is still a debate regarding the variables of age, income (Gilg et al., 2005; Laroche et al., 2001), and education (Laroche et al., 2001). To exemplify, for reusable goods, when income rises to high levels, consumers start to switch from reusable to disposable products. They believe it is too costly to spend time maintaining products when purchasing new disposable ones has a lower opportunity cost of time (Mccollough, 2007). Additionally, Laroche et al. (2001) mentioned one study that found that environmentally friendly behaviours are consistent across different income levels, and another saying that this consumer is less educated and has a lower income comparing to the United States average. It was concluded that income and education are not good predictors of environmental purchasing behaviours. Regarding age, initial research identified the consumer as being young, but the study describes them as older and more mature than average (Laroche et al., 2001).

Environmentally friendly consumers also hold specific psychological factors, having personal attitudes that distinguish them. First, consumers with high levels of perceived consumer effectiveness consume more green products and services. This means that the extent to which consumers believe that their actions can impact the environment affects their sustainable consumption habits (Gilg et al., 2005; Laroche et al., 2001). Secondly, sustainable consumption is altered by how much one can participate, by their self-efficacy. Thirdly, moral responsibility to take part in an action, i.e., social responsibility, influences sustainable consumerism (Gilg et al., 2005).

Additionally, Gilg et al. (2005) defined four sustainable consumers' clusters: committed environmentalists, mainstream environmentalists, occasional environmentalists, and non-environmentalists. Following the previously mentioned order, their likeliness to present environmentally friendly behaviours decreases. Committed environmentalists have the highest likeliness and non-environmentalists the lowest.

H1: Social and environmental values and concerns influence the intention to purchase.

H2: Socio-demographic variables influence the intention to purchase.

H3: Psychological factors influence the intention to purchase.

2.3. The concept of eco-design packaging

As previously mentioned, plastic packaging has a significant impact on the environment but also on public health. Through product innovation and efficiency, companies can address these environmental concerns and create more sustainable options (Ceschin & Gaziulusoy, 2016). Design, "as a primary function for innovation in business", can play a role in this quest for sustainability and it has been doing so since the mid-twentieths (Ceschin & Gaziulusoy, 2016, p. 119). Sustainable packaging has not been clearly defined. One criterion used is from the Sustainable Packaging Coalition (2011, p. 1) where sustainable packaging:

A. "Is beneficial, safe & healthy for individuals and communities throughout its lifecycle
B. Meets market criteria for performance and cost
C. Is sourced, manufactured, transported, and recycled using renewable energy
D. Optimises the use of renewable or recycled source materials
E. Is manufactured using clean production technologies and best practices
F. Is made from materials healthy throughout the lifecycle
G. Is physically designed to optimise materials and energy
H. Is effectively recovered and utilised in biological and/or industrial closed-loop cycles."

Design for Sustainability is also related to the response that design gives to sustainability issues. In this paper, the focus will be at a Product Innovation level, i.e., improving existing products through design (Ceschin & Gaziulusoy, 2016). There are different approaches at a Product Innovation level which will not be detailed in this dissertation but are further explained by Ceschin & Gaziulusoy (2016).

The following sub-topics outline the identified drivers and barriers to purchasing the eco-design product mentioned throughout this thesis.

2.3.1. Environmentally friendliness

Considering the sustainable consumer behavioural traits defined above, especially those from committed environmentalists, consumers value and have a high preference for eco-friendly goods (Harke Group, 2020; Rokka & Uusitalo, 2008). Moreover, as stated by Laroche et al. (2001, p. 503), "the most convincing evidence supporting the growth of ecologically favourable consumer behaviour is the increasing number of individuals who are willing to pay more for environmentally friendly products".

Governments are trying to combat plastic usage through its ban in countries around the world (e.g., ban of plastic straws, cups, plates, … sold in food establishments in Portugal according to the *Lei n.º 76/2019 de 2 de Setembro*). However, literature is scarce regarding global public attitudes towards plastics. One of the few available global information comes from a study that states that "87% of respondents at that time were worried about the impact of plastic products on the environment" (Dilkes-Hoffman et al., 2019, p. 228). Additionally, a study done to the Australian population found that "a large majority (80%) of respondents express a desire to reduce their personal plastic use, view alternative materials as more environmentally friendly packaging options and support measures to reduce the use of disposable items" (Dilkes-Hoffman et al., 2019, p. 233). Nevertheless, the attitude-behaviour gap was present, i.e., these beliefs do not translate into actions, and most agree that it is the industry's and the government's responsibility to provide better options and legislations (Dilkes-Hoffman et al., 2019).

Furthermore, the consumer gives much importance to end-of-life attributes when thinking about the meaning of environmentally friendly packaging. It associates environmentally friendliness with reusability, recyclability, and biodegradability (Herbes et al., 2018). Herbes et al., 2018 stated these end-of-life benefits as a very promising mid-term communication strategy. Due to the implementation of laws, regulations and systems, recycling is widely accepted, viewed as usual or even expected behaviour in Western countries (Herbes et al., 2018; Jerzyk, 2016), having its demand never been so high (Harke Group, 2020). On the other hand, reusability is a much more powerful tool than recycling, being a critical strategy to reduce waste, conserve resources, and sustain quality of life (Ertz et al., 2017).

H4: Perceived environmentally friendliness of the packaging is a driver to purchasing.

> *H4.1: Perceived environmentally friendliness due to reduced plastic usage in packaging is a driver to purchasing.*
>
> *H4.2: Perceived packaging environmentally friendliness due to spray bottle reusability is a driver to purchasing.*
>
> *H4.3: Perceived packaging environmentally friendliness due to recyclability is a driver to purchasing.*

H4.4: Perceived packaging environmentally friendliness due to being biodegradable is a driver to purchasing.

2.3.2. Availability

As mentioned in the *Companies in the Portuguese Market* section, there is a noticeable lack of available products for the Portuguese market. Furthermore, Unilever with Cif identified this lack of availability but also of awareness (Appendix 2). This also applies to most green products since there is still little adherence by most companies. Additionally, for convenience goods like household cleaners, consumers buy them repeatedly, not dedicating much time researching them. Consumers see it as a hassle to locate green products and, consequently, are unlikely to purchase them even if they were willing to (Gleim & Lawson, 2014; Rokka & Uusitalo, 2008).

H5: Lack of perceived product availability is a barrier to purchasing.

2.3.3. Effectiveness

Household cleaning products are associated with attributes of strength while sustainability is associated with gentleness, creating a gap in consumers' minds, i.e., a sustainability liability. When a product is associated with sustainability and being green, people, using the process of compensatory inferences, tend to think it is less effective (Gleim & Lawson, 2014; Lin & Chang, 2012; Luchs et al., 2010; Pickett-Baker & Ozaki, 2008). This is an issue since, as previously mentioned, efficacy is the most valued attribute for this segment (The Nielsen Company, 2016). Moreover, to compensate ineffectiveness, consumers tend to overuse it when compared to the traditional product. This fact is even more accurate for environmentally conscious consumers due to their extensive knowledge of green products. However, if information that increases perceived effectiveness is provided, the amount used will be the same as for traditional products (Lin & Chang, 2012).

H6: Perceived lower effectiveness, due to product association with sustainability, when compared to traditional cleaners, is a barrier to purchasing.

H6.1: Consumers think they have to use a larger amount of product for it to work as well as traditional cleaners.

2.3.4. Price

Price is one of the main attributes and most common barrier when making a green purchasing decision. Green products are often perceived as more expensive than traditional ones, making price an undoubtfully important factor, especially for non-environmentally concerned consumers or for those with lower income. Buying green is then improbable. To counter this, brands should consider a competitive or reduced-price strategy (Gleim & Lawson, 2014; Moser, 2015). The use of these pricing strategies is noticeable in the advertisement brands make. They state that their products price is competitive to the conventional products when paying for the first-time kit (bottle and refill), or even cheaper when only purchasing for the refill cartridge/table (Appendix 1).

However, price is not a barrier for consumers with environmental concerns since they perceive the product's features as benefits, being less price sensitive. Additionally, they accept the trade-off of higher prices for ecological gains (Gilg et al., 2005; Gleim & Lawson, 2014; Moser, 2015).

H7: Perceived higher price due to the product being "green" when compared to conventional cleaners is a barrier to purchasing.

In contrast, price can also be seen as a driver for purchasing. Smaller packaging can lead to a decrease in manufacturing and logistics costs and, consequently, in the final price that can be perceived by the consumer as a benefit to purchasing (Magnier & Crié, 2015).

H8: Perceived decreased price due to smaller packaging when compared to conventional cleaners is a driver to purchasing.

2.3.5. Convenience

The attribute of convenience in saving time and effort, in its various forms, is seen as a driver for purchasing, its importance and demand have increased over the years (Anderson & Shugan, 1991; Berry et al., 2002; Kelley, 1958). It is also a very successful key benefit for the household cleaning products segment (The Nielsen Company, 2016). In this case, consumers must spend time and effort preparing the product at home, which is expected to be a barrier to consumption.

According to Magnier & Crié (2015) and Harke Group (2020), convenience is a perceived benefit of eco-designed packages since it is smaller, occupying less space. A sense of beneficial convenience is also generated if the packaging is easy to eliminate or transform (ex.: compostable, recyclable, and biodegradable packaging).

H9: Perceived higher convenience when compared to conventional cleaners is a driver to purchasing.

H9.1: Time- and effort-spent preparing the product at home is seen as inconvenient and, therefore, a barrier to purchasing.

H9.2: Smaller packaging is seen as convenient and, therefore, a driver to purchasing.

H9.3: Easiness to eliminate or transform the packaging is seen as convenient and, therefore, a driver to purchasing.

2.3.6. Safety concerns

When addressing safety concerns, the previously mentioned sustainability liability prevails. Consumers doubt the ecological packaging capability of protecting its contents when compared to a conventional one since sustainability is associated with gentleness-related attributes, not strength-related attributes. The latter can be preferred over the former, being a purchasing barrier, especially when addressing toxic cleaning supplies (Magnier & Crié, 2015).

H10: Ecological package is perceived as having low protective capabilities regarding product contents, being a barrier to purchasing.

2.3.7. Brand Loyalty to conventional products

Brand loyalty to conventional products is an important barrier, preventing consumers from switching to more unconventional green products. Conventional household cleaners tend to be bought repeatedly by most consumers, creating a sense of loyalty and an unwillingness to change their behaviour (Gleim & Lawson, 2014).

H11: Brand loyalty to conventional products will prevent people from switch to a more unconventional product.

CHAPTER III - RESEARCH METHODOLOGY AND DATA COLLECTION

3.1. Research Method

This research's main objective is to understand the Portuguese consumer traits, drivers, and barriers to purchasing concentrated surface cleaning refills to be diluted in a reusable spray container. Additionally, the veracity of the hypothesis previously created will be checked. Considering the literature review conducted and uniqueness of the product in question, a Mixed Methods Methodology research paradigm will be used to collect reliable data. This paradigm collects, analyses and mixes both qualitative and quantitative data. Quantitative research is an objective method of studying a subject focused on acquiring numerical data, while qualitative research is more subjective and personal. Researchers can then avoid choosing between qualitative and quantitative paradigms, balancing most of what each one lacks when separate and taking advantage of the benefits of both, having a greater overall strength (Creswell, 2009; White & Stephen, 2014). For example, the quantitative data can verify the qualitative data results since the latter is not sufficient to represent the population of interest while the former can be.

3.2. Research Instruments

3.2.1. Qualitative Research

The qualitative data was acquired through an in-depth interview, working as a preliminary interview to verify the hypothesis created and incorporate any relevant discoveries into the quantitative research. It was semi-structured, meaning it followed a pre-design set of questions (Appendix 3) related to the relevant themes found in the literature review but was adaptable to interviewees' answers. Open-ended questions were mostly used to incentivise interviewees to speak freely and expand their answers, obtaining rich insights regarding their perspective on specific topics (White & Stephen, 2014).

Regarding the sample, an initial selection was made, where only Portuguese individuals who live in Portugal were interviewed. Interviewees had to have personally purchased household surface cleaning supplies since they are the ones who can provide the main insights on why they did/did not buy an item. Finally, six users and five non-users of the innovative product were selected, nine women and two men.

The script started by asking consumers' general shopping habits for the traditional product. The following section explained the innovative product being studied and asked if they had ever purchased it. Different follow-up questions where made for users or non-users of the product. Nevertheless, for both, the initial questions related to pre-purchase positive and negative perceptions and benefits, and motives for purchasing/not purchasing the product. Users' habits when buying refills were also checked. Non-users discussed improvements companies should do to the product, their willingness to try it and why. The main overall goal was to verify the hypotheses created related to drivers and barriers to purchasing. To understand interviewees' sustainable characteristics, some questions were done in section III. The final section asked socio-demographic questions to all interviewees.

It is worth mentioning that there are disadvantages, such as bias, reliability, and validity. For example, the interviewee might give the answers he believes will please the interviewer, the interviewer himself might be biased, and the interview process is very time-consuming (White & Stephen, 2014).

Qualitative Data Insights

To distinguishing users from non-users more instinctively, when needed their names will appear as U*Name for users and NU*Name for non-users. Additionally, Appendix 4 contains complementary information.

Socio-demographic variables

As previously mentioned, six users were interviewed: Ana, João, Carolina, Inês, Marisa, and Sofia. All users purchase Cif Power and Shine Ecorefill.

Regarding the non-users, those were: Catarina, Maria L., Maria V., Rita, and Miguel. Only Catarina had previously heard of this type of product, specifically Cif Ecorefill, but had never purchased it.

It was difficult to find male participants who purchase household surface sprays, illustrating the gender bias mentioned in the literature. Additionally, ages vary between 22 and 58, with an average of 29 years old, showing consumers' tendency to be of adult age. All have higher-level education, with most having a Bachelor's degree. Participants have an average and mode score of four regarding their ideological tendency (1 – Liberal to 7 – Conservative). To illustrate, U*Ana has the highest amount of sustainable habits but a score close to conservative of five and NU*Maria V. the lowest amount but a score close to liberal of two. This observation shows that the most sustainable individual is more conservative than liberal, contrary to the literature review.

General Shopping Habits

All have personally bought household surface cleaning sprays and acquire them at the supermarket, indicating that the refill most likely needs to be available in supermarkets. Their frequency varies, but most buy them every month. Seven mentioned that they only purchase brands they know. Known brands assure them efficacy and credibility. There is also a high preference to buy non-private label brands.

Price, a factor of high importance, was not highly mentioned in this section. Three participants search for a good price-quality ratio and seven for price-promotions. For U*Sofia price is not a concern, while for NU*Miguel affordable prices are essential.

Many see high efficacy as an obvious attribute, as a crucial and deciding factor. Easy-to-use packaging was another attribute many mentioned. U*João needs it to be small, convenient and portable to carry around, and comfortable to use.

Most also described the importance of smell extensively. NU*Catarina stated that smelling these products is very important to her, but it is not always easy to do so. Additionally, concentrate smells are too intense.

Only two users had environmental concerns. U*Carolina revealed that she searches for products with low amounts of packaging and U*Ana looks for reusable bottles. Both search for recyclable containers.

<u>Product perceptions and suggested improvements</u>

All interviewees perceive the product as a positive change for the environment, a beneficial purchasing factor. Many mentioned the reduced plastic usage originating from the concentrated formula smaller packaging. The original spray bottle's reusability was also mentioned. Recyclability was seen as a positive factor by five participants, three of them concerning Cif Ecorefill, and as a recommendation by one non-user.

In conclusion, H4, H4.1, H4.2, and H4.3 are verified. Biodegradability, H4.4, was not mentioned, possibly meaning it is an irrelevant factor for consumers. However, the sample is too small to make such an assumption.

All perceived convenience as a positive purchasing attribute. The refill is much smaller, making the consumer process more convenient for purchasing higher amounts of the same product at once, creating less weight and effort when transporting, facilitating storage, and being easier to recycle. The time and effort spent preparing the product are seen as easy, not purchasing barriers. However, U*João stated that "the effort and time do not translate into a huge benefit for the consumer". NU*Miguel added that he would not change if the price were higher than the traditional product due to the effort he would have to put in. From these insights, H9, H9.2, and H9.3 are verified. However, H9.1 can be rejected since the time and effort is not seen as inconvenient by most.

The product's effectiveness was mentioned by two users and three non-users, as expected to be the same. The remaining users stated that the brand assures them efficacy, and if they did not have a specific brand associated with it, they would think that the product was not going to be as efficient. Only U*Sofia feared the concentrates efficacy, due to negative past experiences. These insights are not clear whether hypothesis H6 should be rejected or verified. Nevertheless, a new hypothesis was added – *H12: Brand assures trust in the effectiveness of the product being a driver to purchasing.* As previously stated, most only purchase brands they know due to the reliability of their product's attributes, increasing this hypothesis strength. Regarding H6.1, U*Carolina addressed this topic, expecting to use the same product amount. Lastly, NU*Miguel suggested that companies find ways to prove efficacy by, for example, having an efficacy certificate or by doing experiments in supermarkets.

Most respondents state that the price should be lower since the packaging is smaller, cutting down costs. A few thought it should be higher due to two factors: environment association and/or innovative element. Some participants were torn between higher and lower prices, having contradictory expectations. In conclusion, H7 and H8 are verified. Furthermore, "*H14: Perceived higher price when compared to conventional cleaners due to the product being innovative is a barrier to purchasing"* was created. Respondents mentioned that companies should apply a lower price and offer promotional packs at a lower total cost, including a spray bottle and refills.

Safety was not mentioned by many. NU*Rita referred that the tablets seem safer than traditional cleaners having no risk of breaking and spilling. In contrast, U*João and NU*Catarina feared that, by being a small concentrate, the packaging will not store the product well, having low protective capabilities, and that touching a concentrate may be unsafe. H10 mentioned the ecological packaging as the reason to doubt the protective capabilities, which was not declared here, making the hypothesis's veracity unclear.

Users mentioned that the product is not always available and is not very noticeable in-store. They also did not know much about it and were not very aware of it, being the prior lack of awareness a purchasing barrier. Non-users mentioned that they had never seen or heard of the product, being the reason why they had never purchased it (except for NU*Catarina). This lack of awareness lead to the adjustment of H5 – *H5: Lack of perceived product availability and awareness is a barrier to purchasing.* Unilever, Cif Ecorefill's company, also underlined this new purchasing barrier (Appendix 2). Participants reinforce these barriers when stating that companies should increase awareness and availability.

Smelling a cleaning product in-store is very important, as previously stated. NU*Rita mentioned that the product analysed does not provide the customer with the opportunity of smelling it before purchase and dilution, being a purchasing barrier. From these insights, "*H13: Being unable to smell the final product before purchasing is a barrier to purchasing"* was generated.

Two final suggestions to improve purchase intention were made. They suggested that companies create campaigns that advertise all of the referred advantages and address perceived problems, but more specifically, that connect to social and environmental issues.

Finally, all non-users expressed that they are willing to try, some more than others. Either due to curiosity and, more generally, due to all previously mentioned benefits.

Users' Shopping Habits

Users mentioned that their habits are the same as those for traditional surface sprays. Only two are considering buying more than one refill at a time, due to the convenience that a smaller product generates.

Sustainability and the Consumer

Regarding the meaning of what it is to be sustainable, every participant's definition is different. Some say it is to have environmental beliefs but, also, behaving accordingly. These beliefs vary between having the smallest environmental footprint possible and shifting to more sustainable options without changing one's quality of life.

When asked how they would classify themselves from one, non-sustainable, to seven, fully sustainable, answers varied between three and five. Recycling is the most mentioned habit, followed by the use of reusable bags. Eighteen other different practices were mentioned, which can be found in Appendix 4.

Linking to the environmental and social concerns literature, participants seem open to change. However, non-materialism and frugality do not seem to apply since all want to consume more products, just less impactful.

Most mentioned humankind as the entity responsible for solving sustainable issues with eight participants subscribing to this idea. The other highly mentioned entities are governments and companies/brands. Participants state that nothing can be accomplished without government support and practices, and companies' decisions to adopt and supply sustainable options.

Following the psychological factors literature, several feel morally responsible to act but attribute responsibility to entities with power such as governments and companies.

3.2.2. Quantitative Research

Regarding the quantitative research, the previously created hypotheses were tested using an online survey. The data obtained is numerical and can be evaluated using mathematical and statistical treatments. An online survey is an efficient and faster method of acquiring large data sets to the same pre-designed questions. Since the interviewer is not present, the questionnaire is classified as self-administered. Explanatory research is then done, enabling the examination and explanation of the relationship between variables. (Saunders et al., 2009).

There are, however, some disadvantages to online questionnaires. For example, the interviewee is not present to clarify any doubts respondents might have. Furthermore, respondents might be in a rush or a disturbing environment and reply without putting much thought into their answers. These disadvantages can diminish the veracity of the data and impact research validity. A pre-test of the survey was done, to solve these issues, to five individuals to check and correct questions, the wording used, and other issues. Additionally, one attention question was done where respondents were asked to select a specific option in a Linkert-scale matrix. Those who did not answer correctly were assumed to be distracted, and their answers had low veracity.

The online survey (Appendix 5) started with an introductory text presenting general information regarding its primary objective, rules, guidelines, and contact information. An initial screening question followed, where only Portuguese individuals living in Portugal were able to continue with the goal of analysing the Portuguese market and consumer. Those screened out were redirected to the end of the survey. A second screening question was done to those who remained, asking their purchasing frequency of general household surface cleaning sprays. All who had never purchased were redirected to a set of socio-demographic questions followed by the end of survey message. The goal was to only further include respondents with the most relevant insights and purchasing experience. Respondents who purchase were asked two questions regarding their general shopping habits for these products: usual purchasing location and ranking, by the level of influence on purchases, of nine factors taken from the hypotheses created. An analysis of the consumers' characteristics was then done, using as reference Gilg et al. (2005) study where socio-demographic factors, social values, environmental values and psychological factors were evaluated. In the following part of the questionnaire, the innovative product analysed in this thesis was presented and described. Illustrative images, with no association to a specific brand, were also shown. Respondents were then asked if they had already purchased a product such as this one or were interested in doing so. Participants were then divided into four groups: 1 – those who have never purchased it nor are interested in doing so, 2 – those who have never purchased but have a slight interest in doing so, 3 - those who have never purchased but definitely want to start doing so, and 4 – those who have already purchased it. For each of these groups, questions regarding drivers and barriers to purchasing the product were asked, following the hypotheses previously created. The final set of questions, socio-demographic questions, were also used to characterise the consumer. The age range followed a study done by The Nielsen Company (US) (2018), aggregating respondents per generations. The staring value for the income ranges used the monthly minimum wage in Portugal. These were the same questions done to those who do not purchase household surface cleaning sprays.

3.2.3. Data Analysis

The survey was developed using Qualtric Survey Software and distributed, via an anonymous link, between the 23rd of November and the 2nd of December. A total of 346 responses were obtained, including completed and uncompleted answers. IBM SPSS Statistics 26 was the program used to analyse the data collected.

Data preparation is the initial step for the data analysis. To increase accuracy and precision, data editing was conducted where inconsistent values and ineligible respondents were screened. Thirty-six individuals were discarded, since they were not Portuguese, not living in Portugal, or because they did not answer the attention question correctly (Appendix 7). A total of 224 valid responses were obtained from Portuguese consumers residing in Portugal (Appendix 8).

New variables were computed while others were recoded. Regular sprays' purchasing frequency was reverse coded to be analysed with an increasing scale in frequency amount. The "technological solutions" variable (technocentrism) was reverse coded to be analysed in an ecocentric view. The one regarding "Government responsibility" was also reverse coded to analyse self-moral responsibility. For brands purchased by Group 4, dummy variables were created for each when doing a cross-tabulation.

A variable for purchasing interest was also created without including current customers to analyse questions only inquired to the remaining respondents. Additionally, a new variable was created for the trust one gives to a product's efficacy when related to a specific brand. This variable was computed by summing Groups' 1, 2, and 3 answers to Q16 and Q19. The objective is to analyse only people with interest, without an associated brand (just a concept).

To evaluate the hypotheses created, different statistical tests were performed. For the analysis of social and environmental values, psychological factors, and most drivers and barriers to purchasing and their effects on the dependent variable, level of interest to purchase, several linear regressions were tested. For the consumer characteristics, the regressions varied between using the individual variables asked or computed factors (Appendix 9). For each factor, the mean of the corresponding variables was used to calculate its score. The final factors obtained were altruism, openness to change, conservative, egoism, anthropocentrism, biospherism, and ecocentrism. For the drivers and barriers, the linear regressions in Appendix 10 were made. More specifically, by summing the results for each driver (Q10 (except Q10.j), Q14, and Q18) and barrier (Q11, Q15, and Q17) related statements, a variable for each corresponding hypothesis was obtained and used in the models. Only H6.1 and H12 were not analysed in this model. H7, H8, and H14 were included in the model but further analysed with questions specifically done to current customers. In the end, four models were chosen – Models 2a, 2b, 2c, (all Stepwise method) and Model A (Stepwise). The selection process was based on the models with the highest adjusted r squared and their globally significance level. The independent variables all use a 1 (strongly disagree) to 5 (strongly agree) scale while the dependent variable a 1 (no interest) to 4 (current customer, i.e., highly interested) scale as previously explained.

Table 1

Linear Regression of each model and corresponding appendixes

Linear Regression:	Appendix:
Model 2a	17
Model 2b	18
Model 2c	24
Model A	25
Model for H12	28

Note. From Survey Data.

Regarding the linear regression models' assumptions, their analysis will be done in the following paragraphs.

Starting with the Pearson Correlation analysis to understand the models' correlations and multicollinearity, the independent variables do not have a high correlation with the dependent variable and between themselves, since their correlation values are all between -0.8 and 0.8. As a result, there is a low probability of multicollinearity problems for all models. Furthermore, all models' Tolerance and VIF values are higher than 0.40 and lower than 2.5, respectively, meaning there are no multicollinearity concerns. In the collinearity diagnostics tables, the condition indexes are all lower than 15, except for the 4th dimension in Model 2b and in Model A with a value of 16.801 and of 22.193, respectively. Nevertheless, if the threshold taken into account is 30, all results suggest no multicollinearity concerns for all models.

Regarding the absence of autocorrelation between the errors, the Durbin-Watson test was used. For all models, the value was close to 2, meaning that there was no autocorrelation, and all met the assumption.

Additionally, regarding the homoscedasticity assumption stating that the error variance is constant, the Breusch-pagan test or the Modified White test were used. All models p-values were higher than 0.05. The null hypothesis of the error variance being homoscedastic is then not rejected for all models, meeting the assumption.

Scatterplots were computed for each independent variable, in the x-axis, with the dependent variable, in the y-axis, to analyse the linearity assumption, i.e., if the models are linear. All linear regression model variables were indeed, positively or negatively, linear, meeting the linearity assumption.

Observing all Histograms and Normal P-P Plots for the distribution of standardised residuals, the Histograms display a relative bell-shaped format, and the Normal P-P Plots have their observations somewhat close to the line. Hence, the errors are possibly normally distributed for all models. To verify, the Skewness and Kurtosis tests were checked for all models' variables. All have their values are between -1 and +1, being close to zero, except for some variables. The "Spaceship Earth" and "Scientific Solution" variables from Model 2b have Skewness values between -2 and +2 which are higher than normal but still acceptable according to George & Mallery (2016). However, the Kurtosis of those two variables is higher than 2, meaning that the distribution is more peaked than normal, deviating from normality. Nevertheless, if the Central

Limit Theorem is taken into account, the normality assumption can be assumed since the sample size is medium to large (N=198) and the Model 2b is homoscedastic (Finch et al., 2018). Additionally, the Kurtosis value for "Waste Beliefs" (Model 2c) while above +1 is still below 2, being acceptable, according to George & Mallery (2016). In conclusion, all models' errors are possibly normally distributed according to their residuals, meeting the assumption.

The outliers for the consumer personality were analysed. To understand their impact, the inputs of some the outliers were substituted by the corresponding variable serious-mean. However, the quality of the model was not improved, and the outliers were considered.

CHAPTER IV – RESULTS

4.1. General Shopping Habits

Firstly, the purchasing frequency of Portuguese consumers residing in Portugal was analysed (Appendix 11). The majority purchase every month or every two months, with 77 and 46 respondents, respectively. In a total of 224 responses, 26 never purchase traditional household surface cleaning sprays being redirected, as previously stated, to the final socio-demographic questions.

To understand if the gender bias mentioned throughout the research is present in the survey, a cross-tabulation test was computed between gender and purchasing frequency (Appendix 11). Fisher's Exact test should have been used to understand the variables' statistical independence since there are cells with counts smaller than 5. Due to insufficient memory, it was not possible, and no conclusion can be taken regarding the variables' association. Nevertheless, by analysing the sample, 174 of respondents are female while 48 are male. Of those who responded "never" to purchasing 12 are female and 14 are male, corresponding to 6.9% within the female group and 29.2% within the male group. These individuals were not further included in the analysis, making the remaining sample of 198 respondents. Additionally, an apparent gender bias where women are the predominant consumer is shown.

Appendix 12 shows respondents preference for purchasing at retail stores with a physical location, corresponding to 97.5% of selected answers.

To analyse the ranking of factors by their influence in one's purchase of traditional surface cleaning sprays, Friedman's ANOVA test was computed (Appendix 13). Its p-value of 0.00 is lower than the significance level of 0.05, rejecting the null hypothesis of all means being equal. Additionally, by doing Kendall's W test, a 42.5% variability appears, meaning that in 57.5% of the variability, participants do not agree. This variability is moderate, showing a medium effect of the factors influence one's purchase. Furthermore, from the pairwise comparisons, it is concluded, by evaluating the adjusted significance, that there is a statistical significance between all factors except for: Efficacy-Price, Convenience-Brand, Convenience-Market availability, Brand-Market availability, Packaging size-Environmentally friendly packaging, Packaging size-Safeness of the packaging, Environmentally friendly packaging-Safeness of the packaging, Safeness of the packaging-Possibility to smell the content. Nevertheless, all factors' means are worth analysing. Efficacy and Price have the lowest mean of 2.11 and 2.23, respectively, being the most influential factors even though there is no statistically significant difference between them. They are followed, in decreasing order of importance by convenience, brand, and market availability. Packaging size and environmentally friendliness of the packaging succeed with the same mean of 6.15. Possibility to smell the contents and safeness of the packaging are the least influential with 7.04 and 6.75 respective means.

4.2. Research Questions and Hypotheses Testing

Respondents were arranged in four groups according to their interest in purchasing the innovative product (Appendix 14; Q8). Group 1, those who have never purchased it nor are interested in doing so, comprises 5 individuals. Group 2, those who have never purchased but have a slight interest in doing so, and Group 3, those who have never purchased but definitely want to start doing so, are the largest groups with 89 and 63 respondents, respectively. Group 4, those who have already purchased it, corresponds to 41 participants.

Group 4 indicated in Q9 the brand(s) purchased (Appendix 15). Cif Power and Shine Ecorefill is the most purchased brand, with 35 answers (61.4%) out of the total 51 answers. Ten individuals selected the option "Other" (17.5%), but only two indicated which: Hamway and White Vinegar. From the remaining, eight purchase Lidl W5 Ecoclear Refill Tablets (14%), two purchased Clorox Cleaning System Starter Kit (3.5%), and the other two purchased JAWS Cleaning Sprays or Lysol Smart. CleanPath Cleaning Sprays was never selected.

4.2.1. Research Question 1 – Consumer Characteristics

H1: Social and environmental values and concerns influence the intention to purchase.

Figure 1

Model 2a and 2b Variables

The previously mentioned Model 2a (Appendix 9), a Stepwise linear regression analysing the influence of social values (Q5) in the purchasing interest (Q8), was used to analyse this hypothesis (Appendix 16). Loyalty and Helpful respectively presented the highest means of importance in respondents lives with 4.57 and 4.35, and with the lowest standard deviations of 0.663 and 0.618. Unity and Equality follow them with averages of 4.27 and 4.16, respectively. The social values with the lowest mean of importance were Influential and Wealth, with corresponding values of 2.68 and 2.98.

The following step is to analyse the quality of the model. Its R Square indicates that 2.5% of the variance of the level of purchasing interest is explained by the model, i.e., the independent variables. In the ANOVA table, the p-value is lower than the significance level of 0.05, rejecting the null hypothesis of all coefficients being equal to zero, except for β0. The model is then globally significant, and at least one of the explanatory variables is significant to explain the dependent variable's behaviour. The individual significance tests are performed in the coefficient table, and the null hypothesis of the individual coefficients of the independent variables being equal to zero is tested. The Stepwise method selected one independent variable – Equality. All remaining variables were excluded. Its significance level is equal to the models' (0.025), being Equality statistically significant to explain the effect on the level of interest. The unstandardised coefficient can also be analysed. Its positive sign and value of 0.176, imply that with everything else constant, one unit increase in Equality's importance positively increases the level of interest by 0.176.

The second model used to analyse this hypothesis was Model 2b (Appendix 9). Using the Stepwise method, the model (Appendix 17) has as dependent variable the level of purchasing interest (Q8) and as independent variables, all individual variables related to environmental concerns (Q6).

By analysing the means, "The balance of nature is delicate and easily upset" and "The Earth is like a spaceship, with limited room and resources" are the most agreed upon statements, with average values of 4.31 and 4.26. The two statements most disagreed upon, were "Science will help us to live without conservation" and "Humans were created to rule over nature.". Their averages were, respectively, 1.68 and 1.85.

The model's R Square states that the independent variables explain 7.4% of the dependent variable variance. The model has a p-value of 0.002, lower than the significance level of 0.05, making it globally significant. The Stepwise method (Model 3) included three variables: Scientific Solution, Spaceship Earth, (Reversed) Technological Solutions. The remaining variables were excluded. The variables included, have p-values lower than 0.05, statistically significant to explain the effect on the interest level. By analysing the unstandardised coefficients, "Spaceship Earth" has a positive effect on the interest, and "Scientific Solution" and "(Reversed) Technological Solutions" do not. With everything else constant, one unit increase in "Spaceship Earth" translates in an increase of 0.161 in the dependent variable. However, if the increase is on "(Reversed) Technological Solutions" or "Scientific Solution", the dependent variable decreases by -0.161 and -0.159, respectively. A possible explanation is that those who believe in technology as the solution for environmental problems tend to be more interested in buying the product because they see it as a result of technological advancements. Additionally, believing that the planet earth has limited room and resources, or rejecting the idea that science will solve every problem without conservation, leads to an increase in interest to purchase a more sustainable option.

H2: Socio-demographic variables influence the intention to purchase.

Four studies were done to analyse if socio-demographic variables influence purchasing intention.

A cross-tabulation was run to understand the relationship between gender and purchasing intention (Appendix 18). With Fisher's Exact test of 0.382, the null hypothesis of statistical independence between the two variables cannot be rejected, i.e., there is no association between gender and interest. Nevertheless, by analysing the sample, most females with results higher than 73% in all four levels of interest. Males correspond to 17.2% of total answers and the other two gender options to 0.5%. Analysing the "slightly" and "definitely interested" consumers, 85.4% and 82.5% are females. For the current costumers, 73.2% are also female. These results show females' higher presence in this market and their interest in purchasing the innovative product, making them the expected consumer. The majority of males are also interested or already purchase, with a similar count between groups 2, 3, and 4 of interest. Nevertheless, there is no statistical association nor difference between genders regarding their level of interest.

Regarding age, a cross-tabulation with purchasing interest was done (Appendix 19). There is at least one variable with a count lower than 5, meaning Fisher's Exact test should be observed. Its exact significance value of 0.473 cannot reject the null hypothesis, i.e., there is no association between age and purchasing interest. Nevertheless, the sample in question shows that most interested buyers in group 2, 3, and 4 are from Generation X (44 - 55 years old). Interestingly, the second-highest for Group 4 are Millenials. For the "definitely interested" the second and third highest is Generation Z and Millenials, while for the "slightly interested" are Millenials and Baby Boomers, respectively. Regarding group 1, even though the sample is too small, the highest is Generation Z and Baby Boomers. In conclusion, while there is no association between the two variables, looking into group 2 and 3, the first tends to be a somewhat older-aged group comparing to the second. However, the ones that have purchased are mostly Generation X and Millennials but also Baby Boomers, conflicting the previous insight.

For education, a One-way ANOVA was run with the dependent variable of interest in purchasing (Appendix 20). To verify the homogeneity of variances, the Levene's test was done, and its p-value of 0.033 (lower than 0.05) rejects the null hypothesis. This means that the variances are not equal, the assumption is not met, and the Welch test should be used as an alternative to the one-way ANOVA F test. When looking at the Welch test, its p-value of 0.106, higher than 0.05, does not reject the null hypothesis of equal means. In conclusion, education does not have an impact on the level of interest. However, the answers means are still worth analysing. On average, those with basic education have the lowest interest (1.50) while those with Postgraduation and “other” have the highest (3.12 and 3.00 respectively). All remaining education levels have values of interest around 2. By only focusing on the available sample, higher education does translate into interest in purchasing, reaching its peak for postgraduates.

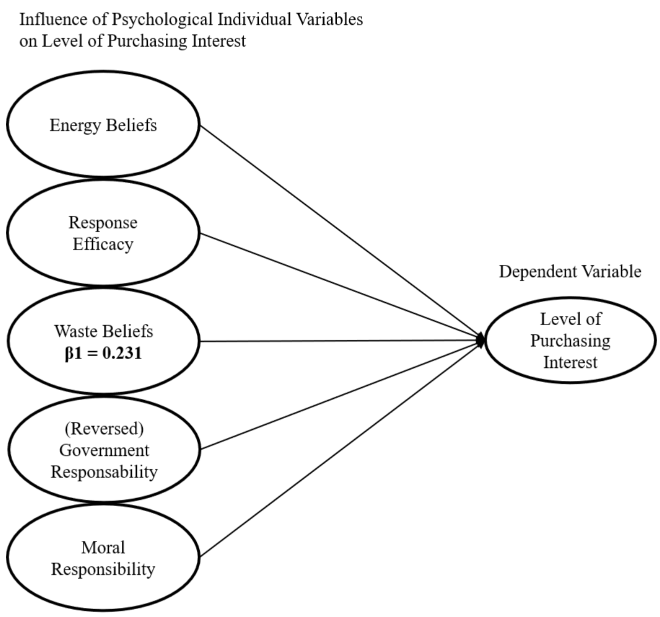
A One-way ANOVA test was also done between income level and the interest level for purchasing (Appendix 21). When analysing the means, it is noticeable that the highest level of interest comes from those with the lowest income level of less or equal to 635€ (3.00), followed by those with a monthly income between 2 001€ - 3 000€ (2.83). The income range of 636€ - 1 000€ has the lowest average of 2.38 but is still interested. To study the homogeneity of variances, the Levene’s test was analysed and, with a p-value of 0.010, rejects the assumption of equal variances. Due to the rejection of the assumption, the Welch test is analysed. Its p-value of 0.054 is higher than the significance level of 0.05, not rejecting the null hypothesis of equal means. As a result, income does not affect the interest level.

Lastly, a one-way ANOVA was also performed to study the effect of being Liberal-Conservative on the interest level for purchasing (Appendix 22). By analysing the means, one can see that as the political ideology changes from conservative to liberal, the level of interest increases. The average interest level for Conservatives is 1.50, while for Liberals is 2.90. This result was expected according to literature, where liberals have a tendency to choose more environmentally friendly options versus conservatives. The Levene’s test for homogeneity of variance was also analysed and, with a p-value higher than 0.05, the assumption of equal variances was met. However, when testing for the null hypothesis of equal means with the ANOVA table, the p-value was higher than 0.05. This p-value does not reject the null hypothesis, meaning that being Liberal-Conservative does not have a statistically significant impact on the level of interest. Nevertheless, the analysis of the means should not be overlooked.

H3: Psychological factors influence the intention to purchase.

Figure 2

Model 2c Variables



To analyse this hypothesis, Model 2c (Appendix 9), a linear regression between the individual psychological variables and the level of interest in purchasing as the dependent variable, was run. The associated results are present in Appendix 23.

The highest mean variables were "Response efficacy", "Moral responsibility", "Waste beliefs", and "Energy beliefs". All have values above four, meaning that respondents more than somewhat agree with their statements. However, for the reversed statement "Environmental problems are *not* the government's responsibility", the average was between somewhat disagree and neither agree nor disagree. As a general analysis, respondents believe that their environmentally friendly actions positively impact the world, i.e., their behaviour has an impact and a positive outcome. They believe they are morally responsible to resolve sustainable issues but also deem the government as the one that should be responsible for such solving problems.

The R square of the model states that 3.5% of the variance of the dependent variable is explained by the independent variables. Regarding the ANOVA table, the model has a p-value of 0.009, lower than the significance level of 0.05, meaning that the model is then globally significant. In this Stepwise model, only the variable "Waste Beliefs" was included. By analysing the coefficient table, the p-value of the variable of 0.009 is lower than 0.05, making this variable statistically significant to explain the model. The “Waste Beliefs” variable has a positive unstandardised coefficient of 0.231. This means that with everything else constant, one unit increase in “Waste Beliefs” equals to a 0.231 increase in the level of purchasing interest. Respondents understand that their waste-related actions have real outcomes, in this case, reducing household waste and recycling diminishes landfills. Furthermore, the product was created to reduce unnecessary plastic, creating less plastic household waste, and in turn, decreasing its environmental footprint. The participants are knowledgeable of the positive outcomes waste reduction has on the environment and see this product as a means to do so, being more interested in purchasing it.

4.2.2. Research Questions 2 and 3 – Drivers and barriers to purchasing

A linear regression using the stepwise method was performed to study the research questions in analysis and corresponding hypotheses (Appendix 24). The model in question corresponds to Model A (Appendix 10), mentioned in the Data Analysis section.

Figure 3

Model A Variables

The highest averaged hypotheses were related to the product's environmentally friendly factors, all with values above 4 ("somewhat agree"). With a mean of 4.38, perceiving the product's packaging as environmentally friendly due to spray bottle reusability (H4.2) was the statement with the highest mean value for driving respondents to purchase. Perceived product environmental friendliness due to recyclability of the packaging (H4.3), general product environmental friendliness (H4), environmental friendliness due to being biodegradable (H4.4) and due to reduced plastic usage in the packaging (H4.1) followed as more than "somewhat agreed" drivers to purchasing with means of 4.27, 4.26, 4.25, and 4.23, respectively. The barrier regarding lack of product availability (H5 – regarding availability) followed with a mean of 4.04, meaning that respondents, on average, "somewhat agree" that this statement is a barrier for purchasing. Easiness to eliminate or transform the packaging and perceiving that as convenient was the final barrier with a score above 4 of 4.03, "somewhat agreeing" with this purchasing driver.

The hypotheses with the lowest scores, having values below 3, were all related to purchasing barriers. Contrary to what was expected, respondents on average disagree, on different levels, that the following hypotheses are indeed purchasing barriers: the product being ecological has low protective capabilities (H10); the time and effort spent preparing it at home is seen as inconvenient (H9.1); due to its association with sustainability it is less effective when compared to traditional cleaners (H6); being loyal to a specific brand's conventional product will prevent people from switch (H11); being unable to smell the final product before purchasing (H13).

All remaining hypotheses had average values above 3 (neither agree nor disagree) and below 4 (somewhat agree).

By analysing the model's R Square, 23.8% of the dependent variable's variance is explained by the independent variables. Additionally, in the ANOVA table, the model has a p-value of 0.00, which is lower than the significance level of 0.05, making it globally significant.

Four hypotheses were included from the Stepwise method – H4.3, H5 (regarding lack of awareness), H9.1, and H14 – excluding the remaining.

Excluded driver-related hypothesis: H4, H4.1, H4.2, H4.4, H8, H9, H9.2, and H9.3

Excluded barrier-related hypothesis: H5 (regarding lack of availability), H6, H7, H10, H13, and H11

All of the above hypotheses were excluded from the model (Appendix 24) since they deteriorated the model's quality. No conclusion can be taken regarding their statistical significance on the level of purchasing interest.

H4.3: Perceived packaging environmentally friendliness due to recyclability is a driver to purchasing.

The unstandardised coefficient for this hypothesis (Appendix 24) presents a positive value of 0.199. As the independent variable increases by one unit, the level of interest increases positively by 0.199. Agreeing more with the product's recyclability and, in turn, environmentally friendliness as a driver to purchasing increases one's level of purchasing interest. Additionally, as previously stated, this driver is the second-highest averaged hypothesis. As a result, this hypothesis is verified.

H5: Lack of perceived product (…) awareness is a barrier to purchasing.

The unstandardised coefficient of this hypothesis presents a value of -0.129 (Appendix 24). A one-unit increase in agreement with this independent variable leads to a decrease in the dependent variable. By agreeing more with the lack of perceived product awareness as a barrier to purchasing, respondents have a lower interest in purchasing. Additionally, with a mean value of 3.66, respondents do not fully "somewhat agree" with this hypothesis. These results prove that the hypothesis is indeed a barrier to being interested in purchasing.

H9.1: Time- and effort-spent preparing the product at home is seen as inconvenient and, therefore, a barrier to purchasing.

For the hypothesis in analysis, its unstandardised coefficient is of -0.162 (Appendix 24). As a result, with an increase of one unit in the level of agreement with time and effort spent preparing the product at home being seen as inconvenient, a purchasing barrier, leads to a decrease in the purchasing interest level of 0.162. Respondents "somewhat disagreed" with this hypothesis according to their mean value. However, as they tend to agree more with it as a barrier, their interest levels decrease as hypothesised.

In conclusion, while not seen as a barrier, by the sample average, agreeing with this hypothesis as a barrier leads to a decrease in purchasing interest.

H14: Perceived higher price when compared to conventional cleaners due to the product being innovative is a barrier to purchasing

With an unstandardised coefficient of -0.231 (Appendix 24), an increase of one unit in this independent variable leads to a decrease of 0.231 in the dependent variable. An increase in the agreement with the purchasing barrier of expected higher prices compared to conventional cleaners, due to the product's innovative factor, decreases the purchasing interest. In conclusion, perceiving this statement as a barrier does lead to less interest in purchasing. However, on average, respondents neither agree nor disagree with this hypothesis.

After analysing the model, it is also essential to analyse the linearity and normality assumptions. The scatterplots between the four independent variables in the x-axis and the dependent variable in the y-axis concluded that there is linearity, meeting the assumption. The Histogram and Normal P-P Plot were analysed to investigate if the errors are normally distributed. The first presents a bell-shape format and the second has its observations reasonably close to the line, indicating a normal distribution of errors. Furthermore, the Skewness and Kurtosis values are all between -1 and +1, indicating normality and meeting the normality assumption.

The following hypotheses were not included in the linear regression models mentioned, and are examined in the following pages:

H6.1: Consumers think they have to use a larger amount of product for it to work as well as traditional cleaners.

To test this hypothesis, Group 4's Q12 was analysed (Appendix 25). Participants had to compare if the innovative product created with refills lasted longer, the same, or less than the traditional one. The objective was to measure the usage amount and test if people tend to overuse eco-friendly products, assuming that if they last a smaller amount of time, the product is being overused and vice-versa. The majority stated that the product lasted the same amount of time, 78% of Group 4, while 19.5% and 2.4% stated that it lasted more and less time, respectively. Focusing on the majority of users, these results reject the hypothesis.

Additionally, the mean value for H6 was of 2.27, meaning that people tend to "somewhat disagree" that this product by being more ecologically friendly is less effective and do not see it as a barrier for purchasing.

A possible explanation for these insights is that by not perceiving an ecological product as less effective and as a barrier to purchasing, consumers will use the same amount of product as traditional ones.

H7: Perceived higher price due to the product being "green" when compared to conventional cleaners is a barrier to purchasing.; H8: Perceived decreased price due to smaller packaging when compared to conventional cleaners is a driver to purchasing.; H14: Perceived higher price when compared to conventional cleaners due to the product being innovative is a barrier to purchasing.

To better understand Group 4's price perception before purchase, Q13, Q13.1., Q13.2., and Q13.3. were analysed (Appendix 26). The majority, 58.5%, thought the price would be lower than the traditional products. Overall, respondents relate the smaller price to the decrease in packaging and the reduced costs that the refill represents for the company producing. 22% thought it should be higher priced due to both the innovative and ecological factor, with similar percentages. No respondent provided another justification. Those who thought the price should be equal, 19.5%, justified it with different reasons: to maintain the same margins, to lead people to buy it, among other reasons.

H12: Brand assures trust in the effectiveness of the product being a driver to purchasing.

A linear regression using Q19 (for Group 1) and Q16 (for Group 2 and 3) with the level of interest in purchasing without Group 4 was used to test this hypothesis. Furthermore, a crosstab between Q10.j, done to Group 4, and the purchased brands was analysed. Different questions were done because Group 4 relates its answers to a specific brand purchased, while the other groups do not.

As stated above, Q16 and Q19 that study the level of trust in the efficacy of a product when it is from a known brand (not private label), a private label, or a new brand, were summed to have the three groups answers and organised into three variables according to the brands. A regression was then computed between the dependent variable of interest in purchasing without group 4 and the independent variables of the trust in the efficacy of three brands (Appendix 27). The Stepwise Model 2 was the chosen model to be evaluated due to its higher Adjusted R square when compared to the Enter method.

By analysing the means, the average level of interest is of 2.4 close to Group 2. The average of the independent variables is of 3.7, 3.1, and 2.7, i.e., from a 1 (Not trustworthy at all) to 5

(Extremely trustworthy) scale, the known brand assures more efficacy, followed by the private label and ending with a completely new brand.

The model's r square value indicates that 15% of the variance of the level of interest in purchasing is explained by the model. Looking into the ANOVA table, the p-value of 0.000 is lower than the significance level of 0.05, meaning that the model is globally significant. In this stepwise method, two independent variables were chosen - Level of trust in the effectiveness of the concentrate to be diluted from a known private label brand (1) and a known brand (not private label) (2). The level of trust in the effectiveness of the product from an entirely new brand was excluded. Both are statistically significant to explain the model, having p-values higher than the significance level of 0.05.

Additionally, by analysing the unstandardized coefficients, one can conclude that with everything else constant, when one independent variable increases, the level of interest in purchasing increases. This insight proves H12, i.e., trusting the efficacy of a specific type of brand increases purchasing interest. The level of interest increases more when the product is from a known private label than from a known brand, having the former a higher impact on the interest. Individuals are possibly more doubtful of a private label efficacy, as shown in the mean analysis, due to the association of cheaper prices translating into lower efficacy. However, if the trust in efficacy increases, private labels will be preferred due to their association with lower prices, which consumers desire, as previously shown.

None of the respondents disagreed with this hypothesis from the crosstabs between Q10.j and the multiple-response question of brands purchased (Appendix 28). The majority, 26 out of 41, somewhat agrees that the brand assures them efficacy. Focusing on Cif Ecorefill, the most purchased brand, 65.7% "somewhat agree" with this hypothesis and 25.7% "strongly agree". It is clear that at some level, consumers associate brands with trust in efficacy, verifying H12. Nevertheless, the cross-tabulation does not offer the Fisher's exact test, making it impossible to conclude whether there is an association between variables.

In conclusion, perceived brand trust regarding efficacy drives interest in purchasing, when associated with known brands and known private label brands, especially for the latter where its impact is higher. However, new brands do not influence purchasing interest. Furthermore, when answering with a specific brand in mind, no association was found. These results are conflicting, but the hypothesis cannot be rejected if focusing on the interested respondents.

CHAPTER V – CONCLUSIONS AND LIMITATIONS

The following chapter will discuss and conclude the results obtained throughout this research study. Based on the hypothesis created from the Literature Review and Qualitative Analysis, further checked by the Quantitative Analysis, a conclusion will be made, and the research questions will be answered.

5.1. Main Findings and Conclusions

With the rise of single-use plastic consumption and its negative repercussions on the environment, the re-design of conventional products to be more ecological give consumers new opportunities to diminish their ecological footprint. Concentrated surface cleaning refills to be diluted in refillable spray containers are an example and the product studied in this dissertation. Specifically, drivers and barriers to purchasing and consumer characteristics in the Portuguese market were analysed.

Regarding the consumer characteristics, some of the social and environmental values and psychological factors studied proved to be influential on the level of interest to purchase the product.

For social values, Equality's importance in one's life leads to a higher purchasing interest. Equality is one of the variables of the Altruism factor. Furthermore, viewing the earth as a place with limited room and resources or rejecting the notion of science without conservation as the solution for every problem, are environmental values that also increase interest. An explanation could be the product's environmentally friendly aspect is a step forward to conserving resources. Additionally, these two beliefs show a tendency for biospherism and run away from anthropocentrism. Believing in technology as the solution for environmental problems is the final environmental value that increases purchasing interest, possibly due to the product's innovative technological aspect. This value shows a tendency for technocentrism.

The only significant psychological factor is the belief that reducing household waste leads to a decrease of landfills, increasing interest in purchasing the product. One of the take-ways it that respondents believe that their actions are impactful and have outcomes, making them more interested in the product. A reason for this association could be the product´s packaging reusability and plastic reduction that, in turn, reduce waste.

No association or effect was found between the interest in purchasing and the socio-demographic variables analysed – gender, age, education, income, and liberalismconservativism. In conclusion, hypotheses 1 and 3 are partially accepted, and hypothesis 2 is rejected.

As for the main purchasing drivers, only two were found statistically significant. The environmentally friendly aspect of the product's recyclability is indeed a driver and increases interest in purchasing. Furthermore, if the product is associated with a known brand, private label or not, the trust in the product's efficacy rises, increasing the level of interest in purchasing. Additionally, trusting the efficacy of known private labels increases even further the purchasing interest than known brands. One could argue that consumers only currently prefer known brands because they are associated with efficacy. However, when proven that known private labels are also effective, they will be more interesting since they are associated with lower pricing schemes. As a result, only the driver-related hypotheses 4.3 and 12 are verified.

Regarding the amount of product used due to environmentally friendly associations, the expected outcome was not obtained. Respondents who use the product do not believe they have to use overuse it, contrary to literature findings. They believe the amount of product needed is the same for both the green and traditional cleaners. Hypothesis 6.1 is then rejected.

Three purchasing barriers were found statistically significant to affect the purchasing interest. Firstly, a lack of awareness of the product was identified as a barrier and negatively impacted interest level. Secondly, according to its mean, the time and effort put into preparing the product were not agreed upon as a barrier. However, as more respondents agree with this hypothesis, the lower the purchasing interest gets, translating into a purchasing barrier. Lastly, even though respondents do not agree or disagree with an expected higher price due to the product's innovative factor, the interest level in purchasing will decrease if the agreement level increases. The barrier-related hypotheses 5 (regarding awareness), 9.1 and 14 are then verified.

5.2. Limitations and Future Research

The present dissertation has some limitations worth mentioning that compromise the validity of the conclusions. Firstly, the main limitation is the sample size. With only 198 answers to the research questions, the results do not represent the Portuguese market in its totality and can be inaccurate. Additionally, by only focusing on the Portuguese market, global conclusions cannot be taken about the main drivers, barriers to purchasing and consumer characteristics. If the objective is world-wide product availability, more countries should be considered in the analysis for such general conclusions, and comparisons between then should also be made.

The hypothesis created were based on in the literature found and qualitative research done. Nevertheless, many other drivers, barriers and consumers characteristics that were not found or considered might be relevant to answer the research questions. Factors that the market considers relevant might not have been addressed in this dissertation, limiting its importance. Furthermore, the literature availability is limited regarding sustainable products and its consumer and the re-design of products to be more ecological. It is even more limited regarding the concentrated product itself.

An additional limitation is the focus on surface cleaning sprays, restricting the application of the results found to only this segment in the cleaning product category.

The first consideration future researchers should have is to expand the sample size and re-analyse the hypothesis. Future research should include more market locations as well as other motives and obstacles to purchasing. More research should be done on the consumer and what it looks for. Furthermore, to expand this initiative, the entire cleaning product segment could be interesting to analyse, and new products could be considered for ecological re-design.

5.3. Managerial Implications

Based on the insights obtained, managers can develop strategies that utilize the drivers for purchasing and mitigate the barriers found. Additionally, the relevant social and environmental values and the psychological factor can be considered when tailoring the strategies to the customer.

Managers wishing to increase interest in purchasing should focus on boosting product awareness. Investment could be made on advertisement to reach consumers, making them aware of the product and possibly pique their interest. Traditional advertising methods for cleaning products could be a good starting place, such as TV advertisements. Engaging and eye-catching points-of-sale can also lead to higher awareness when purchasing other products. Furthermore, the product itself should be recyclable since that characteristic is viewed as more environmentally friendly and increases interest. Additionally, besides including the product's recyclability on its marketing message, managers should reinforce the preparation process's easiness and how non-time consuming it is. By presenting the process "easy steps", with, for example, in-store experiments, the interest in purchasing could be increased.

Regarding the most appropriate pricing scheme, in the literature review, it was concluded that it should be the same or lower than the traditional product. Moreover, consumers who expect the product to be higher priced due to its innovative aspect decrease their purchasing interest. If a manager follows the recommendation of equal or lower prices, that message should come across to the consumers as well as the innovation factor not translating into higher prices.

Lastly, managers should associate the product to a known brand, private label or not, because, if efficacy is trusted, their interest will increase. Likewise, if managers can promote and prove their products' efficacy, and consumers agree, their interest rises, especially for known private labels. The same was not proven for new brands.

Managers should keep in mind the belief in new technological solutions to solve environmental problems as an expected customer characteristic. Consumers believe that there are limited resources, and science will not go further without conservation. Therefore, the product is a technological advancement that considers the environment, impacting resource conservation and waste management positive outcomes, characteristics that should be advertised.

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ACRONYMS LIST

PS: Problem Statement

RQ: Research Question

APPENDICES

Appendix 1

Analysis of available products in the Portuguese market as well as The Blueland Company

Brand	Product name	Claim	Dilution Method	Where to use?	Formula	Scent	Refill (ml or g)	Diluted Quantity	Prices	Distribution Channel
CIF [a]	Cif Ecorefill Power and Shine	No specific claim	Concentrated liquid in cartridges	Kitchen and Bathroom	Toxic	Scented	70 ml	750 ml	First bottle (traditional formula): 3.99€ Refill: 3.49€ (Price applied at Continente)[b]	Independent Stores
CleanPath [c]	CleanPath Cleaning Sprays	"A beautiful way to clean up waste. CleanPath® comes with a reusable bottle that is fully customizable and a refill pod that makes 6 bottles of powerful, eco-friendly cleaner. Cut plastic waste by 90% and pay half as much for premium cleaners. Clean has never looked this good." [c]	Concentrated liquid in cartridges	Multi-Surface, Air & Fabric, Glass, and Bathroom	98% plant based, Less toxic, and Biodegradable	Six fragrances and one fragrance free	Information not available	~414 ml x 6 Note: one pod makes 6 bottles	Starter Kit (Empty bottle with one refill pod): ~13.50€ (equals 2.25€/bottle) Refill: ~10.10€ (equals 1.68€ per refill) Refill per 750ml: 3.04€ (Company's own price)	Own Brand Online Store, and Other Online Stores
JAWS [d]	Jaws Just Add Water System Cleaning Sprays	"The Original Refill Pod Cleaning System JAWS® – the Just Add Water™ System – is an innovative concept in household cleaners created with the planet and all its inhabitants in mind." [d]	Concentrated liquid in cartridges	Bathroom, Glass, Kitchen, Disinfectant, Daily Shower, Hardwood Floor, and Granite	Non-toxic (except the Disinfectant Cleaner)	Scented and Un-scented	Information not available	~798 ml	Starter Kit (Empty bottle with 2 refill pods): ~5.91€ (equals 2.96€/bottle) Refill: ~2.53€ per pod Refill per 750ml: ~2.38€ (Company's own price for estimated comparison; Product only available for Portugal on Amazon where price is unavailable)[e]	Other Online Stores
Lysol [f]	Lysol Smart	"The smart system to clean and disinfect your home while using 75% less plastic." [f]	Concentrated liquid in cartridges	Multi-Purpose, Bathroom	Toxic Disinfectant	2 Scents	~5.77 ml	~739 ml	Product only available for Portugal on Amazon where price is unavailable[g]	Other Online Stores
CLOROX [h]	Clorox Cleaning System Starter Kit	"Now you can have Clorox® cleaning power in a refillable system that's better for you, and better for the environment." [h]	Concentrated liquid in cartridges	All-Purpose, Bathroom, Foamer, and Glass	Toxic, Bleach-free, and Ammonia-free (for Glass cleaner)	Scented and Un-scented	~9.8 ml	~739 ml	Product only available for Portugal on Amazon where price is unavailable [i]	Other Online Stores

W5 – Lidl [a]	W5 Ecoclear Refill Tablets	No specific claim	Concentrated dehydrated tablets	Multi-surfaces, Kitchen, Bathroom, and Glass	Toxic	Information not available	5 g x 2 Note: one box comes with 2 tablets.	750 ml x 2 Note: one box comes with 2 tablets.	Refill: 1.69€ (equals ~0.85€ per refill)	Lidl
BLUELAND [j]	Blueland Cleaning Sprays	"A NEW KIND OF CLEAN Buy the bottle once. Refill for life. No more throwing out bottles." "Fill your Forever Bottle with water. Drop in a cleaning or soap tablet. Clean in minutes—no shaking or stirring required!" [k]	Concentrated dehydrated tablets	Multi-Surface Bathroom Glass and Mirror	Non-toxic	Scented and Un-scented	Information not available	~591 ml	Starter Kit (Empty bottle with 3 refill tablets): ~13.50€ (equals 4.5€/bottle) Refill: ~1.70€ per tablet Refill per 750ml: 2.15€ (Company's own price)	Own Brand Online Store

Note. a – Information based on the product packaging and acquired in-store. b – Hipermercados, 2020. c - CleanPath, 2020. d - JAWS International, 2020. e - Amazon.com, n.d.-b. f - Reckitt Benckiser, n.d.. g - Amazon.com, n.d.-c. h - The Clorox Company, 2020. i - Amazon.com, n.d.-a. j - Blueland, n.d.. k - Blueland, n.d.-b.

Appendix 2

Companies advertised drivers and identified barriers

Product	Advertised Drivers	Identified Barriers
Cif Ecorefill Power and Shine [a]	Ecorefill | Re-use the traditional bottle | Same efficiency with 10x Concentrated than standard | 75% less plastic | Guiding water line | 100% recyclable without the plastic sleeves | Easier to use - twist and click | Cut plastic use and transport emissions | 97% less water being transported, 87% fewer trucks on the road and less greenhouse gas emissions | No effect on product performance | Replace the trigger spray free of charge if it breaks | Small and light | Smaller price tag | Don't feel guilty about throwing away plastic | At-home technology | No-mess	Barriers identified by the company: Lack of awareness and availability Traditional refills are difficult to pour and messy → People worry about spillage (specially with cleaning supplies)
CleanPath Cleaning Sprays [b]	Powerful | Eco-friendly | Premium | Professional quality | Half the price of competing brands | Less plastic | Reusable bottles & Concentrated refill pods | Simple - Just add water | Trust | Lower human and environmental risk profile | Stop paying for water and plastic | Trusted ingredients | Not as harmful to aquatic life | Save space | Guiding water line	
Jaws Just Add Water System Cleaning Sprays [c]	Just Add Water System | Recyclable | Refill the bottle and sprayer | Reuse the bottle and sprayer | Concentrated | Guiding water line | Streak-free | Versatile | Eco-friendly | Effective | Performs as well as the ready-to-use | Biodegradable | Residue-free | Need to empty before refill | Tap water and any temperature and both hard and soft water (but works better with soft) | Convenient | No pouring | No spilling | No measuring | Small | Non-toxic (except the disinfectant) | Safe people and pets | No-shaking | Easy to change pods | One pod per bottle | Not animal tested	Light colour might be associated with less performance | Own brand only ships in the United States
Lysol Smart [d]	75% Plastic saved vs regular cleaner (Lysol® Lemon All Purpose Cleaner 32 oz) | 25x reusable bottle | Kills 99.9% of viruses & bacteria | Smart Trigger + refil system | Refill with water, Reload the pod and Reuse the bottle | Clean dirt | Removes scum | Free from bleach, phosphates | Clean and disinfect | Guiding water line | Equally robust and performs comparably with others | Recyclable bottle (without the sleeve), trigger, cartridge, and box | Works with most water temperatures | Works with regular tap water and better with soft water (but still with hard water) | Finish using before refill | 1 cartridge per bottle | Effective against coronavirus | No need to rinse after use | Safe	Light colour and fragrance might be associated with less performance Availability

Clorox Cleaning System Starter Kit [e]	Refill | Safe to use around kids and pets | Bleach-free (and ammonia-free for the Glass cleaner) | Guiding water line | Reusable bottle (110+ years) | Just add water | Powerful clean | 75% less plastic (vs 32 oz. Clorox® Clean-Up® Cleaner+Bleach bottle) | Environmentally friendly | Human friendly | Recyclable sprayer and bottle | EPA Safer Choice Certified | 70% fewer trucks on the road | Room temperature water and soft water are recommended | No shaking | Finish using before refill | Cartridges are made of recyclable materials | Not tested on animals	Cartridges are not recyclable Does not disinfect
W5 Ecoclear Refill Tablets [f]	Packaging uses up to 99% less plastic than conventional spray cleaners | Save plastic, space, and money with refill tablets | Packaging responsibility – improving & reducing | One bottle of conventional spray lasts 9000 sprays but 750ml only lasts 600 sprays. This means that the bottle could be used 15 times total but after the first use it is put into the trash. | Reduce and economize	
Blueland Cleaning Sprays [g]	Forever bottle | Effective cleaning power | Non-toxic ingredients | Earth-Friendly Packaging - recyclable or compostable | Save money - Refills Start at $2 | Tried, Tested, Proven | Only pay for Refills | Innovative | Powerful | Save space | Guiding water line | Optimal for human health | Cruelty free | Soy and nut | Pet-safe | pH balanced | Gluten-free | Vegan | Safety | Length of time of one Bootle = same as a normal cleaner | Use warm water | Finish using before | No-shaking necessary | Can be used in another container | Solution bubbles | Don't pay for water | 1 tablet per bottle | Can use a different tablet with a different bottle	They are not disinfectant or antibacterial Not organic certified

Note. a - Unilever, 2020a, 2020b; Unilever Portugal, n.d.. b - CleanPath, 2020. c - JAWS International, 2020. d - Reckitt Benckiser, n.d.. e - The Clorox Company, 2020. f - Information based on the product packaging and acquired in-store. g - Blueland, n.d.-a.

Appendix 3: In-Depth Interview Guideline

Tag	Translated Qualitative Interview Script
Intro	My name is Rita Novais, and I am a Marketing Master's student at Católica Lisbon SBE. I am currently doing my thesis which is related with an household surface cleaning products. With this objective in mind, I would like to interview you. This interview will last approximately 20 minutes, where I will only ask you a couple of questions and let you talk freely for the remaining time. You can expand your answers as much as you like, and the important thing is that you feel comfortable. There are no right or wrong answers, and you can say whatever you desire regarding the subject. Finally, I would like to ask you if it would be okay to record this conversation in order to analyse it later? This interview is completely anonymous, the recording only assures no information is lost.
	Section I
Q1	Firstly, do you personally buy household spray surface cleaning products? As, for example, sprays to clean your kitchen counters or bathrooms?
Q2	Please talk me through your purchasing habits in regard to household spray surface cleaning products. What is your routine and your process when purchasing? (frequency, where do you buy them, what type of product do you usually buy, what do you look for in a product,…)
	Section II
	Now I am going to give you a little more information regarding my thesis. The product being analysed are household spray surface cleaning products that work with concentrated refills to be diluted and the refills themselves. When the spray bottle ends, the consumer adds water and the concentrate to the "old" spray bottle to be able to use the product again. The refill, i.e., the concentrate, can be sold as a liquid or as a table that dissolved with water. The following images are only to illustrate some of the formats the product is sold in: *(Appendix 6)*
Q3	Have you ever bought a household surface cleaning spray that works with concentrated refills and the refills themselves?
	Users: *(If the answer is to question 3 is "Yes"):*
Q4	Which brand do you buy?
Q5	What were your main motives/reasons for buying household spray surface cleaning products that work with refills and the refills themselves? What were your perceptions of the product before you purchased it? (Positive and negative perceptions)
Q6	Do you believe this product offers benefits to the environment and/or the consumer? What are those benefits?
Q7	Please talk me through your purchasing habits in regard to household spray surface cleaning products that work with refills and the refills themselves. What is your routine and your process when purchasing? (frequency, where do you buy them, what type of product do you usually buy, what do you look for in a product,…)
	Non-users: *Non-Users (If the answer is to question 3 is "No"):*

Q4	And have you ever heard about household spray surface cleaning products that work with refills?
Q5	What are your perceptions of this type of product? What are your first impressions? (Positive and negative perceptions)
Q6	What were your main motives/reasons for never having bought household spray surface cleaning products that work with refills and the refills themselves before?
Q7	What do you think companies should improve in their product and strategy to incentivise people to buy it?
Q8	Would you try this product? Why?
Q9	Do you believe this product offers benefits to the environment and/or the consumer? What are those benefits?
	Section III: Sustainability and the Interviewee (for both users and non-users):
Q1	For you, what does it mean to be sustainable?
Q2	Do you believe you are a sustainable person? In a scale of 1 to 7, being 1 Non-sustainable and 7 Fully sustainable, where would you put yourself. In what manner?/Why? (actions done, values, beliefs, personal traits, day-to-day life habits, …)
Q3	Who do you think is responsible for making the world a more sustainable place?
	Section IV: Socio-Demographic questions (for both users and non-users):
	Age
	Gender
	Highest level of education completed
	From 1 to 7, being "1" Liberal and "7" Conservative, were would you place yourself?

Appendix 4: Complementary insights from the qualitative interview

Purchasing habits and product attributes – Regular sprays

Main Insights	Interviewees	Main Relevant Quotes
Less plastic amount possible in packaging	User: Carolina	"At home there is always five of us and by buying many sprays, the plastic waste is very high. So besides asking for my mother's opinion, I always try to search for the most environmentally friendly option." - Carolina
High efficacy	User: Ana, Carolina, Marisa, and Sofia Non-user: Catarina, Maria L., Maria V., Miguel, and Rita	"Efficacy is an obvious factor to me. If it isn't very effective, I will switch for another." – Rita
Minimum acceptable efficacy	User: João	"I am not very picky, so if it cleans the general dirtiness and doesn't leave dust or fingerprints (I am satisfied). (…) Efficacy is not the most important thing for me because it's for everyday cleaning and not for a deep cleaning." – João
Easy to use packaging	User: Ana, João, Carolina, Marisa, and Sofia Non-user: Catarina, and Maria V.	"It needs to be easy to use, easy to spray. I had bad experiences where the packaging didn't spray well, and I had to cut it open to take advantage of the entire product." – Catarina
Small sized packaging (convenient and portable)	User: João	"I don't like to buy products that are very large. I look for medium to small sized products. Since I'm walking around, spraying my house, it does not make sense that the bottle is very big. It needs to be convenient and portable." – João
Comfortable to use	User: João	"I quickly search for those that look comfortable when I'm spraying them." – João
Price-Quality ratio	User: Ana, João, and Carolina	"Price-Quality is my main attribute." – João
Price is not an issue	User: Sofia	"I am not worried about the price. If it is very good and effective, I buy it." – Sofia
Lowest Price	Non-user: Miguel	"As a student, I always look for the cheapest products. That is my main factor." – Miguel
Less possible amount of chemicals	User: Carolina	
Chemicals and/or Disinfectant – due to COVID-19	User: Ana, and Marisa Non-user: Catarina, Maria L., Maria V., and Rita	"Now I give more importance to products that say that they have disinfectant." – Rita
Only buy known brands	User: Ana, João, Carolina, Inês, and Sofia Non-user: Maria L., and Miguel	"I like to buy brands I trust, that "run away" from private labels." – Ana "Brands I know assure me efficacy." – Inês

Does not buy private labels	User: Ana, and João Non-user: Catarina, Maria L., and Maria V.	"I normally do not buy private-label cleaning products." – Catarina
Buys private labels	Non-user: Miguel	"As a student I try to find the cheapest options, so I usually have the private labels as my first choice." – Miguel
Reusable bottles	User: Ana	"It's is important to see the environmental impact of the bottles. It is important that I can reuse or recycle them." - Ana
Recyclable bottles	User: Ana, and Carolina	
Looks for price promotions	User: Ana, João, and Inês Non-user; Catarina, Maria L., Maria V., and Miguel	"I only buy when there are promotions or sales." – Maria L. "I also look for promotions if they have a good discount." – Miguel
Uses promotions as an opportunity to try new products	Non-user: Catarina	"I really like to try new cleaning products, especially those with a promotion/on sale." - Catarina
Has a good smell – smell in store	User: Marisa, and Sofia Non-user: Catarina, Maria L., Maria V., and Rita	"It needs to smell good (first attribute mentioned). The act of smelling is very important to me and it is not always easy to smell these types of products and that is an issue for me. And the smell of sprays is very intense if you smell from the bottle." – Catarina
Has no smell	User: João	"I don´t like strong smells, so I always avoid that and look for neutral scents." – João

Innovative product perceptions, drivers and barriers to purchasing, and improvement suggestions

Main Insights	Interviewees	Main Relevant Quotes
	Motives to purchase, Positive perceptions, and Benefits: User and Non-user	
Good for the environment	User: Ana, João, Carolina, Inês, Marisa, and Sofia Non-user: Catarina, Maria L., Maria V., Miguel, and Rita	"It is advantageous in an environmentally friendly way since you reuse the original bottle, the packaging is much smaller, even comparing with traditional refills, those where you substitute the bottle and use the same nozzle (…)." – Rita
• Saves/reduces plastic usage	User: Ana, João, Carolina, Inês, Marisa, and Sofia Non-user: Catarina, Maria L., Miguel, and Rita	"It very good for logistics and transportation in terms of the environment and pollution. It is truly something very good for the environment. It also reduces the plastic usage." – João
• Reuses spray bottles	User: Ana, Inês, Marisa, and Sofia Non-user: Maria L., Maria V., and Rita	"It annoys me that we do not usually have refills for the same bottles, so this is a great thing." – Marisa
• Recyclable	User: Carolina, and Sofia Non-user: Catarina, and Rita	"As a positive. being recyclable shows the commitment to be environmentally friendly." – Catarina
Generally Practical/Convenient	User: Ana, João, Carolina, Inês, Marisa, and Sofia Non-user: Catarina, Maria L., Maria V., Miguel, and Rita	"It looks to me that it is much more practical and convenient to use." – Rita
• Convenient packaging for being smaller than traditional packaging	User: Ana, João, Carolina, Inês, Marisa, and Sofia Non-user: Catarina, Maria V., and Rita	"Takes up less room, it's lighter and more convenient to transport." – Sofia
• Easy to recycle	User: Ana, and Carolina Non-user: Catarina	"It is way easier to recycle; everything I can save in effort by recycling it's great." – Ana
• Time and effort spent preparing the product was easier than expected or not expected to be difficult neither a barrier	User: João, Carolina, Inês, Marisa, and Sofia Non-user: Catarina, Maria L., Maria V., Miguel, and Rita	"I would be willing to try it because it looks really easy to do at home." – Miguel
Equal efficacy to traditional products	User: Ana, and Marisa Non-user: Catarina, Maria V., and Miguel	"I trust that the efficacy is going to be the same, additionally, because of previous experiences with other types of concentrates that work just as well." – Maria V.

Brand assured efficacy - but if it didn´t have the brand, efficacy was expected to be worse than traditional products	User: João, Carolina, Inês, and Sofia	"The assurance that the brand gives me (regarding efficacy) since it's a very well-known brand in the market, and I trust it. If it were another lesser-known brand, I wouldn't probability try it since I wouldn't trust it. (…) For me, it's important to assure its efficacy, and the brand gives that confidence." – Carolina
Tablets are safer	Non-user: Rita	"If it is the tablets, it is much safer since I don't have the risk of breaking it and it spilling all over the place. Even with the small liquid, it is safer than a big bulky bottle that can break and spill." – Rita
Availability at the place where traditional sprays are bought	User: Carolina	"I can find it at least in the place I usually buy it (the supermarket). But the brand (Cif) assures me this. (…) But if it weren't available at the supermarket, I wouldn't buy it." - Carolina
Amount of product used is the same as for conventional products	User: Carolina	"I use the same amount of product as I normally use. It lasts me the same amount of time." - Carolina
Lower price due to smaller packaging	User: Ana, João, Carolina, Marisa, Sofia Non-user: Maria L., Maria V., Miguel, Rita	"I thought it was going to be even cheaper since its much smaller." – Marisa
Positive long-term price	User: Carolina	"I think more in the long-term, especially if this product lasts me a month, and I thought this price was good (in the long-run)." - Carolina
Motives not to purchase, Negative perceptions, and Disadvantages: User and Non-user		
Fear of the packaging being unsafe and have low protective capabilities	User: João Non-user: Catarina	"I am worried about being in close contact with the concentrate, even more, if I have to touch the concentrate if it is in a tablet format. Do I need to wear gloves? (…) I am worried that the packaging is easy to open and doesn't store very well the concentrate, making it easier for my kids to open it." – Catarina
Time and effort spent preparing the product is not that beneficial for the consumer	User: João Non-user: Miguel	"At the same time, if the price is higher than the traditional ones, I would buy the traditional due to the effort I needed to put into making the product with a refill." - Miguel
Fear that the refill was not effective	User: Sofia	"If it wasn't a Cif brand, and even being Cif, I was doubtful of the effectiveness since it's a concentrate, i.e., due to past experiences with concentrates." – Sofia
The price difference is not big – the refill should have an even lower price	User: Ana, João, Marisa	"The price wasn't that lower comparing to a traditional packaging, and I think the company is making a higher profit when we buy the refills." – João
Price of ecological products is expected to be higher	User: Ana, Carolina Non-user: Catarina	"Since this product calls out to the "ecological side", usually these ecological products are more expensive." – Catarina
Price of innovative products is expected to be higher	User: Carolina Non-user: Catarina, and Maria L.	"Normally, when something is an innovation, the tendency is for it to be more expensive." – Catarina
Lack of availability	User: Ana, Sofia Non-user: Maria L., Maria V., Rita	"I have never seen it available and have never heard of it. I think there is zero availability on the market." – Maria V.
Lack of awareness	User: João, Inês, Marisa, Sofia Non-user: Catarina, Maria L., Maria V., Miguel, Rita	"For an innovative product like this, it wasn´t being advertised and shared as it should be. I wasn´t aware of it, and it's not very noticeable." – Catarina
Fear that the spray nozzle breaks	User: João	"Since I would be using the same bottle multiple times, I am afraid that the bottle cannot sustain being used several times and ends up breaking. It's a fear, but it hasn't been verified." – João
Fear of not preparing the product well	Non-user: Rita	"I fear I will not correctly prepare the product, and that this affects its efficacy." – Rita
Unable to smell	Non-user: Rita	"I smell all the products I buy before purchasing, and I am always opening the bottles and here I cannot. (…) If I were deciding to buy the product, I would not be able to smell it, which is one of my main requirements, making this a barrier for me to try it. I do not have access to the smell." – Rita
Reason for never purchasing: Non-users		
Not aware	Maria L., Maria V., Miguel, Rita	"I have never seen it, and I also did not know it existed." – Miguel
Did not have time	Catarina	

Improvements to increase purchase: Non-user		
Campaigns that connect the product to social and environmental problems	Catarina, Maria L.	"The fact that it is good for the environment could be a good starting place for their publicity. That would indeed catch my eye to purchasing it and look for it in-store." – Maria L.
Campaigns that communicate all the advantages	Maria V., Rita	"They should communicate all benefits, and especially educate the consumer about perceive problems that in reality aren't real, for example, related to efficacy." – Maria V.
Lower price	Catarina, Miguel	"For me to start buying it, the price needs to be lower because if it isn't, I will keep buying the same one since it requires less work." – Miguel
Promotional pack with the bottle and the refill	Maria V., Miguel	"They should do a promotional pack with the bottle and the refill to incentivise new purchases." – Maria V.
Increase awareness	Maria L., Rita	"They need to invest in publicity, and there needs to be a boom at a marketing level." – Maria L.
Increase availability	Maria L., Maria V., Rita	"First, they need to improve product availability." – Maria V.
Prove efficacy	Miguel	"They should try to prove before someone purchases, the efficacy. For example, be associated with an organization that vouches for their effectiveness and have their stamp on the bottles. Also, do tests and experiments in the supermarkets." – Miguel

The interviewees and Sustainable habits and beliefs

Meaning of being sustainable: Section III - 1
"Besides having beliefs, i.e., attitudes that I should follow, it is my behaviour. It is not enough to say the world is bad and then not do anything about it. It is contributing the most that I can by making sustainable purchases. (…) More than thinking is acting." – Carolina
"What a person can do in terms of reducing their environmental impact, while still maintaining a quality of life that brings them happiness and mental health. It is thinking if someone really needs something or not, and if not, it is not purchasing it." – Inês
"It is acting and having your behaviours aligned with sustainability. It is related to sustainable practises at home and in the place of work. It is to be conscious of what happens around you, have worries regarding the environment, and try to leave the smallest environmental footprint." – Catarina

Self-attributed sustainability score: Section III - 2

Score	Interviewees
3	User: João, Sofia | Non-user: Maria V.
4	User: Carolina, Marisa | Non-user: Catarina, Maria L.
5	User: Ana, Inês | Non-user: Miguel, Rita
Actions Done	**Interviewees**
Recycle products	User: Ana, Carolina, Sofia | Non-user: Catarina, Maria L., Miguel, Rita
Reduce the use of packages that cannot be recycled	User: Ana
Choose products with the least amount of packaging	Non-user: Catarina
Do not use straws	No-user: Miguel
Buy products that do not cause health issues	User: Ana
Buy environmentally friendly makeup	User: Ana, Inês
Buy environmentally friendly menstrual products	User: Inês
Use soap bars instead of liquid in bottles to reduce packaging.	User: Ana
Use reusable bags	User: Ana, João, Carolina, Inês, Marisa
Eat more vegetables and less meat	User: Ana
Use glass bottles instead of plastic bottles	User: Carolina | Non-user: Catarina, Miguel
Go to places by foot if possible, instead of using a car	User: Carolina
Save on product usage	Non-user: Rita
Turn off the lights whenever possible	User: Marisa | Non-user: Catarina
Save water	User: Marisa | Non-user: Catarina, Rita

Uses water filter jugs in order to reduce the use of plastic water bottles	Non-user: Maria L.
Reduce waste	User: Marisa
Understand brands policies regarding the environment	User: Inês
Buy refills	User: Sofia | Non-user: Maria L.
Choose building materials that are environmentally friendly	Non-user: Catarina

Who is responsible for solving sustainable issues?: Section III - 3

Entity	Interviewees	Main Quotes
Everyone, The entire community, The Humankind	User: Ana, Inês, Marisa, Sofia Non-user: Maria L., Maria V., Miguel, Rita	"The Man. Because it is us that have that ability to protect the environment. Everything depends on each one of us, in contributing and making an effort to work on that direction in every level – consumer or producer." – Sofia "People are the ones responsible for making the world more sustainable. If people have those behaviours, ideologies, and want to maintain that posture, everything else will adapt and follow the lead." – Rita
The governments	User: João, Carolina, Inês Non-user: Maria V., Miguel	"Above all, the governments are the ones that should be responsible because they are the ones that have the power to impose sustainability on the population. It is their responsibility to impose even though its everyone's duty." – Miguel
World leaders	Non-user: Catarina	"And obviously, world leaders should be alerted to these issues." – Catarina
The Companies	User: Carolina, Marisa, Sofia Non-user: Maria L., Maria V.	"Someone that also has a lot of responsibility are the brands. They need to show the product and make it available to everyone. If the information does not reach us, the consumer, we have the tendency to keep up with our habits." – Maria L.
Focus on the younger generations	User: Ana Non-user: Catarina	"Bet highly on the younger generations because they are the future, and the future is going to be really hard on them due to issues like climate change." – Ana
Global and local institutions	User: Ana	"It has to start with global and local institutions making people aware and conscious of the problems." – Ana

Note. Insights and quotes translated to English from Portuguese

Appendix 5: Online Survey

Tag	Question	Answer options
	Block 1: Initial Text	
	Caro/a Participante, em primeiro lugar, obrigada por tirar o tempo para responder a este questionário. Este inquérito foi criado no âmbito da minha tese de mestrado. O mesmo pretende estudar as percepções e características do consumidor português relativamente a um produto inovador no sector de sprays de limpeza de superfícies. O questionário terá uma duração aproximada de 6 minutos. Não existem respostas certas nem erradas e as mesmas serão anónimas. Acima de tudo, gostaria de lhe pedir que responda honestamente a todas as questões, sendo muito importante para a qualidade da minha tese. Caso tenha alguma questão ou deseje dar o seu feedback sobre o assunto em análise, por favor contacte-me em: 152119214@alunos.lisboa.ucp.pt. Muito obrigada, Rita	
	Block 2: Filtering Question - Portuguese from Portugal	
Q1	Tem nacionalidade Portuguesa e vive actualmente em Portugal?	Yes/No
	Skip To: End of Survey If "Não" is selected	
	Block 3: Filtering question - Purchasing frequency	
	Como foi referido, este questionário está relacionado com o sector de sprays de limpeza de casa para limpar superfícies, ou seja, produtos para limpar superfícies (ex.: bancadas, vidros, ...) em formato spray.	
Q2	Aproximadamente, com que frequência costuma comprar sprays de limpeza de casa para limpar superfícies?	1 to 9 [A]
	Skip To: Block Socio-Demographic questions If "Nunca" is selected and then to End of Survey.	
	Block 4: General Shopping Habits	

Q3	Onde costuma comprar sprays de limpeza de casa para limpar superfícies? (Multiple choice answer)	1. No supermercado, hipermercado, etc (retalhista com loja física), 2. Na loja física da própria marca, 3. Na loja online da própria marca, 4. Numa loja online de retalho (ex.: Amazon)
Q4	Coloque os seguintes factores por ordem consoante o que mais influência (1) ao que menos influência (9) a comprar um spray para casa de limpeza de superfícies, sendo 1 o factor que mais influência e 9 o que menos influência.	Preço, Disponibilidade no mercado, Eficácia, Conveniente de usar, Tamanho da embalagem, Segurança da embalagem, Marca, Embalagem "amiga" do ambiente, e Possibilidade de cheirar o conteúdo
	Block 5: Consumer Characteristics	
Q5	Indique o nível de importância que cada um dos seguintes valores têm na sua vida:	
a	Lealdade	1 – Not at all important
b	Igualdade	2 – Slightly important
c	Ajudar os outros	3 – Moderately important
d	Ter uma vida sempre diferente/não monótona	4 – Very Important
e	Curiosidade	5 – Extremely important
f	Obediência	
g	Autoridade	
h	União	
i	Riqueza	
j	Ter Influência	
Q6	Indique o seu nível de concordância com as seguintes frases: (the "→" indicates the associated concept)	
a	A ciência pode ajudar-nos a viver sem ter que se conservar o meio-ambiente. → Scientific Solution	1 - Strongly disagree
b	O Ser Humano foi criado para reinar sobre a natureza. → Humans over Nature	2 – Somewhat disagree
c	O equilíbrio da natureza é algo delicado e facilmente perturbado. → Balance of Nature	3 – Neither agree nor disagree
d	O planeta Terra é como uma nave espacial, com um número limitado de espaço e recursos. → Spaceship Earth	4 – Somewhat agree
e	A tecnologia vai resolver muitos dos problemas ambientais. → Technological Solutions *(Reversed coded to Ecocentric view)*	5 – Strongly agree
f	A exploração de recursos devia ser parada. → Stop Exploitation	
Q7	Indique o seu nível de concordância com as seguintes frases: (the "→" indicates the associated concept)	
a	Poupar energia em casa ajuda a reduzir o aquecimento global. → Energy Beliefs	1 - Strongly disagree
b	O comportamento de cada pessoa por si só, pode ter um impacto positivo na sociedade e no ambiente. → Response Efficacy	2 – Somewhat disagree
c	Reduzir o lixo produzido em casa e reciclar ajuda a prevenir a criação e o aumento do número de aterros. → Waste Beliefs	3 – Neither agree nor disagree
d	É da responsabilidade do Governo tratar de problemas ambientais. → Government Responsibility *(Reversed coded to Self-moral responsability)*	4 – Somewhat agree 5 – Strongly agree
e	Eu tenho uma responsabilidade moral de participar na resolução de problemas ambientais. → Moral Responsibility	
	Block 6: The innovative product	

Esta dissertação tem como foco o estudo de embalagens que foram re-desenhadas para serem mais ecológicas. O produto em analise são sprays de limpeza de superfícies que funcionam com recargas de concentrado para diluir e as recargas em si. O produto foi criado com o objectivo de diminuir o impacto ambiental que sprays de limpeza de superfícies têm no planeta terra. A recarga, i.e., o concentrado, corresponde à fórmula ativa química que tem a capacidade de limpar superfícies sendo, normalmente, 10% de um produto tradicional. Isto traduz-se numa redução da embalagem de, aproximadamente, 75% a 90%. Este pode ser vendido no formato de um líquido ou de uma pastilha efervescente que se dissolve. Adicionalmente, a mesma garrafa spray pode ser re-utilizada várias vezes.

Como usar: 1. Abrir a garrafa de spray. 2. Colocar água até à linha indicada. 3. Colocar o concentrado líquido ou a pastilha efervescente. 4. Fechar a garrafa, esperar uns minutos, e está pronto a usar.

As seguintes imagens são apenas exemplos dos formatos em que o produto é oferecido existindo mais variações: *(Appendix 6)*

Q8	Já alguma vez comprou ou está interessado/a em comprar sprays de limpeza de superfícies que funcionem com recargas de concentrado para diluir em casa e as recargas em si?	1. Nunca comprei nem tenho qualquer intenção de comprar. 2. Nunca comprei, mas tenho algum interesse em comprar. 3. Nunca comprei, mas quero definitivamente passar a comprar. 4. Já comprei.
Skip to: Block 8 If "Já comprei." is selected. | Block 9 If "Nunca comprei, mas tenho algum interesse em comprar" or "Nunca comprei, mas quero definitivamente passar a comprar." is selected. | Block 10 If "Nunca comprei nem tenho qualquer intenção de comprar." is selected.		
Block 7: Remainder to be honest		
Por favor, responda as seguintes perguntas sobre o seu interesse e percepções do produto com a maior honestidade possível.		
Block 8: For Group 4 - Already purchased		
Q9	Que marca(s) é que já comprou? (Multiple choice answer)	1. Cif Power and Shine Ecorefill 2. Lidl W5 Pastilhas de Recarga 3. CleanPath Cleaning Sprays 4. JAWS Cleaning Sprays 5. Lysol Smart 6. Clorox Cleaning System Starter Kit 7. Outro ____
Q10	Das seguintes frases, indique o seu nível de concordância relativamente aos fatores que o levaram a comprar a recarga pela primeira vez. Comprei porque …	
a **b** **c** **d** **e** **f** **g** **h** **i** **j**	... a recarga é mais amiga do ambiente do que o formato tradicional. ... a recarga utiliza menos plástico que o formato tradicional o que é melhor para o ambiente. ... posso re-utilizar a garrafa spray o que é melhor para o ambiente. ... a embalagem da recarga é reciclável o que é melhor para o ambiente. ... a embalagem da recarga é biodegradável o que é melhor para o ambiente. ... a recarga é mais barata tendo em conta que é mais pequena que o produto tradicional. ... a embalagem da recarga é mais conveniente que o formato tradicional. ... a recarga é mais pequena, ocupando menos espaço que o formato tradicional, sendo mais conveniente. ... a embalagem da recarga, sendo reciclável ou biodegradável, é fácil de eliminar ou transformar. ... confio na eficácia dos produtos da marca que comprei.	1 - Strongly disagree 2 – Somewhat disagree 3 – Neither agree nor disagree 4 – Somewhat agree 5 – Strongly agree
Q11	Tendo já comprado, do seu ponto de vista, existe alguma desvantagem neste produto? Classifique os seguintes factores consoante o seu nível de concordância.	
a **b** **c** **d** **e** **f** **g** **h** **i** **j**	As recargas não estão sempre disponíveis. Não tenho muito conhecimento sobre a recarga. A recarga é menos eficaz que o spray tradicional por ser um produto mais ecológico. A recarga é mais cara que o spray tradicional por ser um produto inovador. A recarga é mais cara que o spray tradicional por ser um produto mais ecológico. O tempo e esforço gastos a preparar o produto fazem-me preferir o formato tradicional. Sendo uma embalagem com um formato mais ecológico, receio que não proteja/guarde bem o concentrado. Por favor selecione a opção "Concordo parcialmente". Não consigo cheirar o produto final antes de o comprar e diluir. Tenho preferência/lealdade pelo meu produto tradicional habitual.	1 - Strongly disagree 2 – Somewhat disagree 3 – Neither agree nor disagree 4 – Somewhat agree 5 – Strongly agree
Q12	Caso já utilizasse o produto no formato tradicional (sem recarga) e tenha passado a utilizar este tipo de recargas, complete a seguinte frase: "O produto criado com a recarga dura-me ________ tempo que o tradicional (sem recarga)."	1. Mais (tempo) 2. O Mesmo (tempo) 3. Menos (tempo)

Q13	Antes de comprar, achava que o preço iria ser:	1. Mais elevado que o produto tradicional. 2. Igual ao preço do produto tradicional. 3. Mais baixo que o produto tradicional.
	Display This Question: If "Mais elevado que o produto tradicional" is selected in Q13.	
Q13.1	Selecione a(s) opção(opções) que o levou a pensar que o preço seria mais elevado que o do produto tradicional:	1. É uma novidade/inovação. 2. É um produto ecológico. 3. Outra ____
	Display This Question: If "Mais baixo que o produto tradicional" is selected in Q13.	
Q13.2	Porque é que pensava que o preço seria mais baixo que o do produto tradicional:	____
	Display This Question: If "Igual ao preço do produto tradicional" is selected in Q13.	
Q13.3	Porque é que pensava que o preço seria igual ao do produto tradicional:	____
	(When Block 8 is completed) Skip to Block 11: Socio-demographic questions.	
	Block 9: For Group 2 - Those who have never purchased but have a slight interest in doing so. & Group 3 - Those who have never purchased but definitely want to start doing so.	
Q14	Classifique de acordo com o seu nível de concordância, as seguintes possíveis razões pelas quais estaria interessado/a em comprar sprays de limpeza de superfícies que funcionem com recargas de concentrado para diluir em casa e as recargas em si. Tenho interesse em comprar porque ...	
a	... a recarga é mais amiga do ambiente do que o formato tradicional.	1 - Strongly disagree
b	... a recarga utiliza menos plástico que o formato tradicional o que é melhor para o ambiente.	2 – Somewhat disagree
c	... posso re-utilizar a garrafa spray o que é melhor para o ambiente.	3 – Neither agree nor disagree
d	... a embalagem da recarga é reciclável o que é melhor para o ambiente.	4 – Somewhat agree
e	... a embalagem da recarga é biodegradável o que é melhor para o ambiente.	5 – Strongly agree
f	... a recarga será mais barata tendo em conta que é mais pequena que o produto tradicional.	
g	... a embalagem da recarga é mais conveniente que o formato tradicional.	
h	... a recarga é mais pequena, ocupando menos espaço que o formato tradicional, sendo mais conveniente.	
i	... a embalagem da recarga, sendo reciclável ou biodegradável, é fácil de eliminar ou transformar.	
Q15	Estando interessado/a em comprar, classifique consoante o seu nível de concordância as possíveis razões para nunca o ter feito:	
a	Nunca vi ou quase nunca vejo disponível.	1 - Strongly disagree
b	Não tinha conhecimento da existência do produto.	2 – Somewhat disagree
c	Receio que seja menos eficaz sendo um produto mais ecológico.	3 – Neither agree nor disagree
d	Receio que seja mais caro que o spray tradicional por ser um produto inovador.	4 – Somewhat agree
e	Receio que seja mais caro que o spray tradicional por ser um produto mais ecológico.	5 – Strongly agree
f	O tempo e esforço gastos a preparar o produto fazem-me preferir o formato tradicional.	
g	Sendo uma embalagem com um formato mais ecológico, receio que não proteja/guarde bem o concentrado.	
h	Por favor selecione a opção "Concordo parcialmente".	
i	Não consigo cheirar o produto final antes de o comprar e diluir.	
j	Tenho preferência/lealdade pelo meu produto tradicional habitual.	
Q16	Indique o nível de confiança que teria na eficácia do concentrado para diluir caso este:	
	Seja de marca (não marca "branca") conhecida. Seja de marca "branca" conhecida. Seja de uma marca totalmente nova.	1 to 5 B
	(When Block 9 is completed) Skip to Block 11: Socio-demographic questions.	
	Block 10: For Group 1 - Those who have never purchased it nor are interested in doing so.	
Q17	Classifique consoante o seu nível de concordância as possíveis razões para não ter interesse em comprar sprays de limpeza de superfícies que funcionem com recargas de concentrado para diluir em casa e as recargas em si:	
a	Nunca vi ou quase nunca vejo disponível.	1 - Strongly disagree
b	Não tinha conhecimento da existência do produto.	2 – Somewhat disagree

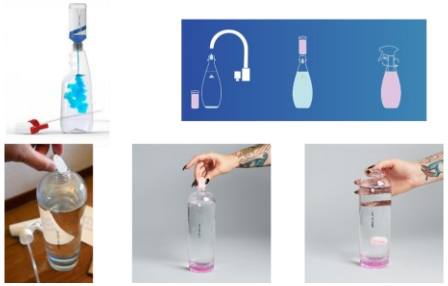
c	Receio que seja menos eficaz sendo um produto mais ecológico.	3 – Neither agree nor disagree
d	Receio que seja mais caro que o spray tradicional por ser um produto inovador.	4 – Somewhat agree
e	Receio que seja mais caro que o spray tradicional por ser um produto mais ecológico.	5 – Strongly agree
f	O tempo e esforço gastos a preparar o produto fazem-me preferir o formato tradicional.	
g	Sendo um formato mais ecológico, receio que não proteja/guarde bem o concentrado.	
h	Por favor selecione a opção "Concordo parcialmente".	
i	Não consigo cheirar o produto final antes de o comprar e diluir.	
j	Tenho preferência/lealdade pelo meu produto tradicional habitual.	
Q18	Selecionou a opção: Nunca comprou nem tem qualquer interesse em comprar. As razões para não comprar têm mais peso e impacto do que as razões para comprar. No entanto, existe algum factor que veja como positivo no produto, como motivo para comprar? Mesmo podendo estes motivos ter menos peso que as barreiras para comprar.	
a	A recarga é mais amiga do ambiente do que o formato tradicional.	1 - Strongly disagree
b	A recarga utiliza menos plástico que o formato tradicional o que é melhor para o ambiente.	2 – Somewhat disagree
c	Posso re-utilizar a garrafa spray o que é melhor para o ambiente.	3 – Neither agree nor disagree
d	A embalagem da recarga é reciclável o que é melhor para o ambiente.	4 – Somewhat agree
e	A embalagem da recarga é biodegradável o que é melhor para o ambiente.	5 – Strongly agree
f	A recarga será mais barata tendo em conta que é mais pequena que o produto tradicional.	
g	A embalagem da recarga é mais conveniente que o formato tradicional.	
h	A recarga é mais pequena, ocupando menos espaço que o formato tradicional, sendo mais conveniente.	
i	A embalagem da recarga, sendo reciclável ou biodegradável, é fácil de eliminar ou transformar.	
Q19	Indique o nível de confiança que teria na eficácia do concentrado para diluir caso este:	
1	Seja de marca (não marca "branca") conhecida.	1 to 5 B
2	Seja de marca "branca" conhecida.	
3	Seja de uma marca totalmente nova.	
	(When Block 10 is completed) Skip to Block 11: Socio-demographic questions.	
	Block 11: Socio-Demographic questions	
Q20	Género	1. Mulher 2. Homem 3. Prefiro não responder 4. Outro ____
Q21	Idade	1. Menos de 18 anos 2. 18 - 24 anos 3. 25 - 43 anos 4. 44 - 55 anos 5. 56 - 74 anos 6. 75 anos ou mais
Q22	Nível de escolaridade completo mais elevado:	1. Ensino Básico (9º ano) 2. Ensino Secundário (12º ano) 3. Licenciatura 4. Pós-graduação 5. Mestrado/MBA ou semelhante 6. Doutoramento/Ph.D. 7. Outro _____
Q23	Numa escala de 1 - Liberal a 7 - Conservador, onde é que se colocaria na mesma?	1 to 7

Q24	Escolha a opção que reflete o intervalo de rendimento mensal ou mesada em que se insere:	1. Menos ou igual a 635€ 2. 636€ - 1 000€ 3. 1 001€ - 2 000€ 4. 2 001€ - 3 000€ 5. 3 001€ - 4 000€ 6. Mais de 4 000€

Note. A: 1 - Every week or more, 1 - 2 or 3 times per month, 3- Every month, 4 - Every 2 months, 5 – Every 3 months, 6 – Every 4 months, 7 – Every 5 months, 8 – More than every 5 months, 9 – Never; B: 1 – Not trust worthy at all, 2 – Slightly trustworthy, 3 – Moderately trustworthy, 4 – Very trustworthy, 5 – Extremely trustworthy;

Appendix 6

Illustrative images of the innovative product formats



Note. From NOW [Photograph], by APLA, 2020, APLA (https://blog.alpla.com/en/blog/products-innovation/now-alpla-presents-innovative-refill-packaging/09-20). From The concept behind the clean [Image], by JAWS International, Ltd., 2020, JAWS (https://jawscleans.com/how-it-works). From Using the Tablets [Photograph], by Megan Kirkland, 2020, My Subscription Addiction (https://www.mysubscriptionaddiction.com/blueland-cleaning-review). From Blueland The Clean Essentials Review [Photograph], by Danielle Directo-Meston, 2020, the spruce (https://www.thespruce.com/blueland-the-clean-essentials-review-5074981).

Appendix 7

Attention Test Question per Group (Select "Somewhat Agree")

		Group 1 Frequency	Group 2 and 3 Frequency	Group 4 Frequency
Valid	Strongly disagree	-	4	1
	Somewhat disagree	-	8	-
	Neither agree nor disagree	-	6	3
	Somewhat agree	5	152	41
	Total	5	170	45
Missing	System	241	76	201
Total		246	246	246

Note. Survey Data.

Appendix 8

Frequency: Portuguese currently living in Portugal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	224	100.0	100.0	100.0

Note. Survey Data

Appendix 9

Assessment of multiple regression models for Social and Environmental values and Psychological factors

Model	Dependent Variable	Independent Variables[1]	Enter Adj R Square	Enter Model p-value	Enter Sig variables	Stepwise Adj R Square	Stepwise Model p-value	Stepwise Sig variables
1a	Purchasing interest	All individual values and factors	0.059	0.057	4	0.030	0.009	1
2a	Purchasing interest	All Social Values (SV)	0.013	0.254	1	0.020	0.025	1
2b	Purchasing interest	All Environmental Values (EV)	0.049	0.016	2	0.060	0.002	3
2c	Purchasing interest	All Psychological Factors (PF)	0.017	0.140	1	0.030	0.009	1
3a	Purchasing interest	SV_Loyalty_a	-0.004	0.705	0			
3b	Purchasing interest	SV_Equality_a	0.020	0.025	1			
3c	Purchasing interest	SV_Helpful_a	0.013	0.058	0			
3d	Purchasing interest	SV_VariedLife_otc	0.008	0.103	0			
3e	Purchasing interest	SV_Curious_otc	0.001	0.288	0			
3f	Purchasing interest	SV_Obedience_c	-0.005	0.787	0			
3g	Purchasing interest	SV_Authority_c	-0.005	0.876	0			
3h	Purchasing interest	SV_Unity_c	-0.005	0.760	0			
3i	Purchasing interest	SV_Wealth_e	-0.002	0.467	0			
3j	Purchasing interest	SV_Influential_e	-0.004	0.621	0			
3k	Purchasing interest	EV_ScientificSolution_ant	0.017	0.038	1			
3l	Purchasing interest	EV_HumansOverNature_ant	-0.004	0.659	0			
3m	Purchasing interest	EV_BalanceOfNature_bio	0.005	0.150	0			
3n	Purchasing interest	EV_SpaceshipEarth_bio	0.021	0.023	1			
3o	Purchasing interest	EV_TechnologicalSolutions_et	0.014	0.050	1			
3p	Purchasing interest	EV_StopExploitation_et	-0.005	0.736	0			
3q	Purchasing interest	PF_EnergyBeliefs_ob	0.003	0.219	0			
3r	Purchasing interest	PF_ResponseEfficacy_ob	-0.005	0.986	0			
3s	Purchasing interest	PF_WasteBeliefs_ob	0.030	0.009	1			
3t	Purchasing interest	PF_GovernementResponsability_r	-0.005	0.882	0			
3u	Purchasing interest	PF_MoralResponsability_r	-0.003	0.505	0			

Model	Dependent Variable	Independent Variables[2]	Enter Adj R Square	Enter Model p-value	Enter Sig variables	Stepwise Adj R Square	Stepwise Model p-value	Stepwise Sig variables
1	Purchasing interest	All (per group) factors	0.013	0.241	0	0.021	0.024	1
2A	Purchasing interest	All Social Values	0.008	0.239	0	nd	nd	nd
2B	Purchasing interest	All Environmental Values	0.027	0.039	1	0.021	0.024	1
2C	Purchasing interest	All Psychological Factors	0.004	0.238	0	nd	nd	nd
3A	Purchasing interest	SV_Altruistic (a)	0.010	0.087	0			
3B	Purchasing interest	SV_Openness to change (otc)	0.009	0.100	0			
3C	Purchasing interest	SV_Conservative (c)	-0.005	0.927	0			
3D	Purchasing interest	SV_Egoism (e)	-0.003	0.484	0			
3E	Purchasing interest	EV_Anthropocentrism (ant)	0.006	0.134	0			
3F	Purchasing interest	EV_Biospherism (bio)	0.021	0.024	1			
3G	Purchasing interest	EV_Ecocentrism (et)	0.000	0.339	0			
3H	Purchasing interest	PF_Outcome Beliefs (ob)	0.009	0.094	0			
3I	Purchasing interest	PF_Responsibility (r)	-0.004	0.650	0			

Note. The colour blue highlights the selected models;[1] The independent variables used are the individual variables studied; [2] The independent variables are the factors – each factor was *calculated by the sum of the variables that correspond to that factor. The individual variables are identified by: "Type of general value/factor"_"Individual variable"_"Corresponding factor"; Source: Survey data.*

Appendix 10

Assessment of multiple regression models for Drivers and Barriers to purchasing

Model	Dependent Variable	Independent Variables	Enter Adj R Square	Enter Model p-value	Enter Sig variables	Stepwise Adj R Square	Stepwise Model p-value	Stepwise Sig variables
A	Purchasing interest	All variables[1]	0.204	0.000	BH5_b, BH14, BH9_1	0.223	0.000	BH14, BH9_1, BH5_b, BH4_3
B1	Purchasing interest	Drivers[2]	0.039	0.055	DH9	0.062	0.001	DH9, DH4_3
B2	Purchasing interest	Barriers	0.207	0.000	BH5_b, BH6, BH14, BH9_1	0.202	0.000	BH14, BH9_1, BH5_b
C1	Purchasing interest	DH4	0.021	0.024	1			
C2	Purchasing interest	DH4_1	0.023	0.018	1			
C3	Purchasing interest	DH4_2	0.015	0.046	1			
C4	Purchasing interest	DH4_3	0.034	0.005	1			
C5	Purchasing interest	DH4_4	0.013	0.059	0			
C6	Purchasing interest	DH8	-0.003	0.526	0			
C7	Purchasing interest	DH9	0.037	0.004	1			
C8	Purchasing interest	DH9_2	0.012	0.066	1			
C9	Purchasing interest	DH9_3	0.027	0.012	1			
C10	Purchasing interest	BH5_a	0.012	0.066	0			
C11	Purchasing interest	BH5_b	0.050	0.001	1			
C12	Purchasing interest	BH6	0.033	0.006	1			
C13	Purchasing interest	BH14	0.110	0.000	1			
C14	Purchasing interest	BH7	0.074	0.000	1			
C15	Purchasing interest	BH9_1	0.093	0.000	1			
C16	Purchasing interest	BH10	0.006	0.142	0			
C17	Purchasing interest	BH13	-0.004	0.650	0			
C18	Purchasing interest	BH11	0.004	0.195	0			

Note. The colour blue highlights the selected models; The drivers and barriers are studied by their individual corresponding hypothesis and each hypothesis is tagged as a driver with an initial "D" or as a barrier with a "B";[1] All variables except for H12; [2] All hypothesis related with drivers except of H12; Source: Survey data.

Appendix 11

*Cross-tabulation: Purchasing frequency of traditional household cleaning sprays*Gender*

			Gender: Female	Gender: Male	Gender: Prefer not to say	Gender: Other	Total [a]
Purchasing frequency of traditional household cleaning sprays	Every week or more	Count	16	3	0	1	20
		% within Gender	9.2%	6.3%	0.0%	100.0%	8.9%
	2 or 3 times per month	Count	16	4	0	0	20
		% within Gender	9.2%	8.3%	0.0%	0.0%	8.9%
	Every month	Count	61	15	1	0	77
		% within Gender	35.1%	31.3%	100.0%	0.0%	34.4%
	Every 2 months	Count	38	8	0	0	46
		% within Gender	21.8%	16.7%	0.0%	0.0%	20.5%
	Every 3 months	Count	15	0	0	0	15
		% within Gender	8.6%	0.0%	0.0%	0.0%	6.7%
	Every 4 months	Count	4	0	0	0	4
		% within Gender	2.3%	0.0%	0.0%	0.0%	1.8%
	Every 5 months	Count	4	0	0	0	4
		% within Gender	2.3%	0.0%	0.0%	0.0%	1.8%
	Longer than every 5 months	Count	8	4	0	0	12
		% within Gender	4.6%	8.3%	0.0%	0.0%	5.4%

Never	Count	12	14	0	0	26
	% within Gender	6.9%	29.2%	0.0%	0.0%	11.6%
Total	Count	174	48	1	1	224
	% within Gender	100.0%	100.0%	100.0%	100.0%	100.0%

Note. Survey Data. [a] Used to analyse genderless purchasing frequency.

Appendix 12

Frequency – Multiple response: Usual purchase location

		Responses		Percent of
		N	Percent	Cases
Location[a]	At the supermarket, hypermarket, etc. (retailer with a physical store)	195	97.5%	98.5%
	In the brand's own physical store	1	0.5%	0.5%
	In the brand's own online store	0	0.0%	0.0%
	At an online retail store (e.g. Amazon))	4	2.0%	2.0%
Total		200	100.0%	101.0%

a. Dichotomy group tabulated at value 1.

Note. Survey Data; [a]Location was calculated as a multiple response set variable.

Appendix 13

Friedman's ANOVA – Descriptive statistics: Ranked data of influential factors when purchasing a household surface cleaning spray.

	N	Mean	Std. Deviation	Minimum	Maximum
Price	198	2.35	1.553	1	8
Market availability	198	5.12	2.172	1	9
Eficacy	198	2.11	1.248	1	8
Convinience	198	4.51	1.608	1	9
Packaging size	198	6.15	1.848	1	9
Safeness of the packaging	198	6.75	1.718	1	9
Brand	198	4.84	2.583	1	9
Environmentally friendly packaging	198	6.15	2.171	1	9
Possibility to smell the content	198	7.04	2.379	1	9

Note. Survey Data

Friedman's ANOVA – Ranks: Ranked data of influential factors when purchasing.

	Mean Rank
Price	2.35
Market availability	5.12
Efficacy	2.11
Convenience	4.51
Packaging size	6.15
Safeness of the packaging	6.75
Brand	4.84
Environmentally friendly packaging	6.15
Possibility to smell the content	7.04

Note. Survey Data. 1=Most influential to 9=Least influential.

Friedman's ANOVA & Kendall's W test – Test Statistics: Ranked data of influential factors when purchasing.

N	198
Kendall's W[a]	.425
Chi-Square	672.924
df	8
Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance

Note. Survey Data

Friedman's ANOVA & Kendall's W test – Pairwise Comparisons

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
Efficacy-Price	.247	.275	.899	.369	1.000
Efficacy-Convenience	-2.399	.275	-8.716	.000	.000
Efficacy-Brand	-2.732	.275	-9.927	.000	.000
Efficacy-Market availability	3.015	.275	10.955	.000	.000
Efficacy-Environmentally friendly packaging	-4.040	.275	-14.680	.000	.000

Efficacy-Packaging size	-4.040	.275	-14.680	.000	.000
Efficacy-Safeness of the packaging	-4.641	.275	-16.863	.000	.000
Efficacy-Possibility to smell the content	-4.929	.275	-17.909	.000	.000
Price-Convenience	-2.152	.275	-7.817	.000	.000
Price-Brand	-2.485	.275	-9.028	.000	.000
Price-Market availability	-2.768	.275	-10.055	.000	.000
Price-Packaging size	-3.793	.275	-13.780	.000	.000
Price-Environmentally friendly packaging	-3.793	.275	-13.780	.000	.000
Price-Safeness of the packaging	-4.394	.275	-15.964	.000	.000
Price-Possibility to smell the content	-4.682	.275	-17.010	.000	.000
Convenience-Brand	-.333	.275	-1.211	.226	1.000
Convenience-Market availability	.616	.275	2.239	.025	.906
Convenience-Packaging size	-1.641	.275	-5.964	.000	.000
Convenience-Environmentally friendly packaging	-1.641	.275	-5.964	.000	.000
Convenience-Safeness of the packaging	-2.242	.275	-8.147	.000	.000
Convenience-Possibility to smell the content	-2.530	.275	-9.193	.000	.000
Brand-Market availability	.283	.275	1.028	.304	1.000
Brand-Packaging size	1.308	.275	4.752	.000	.000
Brand-Environmentally friendly packaging	-1.308	.275	-4.752	.000	.000
Brand-Safeness of the packaging	1.909	.275	6.936	.000	.000
Brand-Possibility to smell the content	-2.197	.275	-7.982	.000	.000
Market availability-Packaging size	-1.025	.275	-3.725	.000	.007
Market availability-Environmentally friendly packaging	-1.025	.275	-3.725	.000	.007
Market availability-Safeness of the packaging	-1.626	.275	-5.909	.000	.000
Market availability-Possibility to smell the content	-1.914	.275	-6.954	.000	.000
Packaging size-Environmentally friendly packaging	.000	.275	.000	1.000	1.000
Packaging size-Safeness of the packaging	-.601	.275	-2.184	.029	1.000
Packaging size-Possibility to smell the content	-.889	.275	-3.229	.001	.045
Environmentally friendly packaging-Safeness of the packaging	.601	.275	2.184	.029	1.000
Environmentally friendly packaging-Possibility to smell the content	-.889	.275	-3.229	.001	.045
Safeness of the packaging-Possibility to smell the content	-.288	.275	-1.046	.296	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Note. Survey Data

Appendix 14

Frequency: Participants grouped by interest level in purchasing the innovative product

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Group 1 - I have never purchased it nor have any intention of purchasing it.	5	2.5	2.5	2.5
	Group 2 - I have never purchased it, but I have a slight interest in purchasing it.	89	44.9	44.9	47.5
	Group 3 - I have never purchased it, but I definitely want to start purchasing it.	63	31.8	31.8	79.3
	Group 4 - I already purchased it.	41	20.7	20.7	100.0
	Total	198	100.0	100.0	

Note. Survey Data

Appendix 15

Frequency – Multiple response: Brand(s) Purchased by Group 4

		Responses		
		N	Percent	Percent of Cases
Brand[a]	Cif Power and Shine	35	61.4%	85.4%
	Lidl W5 Ecoclear Refill Tablets	8	14.0%	19.5%
	JAWS Cleaning Sprays	1	1.8%	2.4%
	Lysol Smart	1	1.8%	2.4%
	Clorox Cleaning System Starter Kit	2	3.5%	4.9%
	Other	10	17.5%	24.4%
Total		57	100.0%	139.0%

a. Dichotomy group tabulated at value 1.

Note. Survey Data; [a]Brand was calculated as a multiple response set variable.

Frequency: Brands Purchased – Inputted text for when "Other" is selected by Group 4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		196	99.0	99.0	99.0
	Hamway	1	.5	.5	99.5
	Vinagre branco	1	.5	.5	100.0
	Total	198	100.0	100.0	

Note. Survey Data

Appendix 16: Model 2a Linear Regression

Model 2a: Descriptive Statistics

	Mean	Std. Deviation	N
Level of interest in purchasing	2.71	.822	198
Loyalty	4.57	.663	198
Equality	4.16	.741	198
Helpful	4.35	.618	198
Varied Life	3.40	.911	198
Curious	3.62	.897	198
Obedience	3.04	.942	198
Authority	3.01	.942	198
Unity	4.27	.715	198
Wealth	2.98	.812	198
Influential	2.68	.969	198

Note. Survey data.

Model 2a: Correlations

		Level of interest in purchasing	Equality
Pearson Correlation	Level of interest in purchasing	1.000	.159
	Equality	.159	1.000

Note. Survey data.

Model 2a: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.159	.025	.020	.813	2.014

Note. Survey data.

Model 2a: ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.367	1	3.367	5.090	.025
	Residual	129.644	196	.661		
	Total	133.010	197			

Note. Survey data.

Model 2a: Coefficients

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)	1.974	.330		5.978	.000		
	Equality	.176	.078	.159	2.256	.025	1.000	1.000

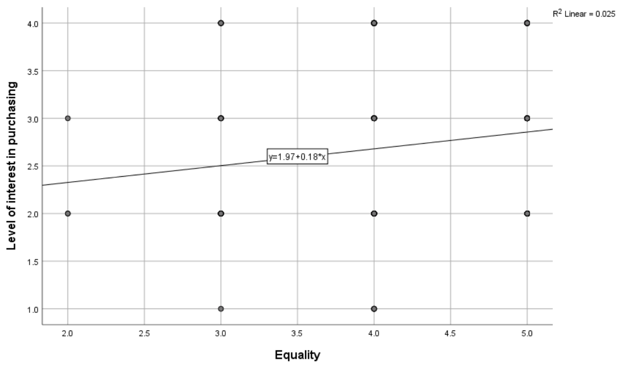
Note. Survey data.

Model 2a: Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Equality
1	1	1.985	1.000	.01	.01
	2	.015	11.337	.99	.99

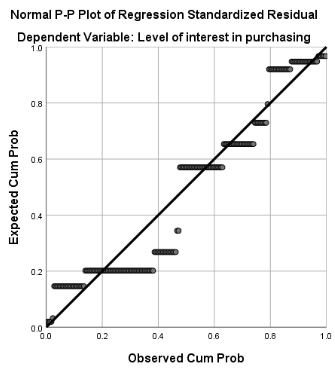
Note. Survey data.

Scatter Plot



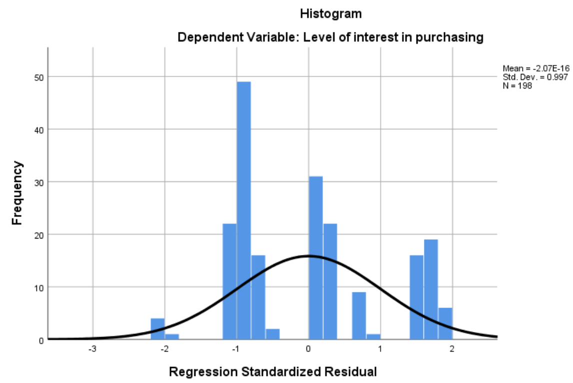
Note. Survey data.

Normal P-P Plot



Note. Survey data

Histogram



Note. Survey data.

Model 2a: Skewness and Kurtosis – Tests of Normality

Equality

N	Valid	198
	Missing	0
Skewness		-.486
Std. Error of Skewness		.173
Kurtosis		-.318
Std. Error of Kurtosis		.344

Note. Survey data.

Model 2a: Breusch-Pagan Test[a] – ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.322	1	.322	.692	.407
	Residual	91.340	196	.466		
	Total	91.662	197			

a. Regression where Squared Residuals = constant + equality + error

Note. Survey data

Appendix 17: Model 2b Linear Regression

Model 2b: Descriptive Statistics

	Mean	Std. Deviation	N
Level of interest in purchasing	2.71	.822	198
Science will help us to live without conservation. → Scientific Solution	1.68	.858	198
Humans were created to rule over nature. → Humans over Nature	1.85	.938	198
The balance of nature is delicate and easily upset. → Balance of Nature	4.31	.775	198
The Earth is like a space ship, with limited room and resources. → Spaceship Earth	4.26	.775	198
Technology will solve many environmental problems.*→ (Reversed) Technological Solutions	2.81	.924	198
Exploitation of resources should be stopped. → Stop Exploitation	3.05	1.006	198

*Note. *The results for this statement were reversed coded, but the sentence is still in its original form, i.e., the statement needs to judged in a reversed way when analysed. Source: Survey Data.*

Model 2b: Correlations

		Level of interest in purchasing	Scientific Solution	Spaceship Earth	(Reversed) Technological Solutions
Pearson Correlation	Level of interest in purchasing	1.000	-.147	.161	-.139
	Scientific Solution	-.147	1.000	-.118	-.204
	Spaceship Earth	.161	-.118	1.000	.055
	(Reversed) Technological Solutions	-.139	-.204	.055	1.000

Note. Survey data.

Model 2b: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
3	.272[c]	.074	.060	.797	2.024

Note. Survey data.

Model 2b: ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
3	Regression	9.876	3	3.292	5.186	.002[d]
	Residual	123.134	194	.635		
	Total	133.010	197			

Note. Survey data.

Model 2b: Coefficients

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
3	(Constant)	2.744	.398		6.887	.000		
	Spaceship Earth	.161	.074	.152	2.178	.031	.985	1.015
	(Reversed) Technological Solutions	-.161	.063	-.182	-2.571	.011	.958	1.044
	Scientific Solution	-.159	.068	-.166	-2.344	.020	.947	1.056

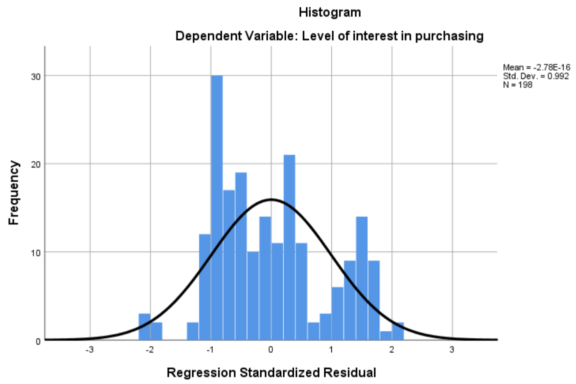
Note. Survey data.

Model 2b: Collinearity Diognostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Spaceship Earth	(Reversed) Technological Solutions	Scientific Solution
3	1	3.727	1.000	.00	.00	.01	.01
	2	.198	4.337	.00	.01	.11	.70
	3	.061	7.789	.03	.18	.77	.15
	4	.013	16.801	.97	.81	.12	.14

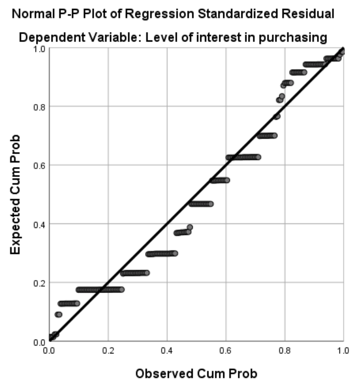
Note. Survey data.

Histogram



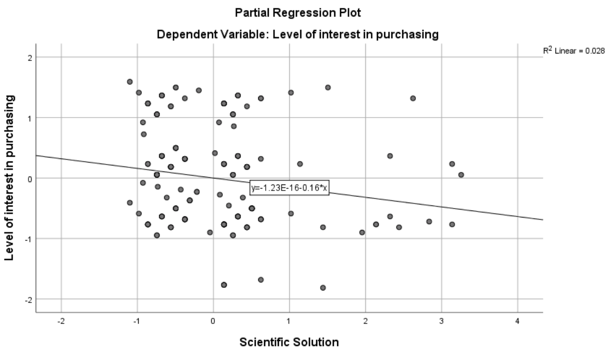
Note. Survey data.

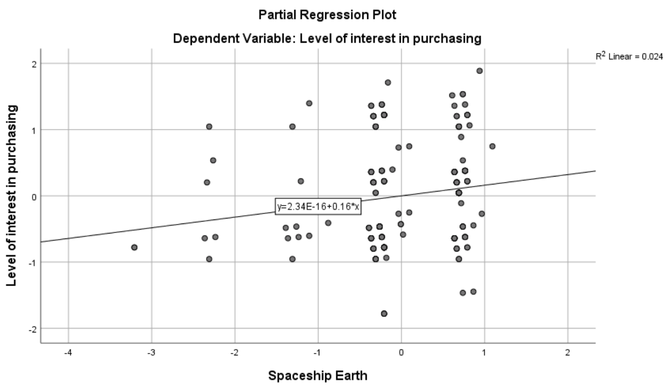
Normal P-P Plot

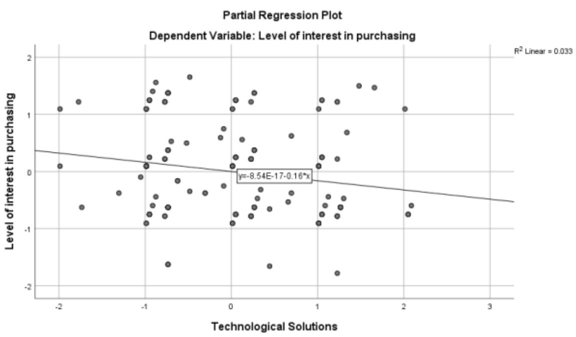


Note. Survey data.

Scatterplots:







Note. Survey data.

Model 2b: Skewness and Kurtosis – Tests of Normality

		Scientific Solution	Spaceship Earth	(Reversed) Technological Solutions
N	Valid	198	198	198
	Missing	0	0	0
Skewness		1.785	-1.419	.342
Std. Error of Skewness		.173	.173	.173
Kurtosis		3.977	3.239	-.812
Std. Error of Kurtosis		.344	.344	.344

Note. Survey data.

Model 2b: Breusch-Pagan Test[a] – ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.805	3	.268	.521	.668
	Residual	99.892	194	.515		
	Total	100.697	197			

a. Regression where Squared Residuals = constant + equality + error

Note. Survey data.

Appendix 18

Crosstabs: Level of interest in purchasing and Gender

			Level of interest in purchasing				
			Group 1	Group 2	Group 3	Group 4	Total
Gender	Female	Count	4	76	52	30	162
		% within Level of Interest in purchasing	80.0%	85.4%	82.5%	73.2%	81.8%
	Male	Count	1	12	11	10	34
		% within Level of Interest in purchasing	20.0%	13.5%	17.5%	24.4%	17.2%
	Prefer not to say	Count	0	0	0	1	1
		% within Level of Interest in purchasing	0.0%	0.0%	0.0%	2.4%	0.5%
	Other	Count	0	1	0	0	1
		% within Level of Interest in purchasing	0.0%	1.1%	0.0%	0.0%	0.5%
Total		Count	5	89	63	41	198
		% within Level of Interest in purchasing	100.0%	100.0%	100.0%	100.0%	100.0%

Note. Survey Data

Crosstabs - Chi-square tests: Level of interest in purchasing and Gender

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7.549[a]	9	.580	.405		
Likelihood Ratio	7.167	9	.620	.521		
Fisher's Exact Test	10.945			.382		
Linear-by-Linear Association	1.555[b]	1	.212	.246	.127	.035
N of Valid Cases	198					

a. 10 cells (62.5%) have expected count less than 5. The minimum expected count is .03.
b. The standardized statistic is 1.247.

Note. Survey data.

Appendix 19

Crosstabs: Level of Interest in purchasing and Age

			Level of interest in purchasing				
			Group 1	Group 2	Group 3	Group 4	Total
Age	18 - 24 years: Generation Z	Count	0	13	18	4	35
		% within Level of interest in purchasing	0.0%	14.6%	28.6%	9.8%	17.7%
	25 - 43 years: Millenials	Count	1	24	14	11	50
		% within Level of interest in purchasing	20.0%	27.0%	22.2%	26.8%	25.3%
	44 - 55 years: Generation X	Count	2	30	21	18	71
		% within Level of interest in purchasing	40.0%	33.7%	33.3%	43.9%	35.9%
	56 - 74 years: Baby Boomers	Count	2	20	9	7	38
		% within Level of interest in purchasing	40.0%	22.5%	14.3%	17.1%	19.2%
	75 years old or older: Greatest Generation	Count	0	2	1	1	4
		% within Level of interest in purchasing	0.0%	2.2%	1.6%	2.4%	2.0%

Total	Count	5	89	63	41	198
	% within Level of interest in purchasing	100.0%	100.0%	100.0%	100.0%	100.0%

Note. Survey data.

Crosstabulation - Chi-Square tests: Interest in purchasing and Age

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.193[a]	12	.512	.[b]	
Likelihood Ratio	11.571	12	.481	.565	
Fisher's Exact Test	11.290			.473	
Linear-by-Linear Association	.403	1	.525	.[b]	.[b]
N of Valid Cases	198				

a. 8 cells (40.0%) have expected count less than 5. The minimum expected count is .10.
b. Cannot be computed because there is insufficient memory.

Note. Survey data.

Appendix 20

One-way ANOVA: Level of interest in purchasing and Education - Descriptives

Level of interest in purchasing

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Min.	Max.
Basic Education (9th year)	2	1.50	.707	.500	-4.85	7.85	1	2
Secondary Education (12th year)	29	2.69	.891	.165	2.35	3.03	2	4
Bachelor's degree	94	2.65	.772	.080	2.49	2.81	1	4
Postgraduation	26	3.12	.766	.150	2.81	3.42	2	4
Master's degree/MBA or similar	39	2.72	.857	.137	2.44	3.00	1	4
Doctorate/Ph.D.	6	2.17	.408	.167	1.74	2.60	2	3
Other	2	3.00	1.414	1.000	-9.71	15.71	2	4
Total	198	2.71	.822	.058	2.59	2.82	1	4

Note. Survey data.

One-way ANOVA: Interest in purchasing and Education – Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Level of interest in purchasing	Based on Mean	2.346	6	191	.033
	Based on Median	1.066	6	191	.385
	Based on Median and with adjusted df	1.066	6	147.293	.386
	Based on trimmed mean	2.404	6	191	.029

Note. Survey data.

One-way ANOVA: Interest in purchasing and Education – Robust test of equality of means

Level of interest in purchasing

	Statistic[a]	df1	df2	Sig.
Welch	2.704	6	7.243	.106

a. Asymptotically F distributed.

Note. Survey data.

Appendix 21

One-way ANOVA: Level of interest in purchasing and Income - Descriptives

Level of interest in purchasing

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound	Minimum	Maximum
Under or equal to 635€	23	3.00	.674	.141	2.71	3.29	2	4
636€ - 1 000€	26	2.38	.637	.125	2.13	2.64	2	4
1 001€ - 2 000€	61	2.66	.834	.107	2.44	2.87	1	4
2 001€ - 3 000€	36	2.83	.878	.146	2.54	3.13	1	4

	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Min.	Max.
3 001€ - 4 000€	17	2.71	.920	.223	2.23	3.18	1	4
More than 4 000€	35	2.71	.860	.145	2.42	3.01	1	4
Total	198	2.71	.822	.058	2.59	2.82	1	4

Note. Survey data.

One-way ANOVA: Interest in purchasing and Education – Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Level of interest in purchasing	Based on Mean	3.094	5	192	.010
	Based on Median	2.006	5	192	.080
	Based on Median and with adjusted df	2.006	5	166.870	.080
	Based on trimmed mean	3.236	5	192	.008

Note. Survey data.

One-way ANOVA: Interest in purchasing and Education – Robust test of equality of means

Level of interest in purchasing

	Statistic[a]	df1	df2	Sig.
Welch	2.299	5	71.540	.054

a. Asymptotically F distributed.

Note. Survey data.

Appendix 22

One-way ANOVA: Level of interest in purchasing and Political ideology – Descriptives

Level of interest in purchasing

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
1 - Liberal	10	2.90	.876	.277	2.27	3.53	2	4
2	44	2.82	.756	.114	2.59	3.05	1	4
3	42	2.79	.842	.130	2.52	3.05	2	4
4	42	2.67	.816	.126	2.41	2.92	2	4
5	46	2.65	.822	.121	2.41	2.90	1	4
6	12	2.42	.900	.260	1.84	2.99	1	4
7 - Conservative	2	1.50	.707	.500	-4.85	7.85	1	2
Total	198	2.71	.822	.058	2.59	2.82	1	4

Note. Survey data.

One-way ANOVA: Interest in purchasing and Political ideology – Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Level of interest in purchasing	Based on Mean	.668	6	191	.676
	Based on Median	.461	6	191	.837
	Based on Median and with adjusted df	.461	6	154.483	.837
	Based on trimmed mean	.668	6	191	.675

Note. Survey data.

One-way ANOVA: Interest in purchasing and Political ideology – ANOVA Table

Level of interest in purchasing

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.308	6	.885	1.323	.249
Within Groups	127.702	191	.669		
Total	133.010	197			

Note. Survey data.

Appendix 23: Model 2c Linear Regression

Model 2c: Descriptive Statistics

	Mean	Std. Deviation	N
Level of interest in purchasing	2.71	.822	198

Energy saving in the home helps reduce global warming. → Energy Beliefs	4.18	.722	198
Each person's behaviour can have a positive effect on society and the environment. → Response Efficacy	4.48	.602	198
Reducing household waste and recycling saves rubbish being buried in landfill. → Waste Beliefs	4.38	.663	198
Environmental problems are the government's responsibility.*→ (Reversed) Government Responsibility	2.44	1.035	198
I have a moral responsibility to take part in the resolution of environmental issues. → Moral Responsibility	4.45	.528	198

*Note: *The results for this statement were reversed coded, but the sentence is still in its original form, i.e., the statement needs to judged in a reversed way when analysed. Source: Survey data.*

Model 2c: Pearson Correlations

		Level of interest in purchasing	Waste Beliefs
Pearson Correlation	Level of interest in purchasing	1.000	.186
	Waste Beliefs	.186	1.000

Note. Survey data.

Model 2c: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.186	.035	.030	.809	2.025

Note. Survey data.

Model 2c: ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.605	1	4.605	7.030	.009
	Residual	128.405	196	.655		
	Total	133.010	197			

Note. Survey data.

Model 2c: Coefficients

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	1.697	.385		4.406	.000		
	Waste Beliefs	.231	.087	.186	2.651	.009	1.000	1.000

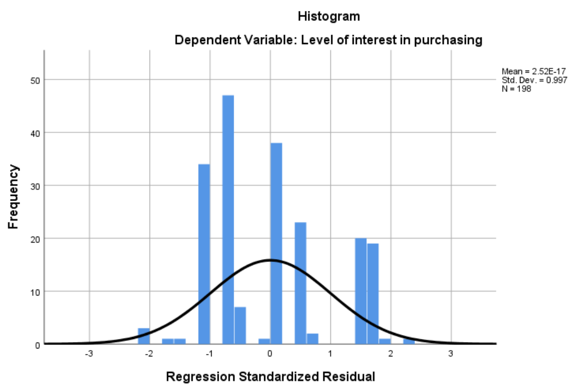
Note. Survey data.

Model 2c Linear Regression: Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions Waste Beliefs
1	1	1.989	1.000	.01	.01
	2	.011	13.318	.99	.99

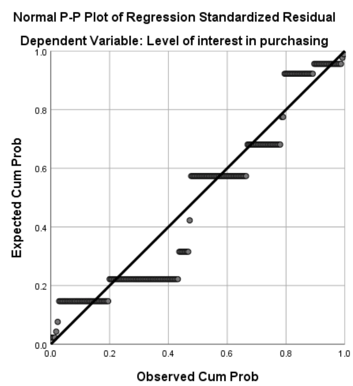
Note. Survey data.

Histogram



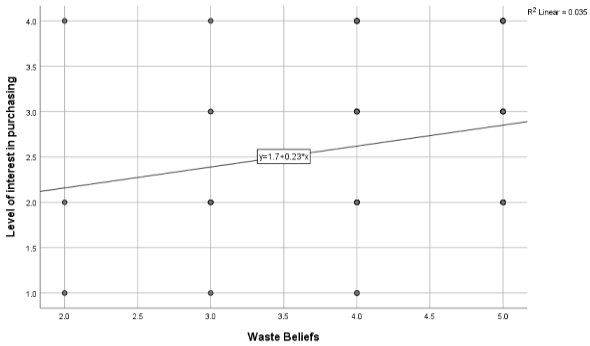
Note Survey data.

Normal P-P



Note. Survey data.

Scatterplots



Note. Survey data.

Model 2c Linear Regression: Skewness and Kurtosis – Tests of Normality

Waste Beliefs

N	Valid	198
	Missing	0
Skewness		-.918
Std. Error of Skewness		.173
Kurtosis		1.055
Std. Error of Kurtosis		.344

Note. Survey data.

Model 2c Linear Regression: Modified White Test[a] – ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.097	2	1.049	2.308	.102
	Residual	88.591	195	.454		
	Total	90.688	197			

c. Regression where Squared Residuals = constant + estimate of the dependent variable + estimate of the dependent variable squared + error

Note. Survey data.

Appendix 24: Model A Linear Regression

Model A: Descriptive Statistics

	Mean	Std. Deviation	N
Level of interest in purchasing	2.71	.822	198
DH4	4.2576	.65246	198
DH4_1	4.2323	.71713	198
DH4_2	4.3838	.66389	198
DH4_3	4.2677	.67144	198
DH4_4	4.2475	.75021	198
DH8	3.8131	.97711	198
DH9	3.5556	.85166	198
DH9_2	3.7020	.83520	198
DH9_3	4.0253	.70845	198
BH5_a	4.0404	.92806	198
BH5_b	3.6616	1.17575	198
BH6	2.2727	.95395	198
BH14	3.0556	1.01858	198
BH7	3.1465	1.02445	198
BH9_1	2.2020	1.07089	198
BH10	1.9646	.76984	198
BH13	2.6616	1.07186	198
BH11	2.5455	1.02529	198

Note. Survey data.

Model A: Correlations

		Level of interest in purchasing	DH4_3	BH5_b	BH14	BH9_1
Pearson Correlation	Level of interest in purchasing	1.000	.198	-.234	-.338	-.313
	DH4_3	.198	1.000	.000	.067	-.259
	BH5_b	-.234	.000	1.000	.139	.051
	BH14	-.338	.067	.139	1.000	.176
	BH9_1	-.313	-.259	.051	.176	1.000

Note. Survey data.

Model A: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
4	.488	.238	.223	.724	1.995

Note. Survey data.

Model A: ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	31.714	4	7.929	15.106	.000
	Residual	101.296	193	.525		
	Total	133.010	197			

Note. Survey data.

Model A: Coefficients

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
4	(Constant)	3.393	.422		8.042	.000		
	BH14	-.231	.052	-.287	-4.420	.000	.939	1.065
	BH9_1	-.162	.051	-.211	-3.183	.002	.895	1.118
	BH5_b	-.129	.044	-.184	-2.900	.004	.980	1.020
	DH4_3	.199	.080	.162	2.480	.014	.920	1.087

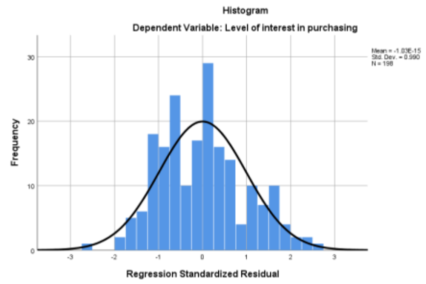
Note. Survey data.

Model A: Collinearity Diagnostics

				Variance Proportions				
Model	Dimension	Eigenvalue	Condition Index	(Constant)	BH14	BH9_1	BH5_b	DH4_3
4	1	4.682	1.000	.00	.00	.01	.00	.00
	2	.165	5.329	.00	.01	.82	.04	.01
	3	.082	7.558	.00	.63	.02	.49	.00
	4	.062	8.719	.04	.36	.00	.41	.12
	5	.010	22.193	.96	.00	.15	.05	.87

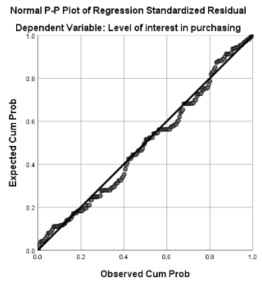
Note. Survey data.

Histogram



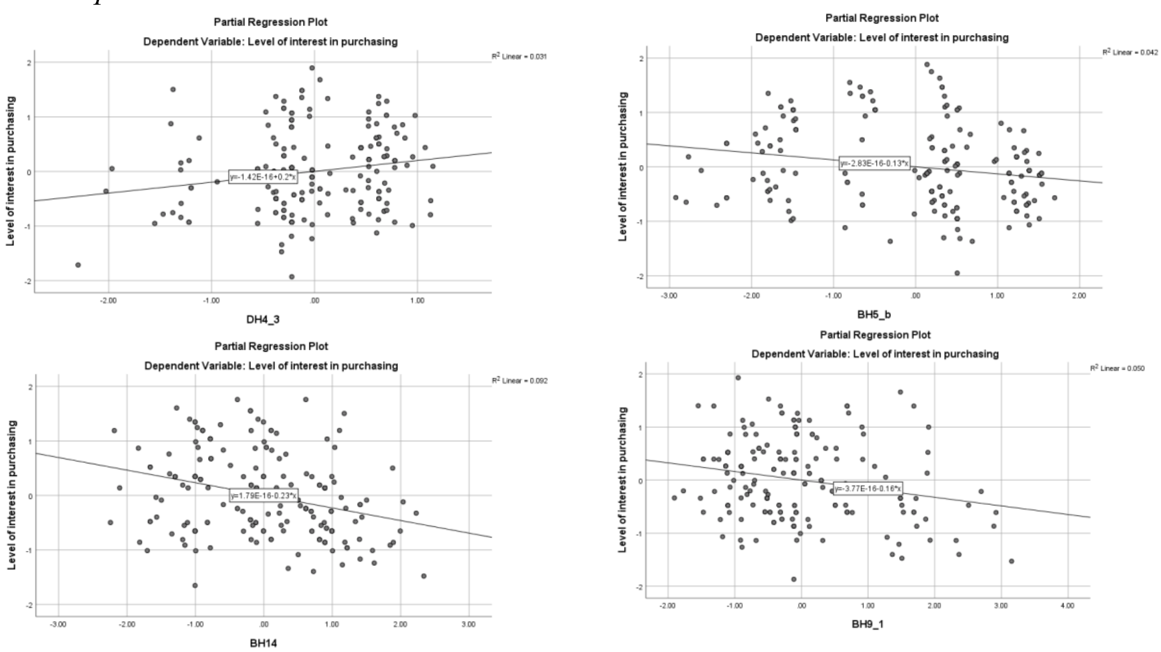
Note. Survey data.

Normal P-P Plot



Note. Survey data.

Scatterplots



Note. Survey data.

Model A: Skewness and Kurtosis – Tests of Normality

		BH14	BH9_1	BH5_b	DH4_3
N	Valid	198	198	198	198
	Missing	0	0	0	0
Skewness		-.083	.791	-.659	-.680

Std. Error of Skewness	.173	.173	.173	.173
Kurtosis	-.824	-.176	-.607	.629
Std. Error of Kurtosis	.344	.344	.344	.344

Note. Survey data.

Model A: Modified White Test[a] – ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.104	2	.552	1.294	.276[b]
	Residual	83.168	195	.427		
	Total	84.272	197			

a. Regression where Squared Residuals = constant + estimate of the dependent variable + estimate of the dependent variable squared + error

Note. Survey data.

Appendix 25

Frequency: Product usage amount, by Group 4, measured in time by comparison with the traditional format

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More (amount of time)	8	4.0	19.5	19.5
	The same (amount of time)	32	16.2	78.0	97.6
	Less (amount of time)	1	.5	2.4	100.0
	Total	41	20.7	100.0	
Missing	System	157	79.3		
Total		198	100.0		

Note. Survey Data

Appendix 26

Frequency: Pre-purchase price perception, by Group 4, in comparison to the traditional format

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Higher than the one of the traditional product	9	4.5	22.0	22.0
	Equal to the one of the traditional product	8	4.0	19.5	41.5
	Lower than the one of the traditional product	24	12.1	58.5	100.0
	Total	41	20.7	100.0	
Missing	System	157	79.3		
Total		198	100.0		

Note. Survey Data

Pre-purchase price perception justification for higher price: Multiple choice results for Q13.1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	It is an innovation	5	2.5	55.6	55.6
	It is an ecological product	4	2.0	44.4	100.0
	Total	9	4.5	100.0	
Missing	System	189	95.5		
Total		198	100.0		

Note. Survey Data

Pre-purchase price perception justification: Text entry responses for Q13.2 and Q13.3

Q13.2 – Lower price	Q13.3 – Equal price
A embalagem e conteúdo sai menores. As embalagens da recarga são habitualmente mais simples. Factor embalagem. Mais barato de produzir e transporter. MARKETING. Menos gastos com embalagem. Pelo uso menor de materia prima na embalage. Por a embalagem não ter o dispositivo spray. Por ser concentrado a embalagem é mais pequena, logo, leva menos plástico no seu fabrico e o não é necessário o mesmo armazenamento.	Para a empresa conseguir margens semelhantes. Para que a pessoa comprasse o concentrado. Parece-me o correto. Se não mais barato pois usa menos material de embalagem. Porque acho que os custos de fabrico são semelhantes.

Por causa do tamanho da embalagem, de ser o utilizador a juntar a água ao produto. Por ser mais pequeno. Por ser recarga. Por ser uma recarga. Porque a embalagem é mais pequena e há menos um passo na produção. Porque a embalagem é mais simples. Porque a embalagem é menor e porque tenho de adicionar água. Porque a embalagem, supostamente terá um custo inferior. Porque a recarrega tem menos elementos e é só por no frasco original. Porque é uma Recarga e não precisa do spray. Porque há menos embalagem envolvida na produção e isso significa um custo menor em grande escala. Porque parace muito menos. Porque tem menos naterial de embalagem. Porque tem menos plástico/embalagem. Porque tem menos quantidade. Sem embalagem.	Porque não faz sentido ser superior, é um incentivo a um planeta mais sustentável, manter o preço faz sentido. Porque se trata do mesmo produto. Porque tem de ter um bom preço. Porque tem menos embalagem.

Note. Survey Data

Appendix 27: Linear Regression Model for H12 – Stepwise method

Model H12: Enter and Stepwise methods – Adjusted R Square, Model p-values and Number of Significant Variables

Enter			Stepwise		
Adj R Square	Model p-value	Sig variables	Adj R Square	Model p-value	Sig variables
.134	.000	2	.139	.000	2

Note. Survey data.

Model H12 – Stepwise: Descriptive Statistics

	Mean	Std. Deviation	N
Level of interest in purchasing (without Group 4)	2.3694	.54639	157
Level of trust in the effectiveness of the concentrate to be dilute from a known brand (not private label).	3.6624	.90266	157
Level of trust in the effectiveness of the concentrate to be dilute from a known private label brand.	3.1083	.90284	157
Level of trust in the effectiveness of the concentrate to be dilute from a completly new brand.	2.6815	.88461	157

Note. Survey data.

Model H12 – Stepwise: Correlations

		Level of interest in purchasing (without Group 4)	Level of trust in the effectiveness of the concentrate to be dilute from a known brand (not private label).	Level of trust in the effectiveness of the concentrate to be dilute from a known private label brand.	Level of trust in the effectiveness of the concentrate to be dilute from a completly new brand.
Pearson Correlation	Level of interest in purchasing (without Group 4)	1.000	.293	.347	.139
	Level of trust in the effectiveness of the concentrate to be dilute from a known brand (not private label).	.293	1.000	.391	.073
	Level of trust in the effectiveness of the concentrate to be dilute from a known private label brand.	.347	.391	1.000	.517
	Level of trust in the effectiveness of the concentrate to be dilute from a completly new brand.	.139	.073	.517	1.000

Note. Survey data.

Model H12 – Stepwise: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
2	.387	.150	.139	.50704	1.755

Note. Survey data.

Model H12 – Stepwise: ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	6.981	2	3.490	13.577	.000
	Residual	39.592	154	.257		
	Total	46.573	156			

Note. Survey data.

Model H12 – Stepwise: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
2	(Constant)	1.441	.188		7.650	.000		
	Level of trust in the effectiveness of the concentrate to be dilute from a known private label brand.	.166	.049	.274	3.399	.001	.847	1.181
	Level of trust in the effectiveness of the concentrate to be dilute from a known brand (not private label).	.113	.049	.186	2.305	.022	.847	1.181

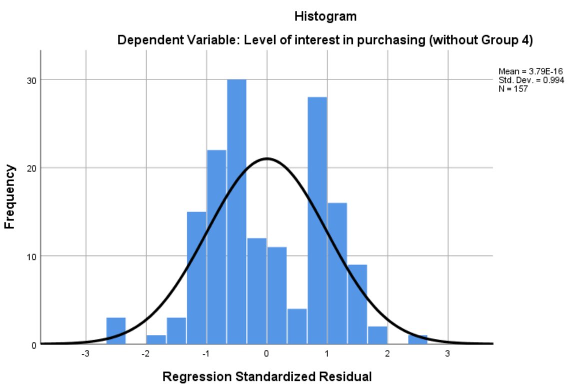
Note. Survey data.

Model H12 – Stepwise: Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Level of trust in the effectiveness of the concentrate to be dilute from a known private label brand.	Level of trust in the effectiveness of the concentrate to be dilute from a known brand (not private label).
2	1	2.927	1.000	.01	.01	.01
	2	.044	8.136	.13	.99	.22
	3	.029	10.080	.86	.01	.77

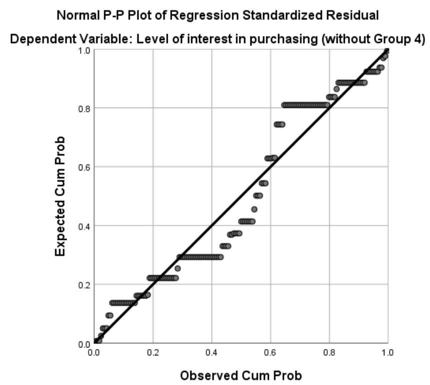
Note. Survey data.

Histogram



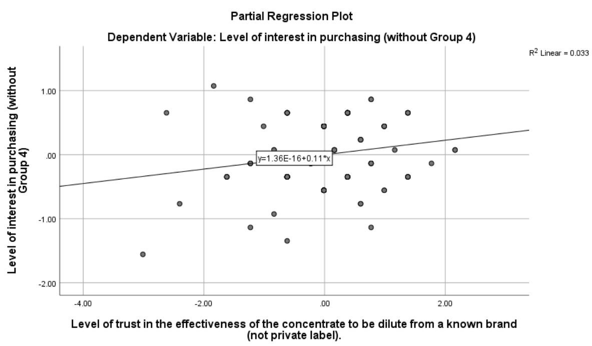
Note. Survey data.

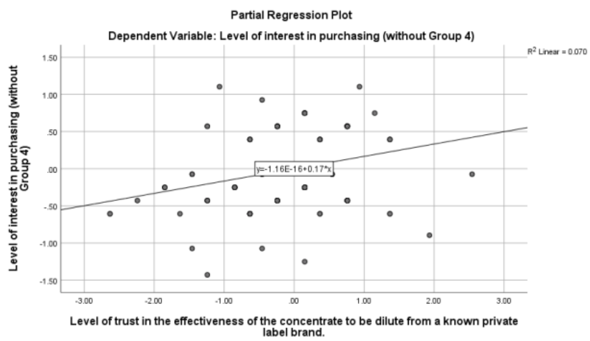
Normal P-P Plot



Note. Survey data.

Scatterplots





Note. Survey data.

Model H12 – Stepwise: Skewness and Kurtosis – Tests of Normality

		Level of trust in the effectiveness of the concentrate to be dilute from a known brand (not private label).	Level of trust in the effectiveness of the concentrate to be dilute from a known private label brand.	Level of trust in the effectiveness of the concentrate to be dilute from a completly new brand.
N	Valid	157	157	157
	Missing	41	41	41
Skewness		-.602	-.428	.222
Std. Error of Skewness		.194	.194	.194
Kurtosis		.312	.281	.034
Std. Error of Kurtosis		.385	.385	.385

Note. Survey data.

Model H12 – Stepwise: Modified White Test[a] – ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.333	2	.167	2.074	.129
	Residual	12.370	154	.080		
	Total	12.703	156			

c. Regression where Squared Residuals = constant + estimate of the dependent variable + estimate of the dependent variable squared + error

Note. Survey data.

Appendix 28

Crosstabs – Multiple response set: Brands purchased and Hypothesis 12 for Group 4

			I purchased because ... I trust the efficacy of the product from the brand that I bought. (H12)			
			Neither agree nor disagree	Somewhat agree	Strongly agree	Total
Brands Purchased[a]	Purchased Cif Power and Shine Ecorefill	Count	3	23	9	35
		% within $Brands	8.6%	65.7%	25.7%	
		% within H12_G4	75.0%	88.5%	81.8%	
	Purchased Lidl W5 Ecoclear Refill Tablets	Count	1	6	1	8
		% within $Brands	12.5%	75.0%	12.5%	
		% within H12_G4	25.0%	23.1%	9.1%	
	Purchased JAWS Cleaning Sprays	Count	1	0	0	1
		% within $Brands	100.0%	0.0%	0.0%	
		% within H12_G4	25.0%	0.0%	0.0%	
	Purchased Lysol Smart	Count	0	1	0	1
		% within $Brands	0.0%	100.0%	0.0%	
		% within H12_G4	0.0%	3.8%	0.0%	
	Purchased Clorox Cleaning System Starter Kit	Count	1	1	0	2
		% within $Brands	50.0%	50.0%	0.0%	
		% within H12_G4	25.0%	3.8%	0.0%	
	Purchased another brand	Count	1	6	3	10
		% within $Brands	10.0%	60.0%	30.0%	
		% within H12_G4	25.0%	23.1%	27.3%	
Total		Count	4	26	11	41

Percentages and totals are based on respondents.

a. Dichotomy group tabulated at value 1.

Note. Survey Data