Lisbon School of Economics & Management
Universidade de Lisboa

MASTER

MASTER IN MANAGEMENT (MIM)

MASTER´S FINAL WORK

PROJECT

ENVIRONMENTAL CONCERN AND SOCIODEMOGRAPHIC FACTORS IMPACT ON WILLINGNESS TO PAY FOR RECYCLED OLIVE OIL BOTTLES

MARIA AURORA BERNARDO GOUVEIA

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ABSTRACT

The introduction of mandatory recycled polyethylene terephthalate (PET) percentages in packaging by the European Union have created significant challenges for companies that are now forced to transition from traditional virgin plastic packaging to sustainable packaging with recycled PET. In the scope of a consulting project as part of the master's final work, a Portuguese olive oil company identified several challenges associated with this legislation. Given that the cost of this transition will ultimately be transferred to consumers, businesses must identify which consumer groups are most receptive to sustainable packaging alternatives and the extent to which they are willing to pay for them. This study aims to address these challenges and identify a profile of environmentally conscious consumers who are more open to the implementation of recycled PET and analyse how being environmentally conscious will translate into willingness to pay for sustainable packaging.

Based on a quantitative study, this research was exploratory and done through a cross-sectional study. The sample utilized was a non-probabilistic convenience sample and data was collected through a survey. In all, 150 valid responses were collected, and the data was analysed using IBM SPSS Statistics. The findings revealed that women and individuals aged over 45 years old have higher levels of environmental concern than men and other group ages. The results also showed that higher levels of environmental concern translate into higher willingness to pay for sustainable packaging alternatives.

On a practical level, these findings help companies dealing with this legislation, particularly those in the food industry, better define their target market and tailor their strategies to consumer stated preferences. On an academic level, this study adds to the body of knowledge about pro-environmental behavior and willingness to pay, as well as the relationship between the variables that drive pro-environmental behavior.

Keywords: Pro-Environmental Behavior; Environmental Concern; Willingness to Pay; Theory of Planned Behavior; Sustainable Packaging.

RESUMO

A introdução de percentagens obrigatórias de tereftalato de polietileno reciclado *(PET)* em embalagens pela União Europeia trouxe desafios significativos para as empresas que são agora forçadas a passar de embalagens tradicionais de plástico virgem para embalagens sustentáveis com *PET* reciclado. No âmbito de um projeto de consultoria para o trabalho final de mestrado, uma empresa portuguesa de azeite identificou vários desafios associados a esta legislação. Dado que o custo desta transição acabará por ser transferido para os consumidores, é essencial que as empresas identifiquem os grupos de consumidores mais recetivos a alternativas de embalagens sustentáveis e até que ponto os mesmos estão dispostos a pagar mais por essa alternativa. Este estudo visa abordar estes desafios e identificar um perfil de consumidores ambientalmente conscientes e mais recetivos à implementação de *PET* reciclado e analisar de que forma essa consciência ambiental se traduzirá na vontade de pagar por embalagens sustentáveis.

Com base num estudo quantitativo, esta pesquisa foi exploratória e realizada através de um estudo *cross-sectional*. A amostra utilizada foi uma amostra de conveniência não-probabilística e os dados foram recolhidos através de um inquérito *online*. No total, foram recolhidas 150 respostas válidas e os dados foram analisados através do software IBM SPSS Statistics. Os resultados revelaram que as mulheres e os indivíduos com mais de 45 anos de idade têm níveis de preocupação ambiental mais elevados do que os homens e outras idades do grupo. Os resultados também mostraram que níveis mais elevados de preocupação ambiental se traduzem numa maior vontade de pagar por alternativas de embalagem sustentáveis.

A nível prático, estes resultados ajudam as empresas que estão a lidar com esta legislação, particularmente as da indústria alimentar, a definir melhor o seu mercado-alvo e a adaptar as suas estratégias ao perfil e preferências dos consumidores. A nível académico, este estudo contribui para a literatura sobre comportamento pró-ambiental e vontade de pagar, bem como para a relação entre as variáveis que impulsionam o comportamento pró-ambiental.

Palavras-chave: Comportamento Pro-Ambiental; Preocupação Ambiental; Disposição a Pagar; Teoria do Comportamento Planeado; Embalagem Sustentável.

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1. INTRODUCTION

1.1.Context of the Problem

The world is currently dealing with tremendous levels of pollution and plastic waste due to the current economic model that is based on producing and consuming assuming infinite resources (Korhonen et al., 2018). One of the major contributors for the extremely high pollution rates is the production and disposal of plastic (Herrmann et al., 2022). In the consumer products market, 70% is accounted for plastic packaging (Benyathiar et al., 2022) which has startlingly low post-consumption recycling rates. In the packaging industry, polyethylene terephthalate (PET) is the most used plastic for liquid containers because of its chemical resistance and the fact that it is unbreakable and very low weight when compared to glass and metal packaging (Welle, 2011). This plastic is one of the most significant sources of waste due to its sluggish rate of natural decomposition when buried, resulting in air, water, and soil contamination (Benyathiar et al., 2022) as well as the costly procedures to process PET for it to breakdown biologically (Welle, 2011).

The growing trend of sustainability, increased environmental concerns, space restrictions for burying plastic waste in landfills as well as rising plastic costs, have prompted governments to impose regulations and incentivize sustainable packaging solutions (Shojaei et al., 2020). One of these solutions is recycled PET as there are already tremendous amounts of virgin PET recurrently introduced in the market. Although not all techniques of PET recycling are environmentally friendly, recycling PET is critical to improve sustainability (Shojaei et al., 2020).

Over the last years, significant developments have been made in the sustainable global agenda to promote circular economy and find ways to balance economic growth with sustainability. In 2015, the United Nations compromised on 17 Sustainable Development Goals (SDGs) to be met by 2030. These are composed of a set of goals and targets to achieve global sustainability and human development (Stafford-Smith et al., 2017). The most relevant SDGs to this study are SDG 12, which relates to “responsible consumption and production” through the efficient use of natural resources and reduction of environmental impact, SDG 14 “Life Below Water” which aims to protect oceans which are extremely affected by plastic pollution and SDG 15 “Life on land” through the

promotion of plastic recycling and reduction of plastic waste buried in the soil (United Nations, 2015).

The European Union (EU) has been developing several legislations that will prompt the market to move towards Circular Economy. In 2018, a commitment was signed between the European Comission and supply chain industry groups to increase recycling capacity by 2030 for plastics. In 2019, the legislation that prompted this study was published. The directive (2019/904) for single-use plastics introduced mandatory recycled PET in bottles of 25% by 2025 and 30% by 2030 (Plastics Recyclers Europe [PRE], 2022). This legislation will have a tremendous impact on all companies that use PET packaging, particularly the food industry companies. One of the impacted markets and the focus of this study is the olive oil market. The global olive oil market size reached USD 13.77 billion in 2021 (Business Insights, 2022). This market has been experiencing robust growth for the past years due to the increasing demand for olive fruit oil across the food market and the growing trend of the Mediterranean diet. The driving factors of this market are mainly increasing awareness about the health benefits of olive oil and the rise in popularity of minimally processed oils (Business Insights, 2022).

1.2. Research Problem and Methods

Considering the theoretical context, the European Union's new legislation requiring mandatory percentages of recycled PET on plastic bottles has created new challenges for companies that use PET packaging, particularly those in the food industry, who must implement this sustainable packaging solution while managing consumer demand and the high costs of incorporating recycled PET. The goal of this research is to address the issues identified by a Portuguese olive oil company in the scope of a consulting project as part of the master's final work consulting path. Because the introduction of recycled PET will increase the product price, the Portuguese company identified the need to investigate how will consumers react to this change and to establish a profile of environmentally concerned consumers who will be more open to this new packaging, as well as to analyse how being environmentally conscious influences their willingness to pay for the product. In response to the stated issues, two research questions were developed.

Firstly, the following research question was defined:

Q1: What is the sociodemographic profile of environmentally conscious consumers of olive oil in Portugal?

Having stated that, the second research question was defined to analyse how environmental concern translates into consumer willingness to pay for olive oil bottles produced from recycled PET:

Q2: What is the relationship between environmental concern and willingness to pay for olive oil bottles with recycled PET among buyers in Portugal?

To respond to these questions, a quantitative methodology was used. The data was collected through a survey method, particularly a questionnaire published on the internet. This study was cross-sectional.

1.3. Relevance of the study

Although there is a vast literature on sustainable packaging, there is not much on the specific issue of recycled PET because the legislations on mandatory percentages of recycled PET in packaging are recent (Plastics Recyclers Europe [PRE], 2022). As a result, the purpose of this study is to contribute to the research topic in both practical and theoretical ways.

On a practical level, this study is relevant for all companies that use PET packaging and thus are affected by the legislation on mandatory recycled PET percentages, particularly companies in the food industry, such as companies operating in the olive oil market. Therefore, the purpose of this research is to assist these companies in understanding the profile of consumers who are more open to recycled PET packaging, as well as how to market their products to environmentally conscious consumers and adapt their marketing strategies to this specific target group. This research is also relevant for companies to define their pricing and product positioning strategies as it accesses how being environmentally conscious consumers will impact on their willingness to pay for the product with recycled PET. In terms of theoretical relevance, this study seeks to add to the body of knowledge on consumer behavior and willingness to pay for sustainable products, particularly in the context of sustainable packaging. This research also aims to comprehend how sociodemographic factors vary across different segments of environmentally concerned individuals and how that relates to the concept of willingness to pay.

In summary, this study is relevant both theoretically for the academic universe by filling research gaps about the implementation of recycled PET in packaging and how consumers will respond to it, as well as on practical levels by assisting both managers and marketers in developing more efficient strategies.

1.4. Work Structure

This work is divided into 5 main chapters: Introduction, Literature Review, Methodology, Data and Data Analysis, and Conclusion. The introduction chapter begins with a theoretical contextualization, followed by the research problem and practical and academic relevance. The second chapter includes a literature review of the main topics and concepts that support this research as well as the conceptual framework that includes the main research questions and hypotheses that will be tested. The third chapter describes the methodology for this work, beginning with the type of study, population and sample characterization, followed by data collection and the measurement scales used as well as the preliminary treatment and analysis of the data. The fourth chapter begins with a presentation of the data in form of tables and follows with the results discussion of the statistical tests performed. The fifth and final chapter contains the conclusions from the tests results, practical and corporate contributions, limitations, and suggestions for future research.

2. LITERATURE REVIEW

2.1. Current Economic Model and Transition to Circular Economy

The linear model of extraction, production, consumption, and waste generating that has been dominating globally is fundamentally incompatible with sustainable development. This model has contributed and caused depletion of natural resources while causing massive environmental damage (Korhonen et al., 2018; Münster et al., 2022). The concerns about the environment and finite resources initiated the global agenda for sustainable development to create a compromise between economic growth and the prevention of environmental and social catastrophes (Brundtland, 1987; Velenturf & Purnell, 2021). This prompted a shift in market functioning towards a system based on Circular Economy that promotes sustainable production and consumption (Münster et al., 2022).

Circular Economy (CE) concept is based on business models that aim to replace the concept of "end-of-life" with the 4R Framework "reducing, reusing, recycling and recovering", while also considering the environmental, economic, and social dimensions of sustainability and meeting the requirements of current generations without jeopardizing future ones (Kirchherr et al., 2017). The main goal of CE approaches is to repurpose previously wasted materials as reusable resources to reduce environmental impacts (Korhonen et al., 2018). Despite the perceived benefits of circular economy, there are also current limitations to the circular approach, particularly technical limitations of recycling systems in the packaging industry (Yamoah et al., 2022).

The primary goal of packaging is to protect the product's quality and safety from outside influences during transport, distribution and storage (Otto et al., 2021). The uncontrolled disposal of plastic packaging, where a great deal of it is ascribed to the food industry, and especially single-use plastic packaging, is one of the main causes of the current high pollution rates (Herrmann et al., 2022). The fraction of plastic that is recovered and recycled is very small due to shortcomings in infrastructures and incorrect or non-existent waste separation from consumers (Phelan et al., 2021). Therefore, there is a shift in the market to reduce and substitute the use of virgin plastic in packaging (Herrmann et al., 2022). The most common substitutes for virgin plastic in packaging are

recycled plastic materials, followed by paper-based packaging, reduction of packaging and ultimately unpackaging if suitable (Herrmann et al., 2022).

Due to increased access to information promoted by the current global trend of sustainability, consumers began to perceive packaging as an important contributor to the current plastic waste and are starting to choose packaging that is recyclable or made from recycled materials (Otto et al., 2021). There are still some misconceptions from consumers towards sustainable packaging and associated barriers such as sometimes green products being associated with a trade-off on price, quality, performance or convenience (Boz et al., 2020; Ketelsen et al., 2020). Currently, only approximately a quarter of companies from the food and beverages industry have started the transition to sustainable packaging by compromising either on increasing the percentage of recycled plastic in their packaging or changing to more sustainable materials for packaging (Phelan et al., 2021).

2.2. Green Marketing and Sustainable Consumer Behavior

The definition of green marketing was first published by Henion and Kinnear (1976) as ecological marketing referring to all marketing operations that can serve to positively or negatively impact environmental matters (Dangelico & Vocalelli, 2017; Henion & Kinnear, 1976). The American Marketing Association (AMA) refers to green marketing as all efforts to advertise and promote products that are environmentally friendly and includes all processes related to production, packaging, distribution and advertising (Mishra & Sharma, 2010). Green products refer to products that are produced in environmentally friendly ways and are environmentally safe (Chikosha & Potwana, 2021). Sustainable or green purchase behavior is when consumers purchase products that fulfil their needs without harming the environment (Steg & Vlek, 2009). Sustainable behavior is controlled by individual attitude and intention towards sustainable products, cultural norms on sustainability and the perceived level of difficulty of an action to engage in a specific sustainable behavior (Boz et al., 2020).

Green Marketing has been utilized to drive sales and purchasing behaviors towards green products because from an environmental perspective, green consumption can be an important contributor to environmental sustainability as it can incentivize consumers to purchase green in the short term and adopt greener lifestyles in the long run (Paul et al.,

2016). In turn, there are a lot of failures associated with green marketing, such as lack of clear communication. One of the causes for this lack of communication is the burden for companies to be associated with greenwashing. Greenwashing refers to misleading claims, symbols or colours used to convey that a package is environmentally more sustainable than the alternative packaging. To avoid accusations of greenwashing and potential negative consumer feedback many companies don't promote their efforts on sustainable packaging (Boz et al., 2020). Also, companies tend to frill their environmental impacts toward the public which leads to consumers not trusting the way corporations communicate their sustainable efforts, contributing to consumers not adopting green purchasing behaviors (Vizzoto et al., 2021). There are also consumer barriers associated with sustainable behavior such as motivational barriers when consumers don't see a real positive impact on sustainability from their behavior and therefore are driven away from that behavior. There are also time, cost and trade-off barriers towards green products such as product price, quality and performance (Boz et al., 2020).

2.2.1 Theory of Planned Behavior

The Theory of Planned Behavior explains how and why consumers act in a certain way and how behavior is influenced by several factors (Yuriev et al., 2020).

TPB is a theoretical framework developed by Ajzen that was firstly designed to extend the Theory of Reasoned Action (TRA) (Ajzen, 1985) and it is widely used to explain how consumer behavior works (Yuriev et al., 2020). According to TPB, intention is an important predictor and antecedent of behavior and is defined by three factors: attitudes, subjective norms, and perceived behavior control (Bamberg, 2003). Attitudes are defined by the evaluation of the consequences of performing a behavior and can be positive or negative. Subjective norms are related to the social pressure that an individual perceives in relation to approval or disapproval from others to perform a behavior and perceived behavioral control refers to the degree of control that an individual believes to have over the ability and success to perform a behavior (Mancha & Yoder, 2015; Parker & Manstead, 1995).

Environmental behavior and attitudes are fairly explained by the three dimensions of TPB. Environmental concern influences the perception and evaluation towards a specific

situation which via their impact on attitude, subjective norms and perceived behavioral control determine behavior (Bamberg, 2003). Pro-environmental behavior is also influenced by social pressures, therefore if people think that those close to them expect them to behave environmentally friendly then that will likely result in a change to sustainable behavior (Mancha & Yoder, 2015). TPB is also an important framework for explaining consumer Willingness to Pay (WTP) through the three main pillars of the theory. Attitudes relate to individual's predisposition to pay, subjective norm relates to the belief about whether others think they should or not pay and perceived behavioral control relates to their own ability to pay (López-Mosquera, 2016).

Although TPB is widely used to explain consumer behavior, the literature shows some methodological issues and limitations, such as measurement issues as the constructs of TPB are difficult to measure across different circumstances and limitations of context (Parker & Manstead, 1995). This theory is also based on self-report which can cause the data to be biased as individuals can change their answers to be more socially accepted (Armitage & Conner, 2001).

2.2.2 Environmental Concern

According to the Theory of Planned Behavior, attitudes shown by individuals regarding environmental issues are overall referred to as Environmental Attitude, Environmental Concern or Environmental Awareness (Cruz & Manata, 2020). It is a direct predictor of behavior towards sustainability issues therefore has an important explanatory role of green purchasing behavior (Paul et al., 2016).

Being a broad concept, Environmental Concern is defined differently throughout the literature. Dunlap & Jones (2002) define environmental concern as an individual's level of awareness of the environment and its challenges, as well as their level of support for initiatives to promote and contribute to solutions to environmental problems. It may also be described as the strength of individuals favorable or negative feelings toward environmental issues (Cruz & Manata, 2020). An individual's level of environmental concern is directly linked to a variety of aspects including perceptions, emotions, knowledge, attitudes and beliefs (Bamberg, 2003). EC is characterized by the level of commitment and emotion towards environmental issues. Individuals with higher degrees

of environmental concern and knowledge tend to have a more ecological mindset, which is often translated into increased green purchasing behavior. (Asih et al., 2020).

The revised NEP scale (New Environmental Paradigm) by Dunlap et al. (2000) is one of the most used scales to measure environmental concern. It consists of 15 statements about how individuals feel about sustainability issues and all items are rated on a five-point Likert scale ranging from "strongly disagree" to "strongly agree" (Cruz & Manata, 2020). As new environmental issues constantly arise, some limitations to this scale arise as well such as desirability bias from respondents to achieve a better social impression of themselves (Vesely & Klöckner, 2020) and the scale becoming outdated when it comes to capturing all the relevant aspects of environmental concern and current sustainability issues (Cruz & Manata, 2020).

The relationship between sociodemographic characteristics and environmental concern has also been studied in the literature. Overall, gender is a determining element of Environmental Concern. Most studies show that females are usually more environmentally concerned than males (Laroche et al., 2001; Liere & Dunlap, 1980). The impact of age on environmental concern and sustainable behavior is mixed and inconclusive. Some older studies show that younger individuals tend to show higher environmental concern levels than older individuals (Howell & Laska, 1992; Liere & Dunlap, 1980). This discrepancy seems to be reducing as time passes as some recent studies show that green consumer is now slightly older than traditional consumer (Finisterra Do Paço et al., 2009; Witek & Kuźniar, 2021). Education level and income are also major indicators of social class and an important predictor of environmental concern. Overall, highly educated individuals with high income levels show higher levels of environmental concern (Howell & Laska, 1992; Liere & Dunlap, 1980).

2.2.3 Willingness to Pay

Price is one of the most important variables in the study of consumer purchasing decisions. When associated with sustainability, price is pointed out as a major influencer of purchasing decision as well as a possible barrier (Boz et al., 2020; Chekima et al., 2016). The concept of willingness to pay is defined as the "maximum price a given consumer accepts to pay for a given product or service" (Kalish & Nelson, 1991; Wertenbroch & Skiera, 2002). It is also referred as reservation price or floor reservation

price, which is conceptualized in terms of margin, and corresponds to the maximum price at which and under which, the consumer is 100% certain to buy the product (Kalish & Nelson, 1991). The concept was first reported in economics literature as it was designed initially as a method to determine prices for public goods and services. WTP is an important tool for price setting by cumulating the buyers who accept to pay a determined price which then through the law of demand and price elasticities enables the definition of a price that will likely maximize profits (Le Gall-Ely, 2009).

Consumer willingness to pay is heavily dependent on price since consumers are extremely price-sensitive, particularly for regularly purchased items (Bray et al., 2011). Consumer willingness to pay for sustainable products appears to be evolving because of the rising trend of sustainability and sustainable awareness, although the research on the issue remains conflicting (Herrmann et al., 2022; Manaktola & Jauhari, 2007) The literature also shows an influence of sociodemographic characteristics on Willingness to Pay. Gender was found to be significant as women were found to be willing to pay more for environmentally friendly products (Dangelico et al., 2022; Laroche et al., 2001). In terms of age, some research demonstrate that younger individuals have more willingness to pay (Dangelico et al., 2022), while other studies show there is no relation between age and WTP (Laroche et al., 2001). The same study shows no impact for education and professional status (Laroche et al., 2001). In relation to income, a study found that higher income consumers have more willingness to pay which is coherent with consumer behavior theories (Dangelico et al., 2022).

The scales to measure Willingness to Pay can be through direct or indirect surveys. The most used methods are through indirect surveys as it has higher internal and external validity (Breidert et al., 2006). Through the method of conjoint analysis, WTP is estimated based on the respondent's data and the respondents are asked to choose a preferred option or rank the offered combinations according to their perceived preference out of a series of product profiles with assigned prices that can vary in attributes and levels (Wertenbroch & Skiera, 2002). There are some limitations to conjoint-based approaches such as complexity to the respondents and the hypothetical bias due to not incorporating a real decision as it is only a stated preference (Le Gall-Ely, 2009). In the method of contingent valuation, the respondents are asked to directly express their WTP through a series of questions. This method also has limitations such as lack of realism as it is based

on hypothetical hypotheses (Breidert et al., 2006) and strategic bias when respondents deliberately answer in a determined way that will influence the results to further their own interests (Le Gall-Ely, 2009).

2.2.4. Relationship between Environmental Concern and Willingness to Pay

While there has been an increase in research regarding the impact of Environmental Concern on Willingness to Pay, the evidence is not consensual. Some scholars associate higher levels of environmental concern with higher green purchase rates (Khan & Danish Kirmani, 2015; O'Rourke & Ringer, 2016), while other authors state that the relationship between environmental concern and actual green purchasing behavior is not positive as it has no cause-effect (Manaktola & Jauhari, 2007; Öberseder et al., 2011).

On one side, some studies state that the involvement of consumers in environmental issues is a major influencer on behavior and willingness to pay because consumers that are informed and environmentally concerned are more prone to incorporate sustainability concerns in their purchase intention (O'Rourke & Ringer, 2016) and are willing to pay more to incorporate these issues into their buying decisions (Khan & Danish Kirmani, 2015). Some consumers are even willing to pay a price premium to purchase environmentally friendly products to the detriment of conventional products, meaning that there is a shift happening in terms of sustainable consumer behavior (Phelan et al., 2021). In contrast, consumers that are not involved in environmental issues and haven't shown previous environmental concern have decreased purchase intentions towards environmentally friendly brands and show lower willingness to pay for green products (O'Rourke & Ringer, 2016).

Other scholars have contradictory views. Consumers are generally unwilling to renounce aspects such as price, quality, value and performance in favour of environmental causes (Chikosha & Potwana, 2021) which leads to a lack of impact of environmental concern on actual purchase decisions and willingness to pay for sustainable products (Öberseder et al., 2011). Some studies state that consumers are unwilling to pay more to support environmental practices, believing that companies should bear that extra cost rather than the customer (Manaktola & Jauhari, 2007). When that incremental cost of producing environmentally friendly products or increasing corporate environmental

performance is transferred to the consumer, most consumers are not willing to pay that extra cost.

A study on the sociodemographic profile of Portuguese green consumers concluded that, although showing environmental concern, Portuguese consumers don't usually translate these concerns into environmentally friendly behavior and when they do it is usually based on economic factors such as saving electricity and water. This study showed that there is a small percentage of green consumers in Portugal that is composed by individuals with higher education and income levels (Finisterra Do Paço et al., 2009).

2.3. Conceptual Framework

Considering the previous literature review, a conceptual framework was developed. Since there are authors who identified differences in environmental concern levels between variables sex, age, education and income (Laroche et al., 2001; Liere & Dunlap, 1980; Howell & Laska, 1992) and authors who identified no differences between the variables (Finisterra Do Paço et al., 2009; Witek & Kuźniar, 2021), the following hypotheses were defined based on equality.

The first research question and hypotheses were defined:

Q1: What is the sociodemographic profile of environmentally conscious consumers of olive oil in Portugal?

H1a: Environmental concern is the same for females and males.

H1b: Environmental concern is the same throughout all age groups.

H1c: Environmental concern is the same among all education levels.

H1d: Environmental concern is the same for all income levels.

To understand how increased levels of environmental concern will translate into willingness to pay for recycled PET olive oil bottles, the second research question and hypothesis will study the relationship between environmental concern and willingness to pay:

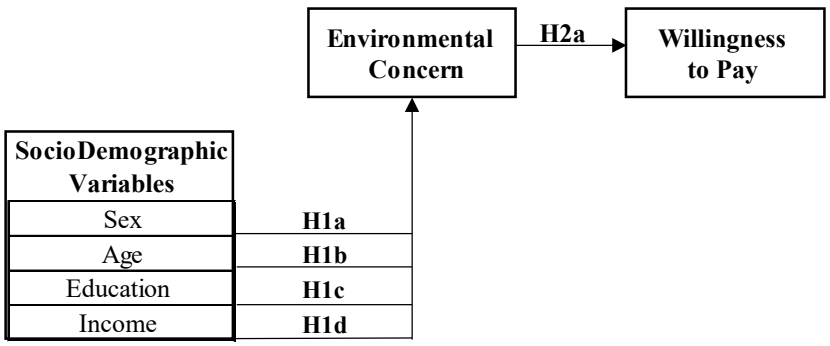
Q2: What is the relationship between environmental concern and willingness to pay for olive oil bottles with recycled PET among buyers in Portugal?

H2a: There is a positive relationship between environmental concern and willingness to pay for recycled PET olive oil bottles.

To answer the research problem of the present study and the hypotheses defined, two models of different authors were chosen as the base to evaluate both concepts of environmental concern and willingness to pay. Firstly, the model developed by Dunlap et al. (2000) that aims to evaluate individuals' consciousness and concerns for the environment was adapted to measure environmental concern of olive oil buyers. Secondly, the model developed by Wei et al. (2018) that studied willingness to pay for t-shirts made from environmentally friendly materials was adapted to evaluate willingness to pay for recycled PET olive oil bottles.

Therefore, the following conceptual model and hypotheses are proposed:

FIGURE 1 – CONCEPTUAL MODEL



Source: Own elaboration.

TABLE I – RESEARCH HYPOTHESES

Research hypotheses
H1a: Environmental concern is the same for females and males.
H1b: Environmental concern is the same in all age groups.
H1c: Environmental concern is the same among all education levels.
H1d: Environmental concern is the same for all income levels.
H2a: There is a positive relationship between environmental concern and willingness to pay for recycled PET olive oil bottles.

3. METHODOLOGY

This chapter presents the methodological choices that were used to test the hypotheses and respond to the research questions listed on the conceptual framework.

3.1 Study type

Considering the goal of this investigation and the sample obtained, the purpose of this study is exploratory. The methodological choice was quantitative research, specifically a mono-method quantitative study. This method is associated with a deductive approach, with the goal of analysing the correlation between variables through data collection and analysis using statistical techniques and graphs (Saunders et al., 2019). Therefore, the research method used was the survey method. Finally, this study was limited to a specific time frame and therefore is defined as a cross-sectional study (Saunders et al., 2019).

3.2 Population and sample

The target population of this study was olive oil buyers that live in Portugal and were 18 years old or more with access to the internet. To comply with time and money restrictions, the non-probability convenience sampling technique was used to define the sample. This technique consists of selecting a sample of the population that is easily reachable (Saunders et al., 2019).

3.3 Data Collection

The primary data was collected through a questionnaire that was self-administered and mediated by the internet which allowed a structured data collection that simplified the analysis and interpretation of results (Saunders et al., 2019). The survey was developed both in English and Portuguese, using the software Qualtrics and was published online between 17th January and 31st January. It was divulged on social media, specifically WhatsApp, Instagram and Facebook, reaching a total of 237 responses. Out of these responses, 150 were considered valid for the analysis. To respect privacy and confidentiality rules and to minimize potential bias in the responses, the questions were answered anonymously.

3.4. Measurement Scales

The survey constructs Environmental Concern and Willingness to Pay were based on Likert and semantic differential scales previously used by other authors that are

summarized in Table II. However, the constructs were adapted and translated to meet the specificities of this study, which can be found detailed in Appendix 3. In turn, the sociodemographic data was measured through nominal and ordinal scales (Saunders et al., 2019).

TABLE II – CONSTRUCTS MEASUREMENT SCALES

Constructs	Reference authors	# Items	Scales
Environmental Concern	Dunlap et al. (2000)	15	Five-point Likert scale (1=" Strongly Disagree" to 5=" Strongly Agree")
Willingness to Pay	Wei et al. (2018)	4	Seven-point Likert Scale (1=" Strongly Disagree" to 7=" Strongly Agree")

Source: Own elaboration.

To measure Environmental Concern, the scale used was the revised New Ecological Paradigm Scale (Revised NEP) (Dunlap et al., 2000) as it is the most widely used scale to evaluate individuals' attitudes and concerns regarding the environment (Cruz & Manata, 2020). It is composed by 15 statements and for each one, the respondent is asked to indicate their level of agreement based on a five-point Likert scale.

To measure Willingness to Pay, a set of 4 questions were adapted from a previous study that measured willingness to pay more for t-shirts made from environmentally friendly materials measured using a seven-point Likert scale (Wei et al., 2018) which was based on a previous article that measured willingness to pay more for green products in general (Laroche et al., 2001).

3.5. Survey Development

The survey can be found detailed in Appendix 1 in English and Appendix 2 in Portuguese. It was divided into 5 main blocks with all questions being mandatory answers. The first block was composed of a presentation of the study and 2 questions about buying behavior, specifically determining if respondents were regular olive oil buyers and what is the regularity of buying and quantities within 1 year. The first question was exclusionary, to filter the respondents that regularly buy olive oil.

The second block was focused on defining the level of environmental concern and was composed by 15 items about the relationship between humans and the environment. For each statement, the respondent was asked to indicate their level of agreement based

third block was composed by 4 questions to define respondents willingness to pay and were measured on a seven-point Likert scale anchored by 1=”strongly disagree” to 7=”strongly agree”. Finally, the fourth block was composed of 7 multiple-choice questions that asked for sociodemographic information to characterize the sample such as age, gender, education background, household family, household income, current employment situation and current resident country.

Before publishing the survey, a Pre-Test was conducted to verify the validity and reliability of the data and correct any possible misunderstanding or coherence issues (Saunders et al., 2019). The Pre-Test was conducted by a convenience sample of 8 individuals that were part of the target population, on the 13th of January. Considering the feedback received, the necessary corrections and changes were made, and the survey was finalized and published on the 17th of January.

3.6. Preliminary Data Analysis and Treatment

To ensure the quality and coherence of the statistical results, a preliminary analysis and treatment of the data set was performed. Considering the data collected was quantitative, the treatment and analysis of the data was done using the software IBM SPSS Statistics.

As previously mentioned, the total number of responses was 237. Out of these, 65 were firstly excluded through the exclusionary question due to not being part of the target population of this study. Out of the 172 responses left, 22 were not complete and therefore were also excluded, compelling in 150 valid and complete responses. Next, the data was edited and cleaned. The minimum and maximum values of the scale were calculated to verify any inconsistencies between the survey and the data. All values ranged from 2.4 to 5 (EC) and 1 to 7 (WTP) and therefore were coherent with the scales used. On the construct Environmental Concern, 6 items were inverted to correctly analyse the responses and are identified with an (I) in appendix 3. In terms of recoding, the variable education was recoded so that the groups high school and basic school became one “basic or high school” and the group “doctorates” became part of the group “masters, post-graduates or doctorates”. The variable income was also recoded, the group “less than 500€” and “between 501€ and 1000€” became the group “less than 1000€”.

To study the proposed hypothesis and respond to the research questions, 2 synthetic indices were created through the arithmetic mean of the items that compose each construct which is detailed in Appendix 4. To ensure that the indices created are reliable, consistent and adequately represent the constructs in study, a Reliability and Internal Consistency Analysis was conducted.

3.6.1 Reliability and internal consistency analysis

The reliability analysis was done through the Cronbach's alpha (α) and is presented in Table III. This coefficient provides an indication of the mean correlation between the items that compose each measurement scale and can range between 0 and 1, considering that it must be greater than 0.7 to be considered reliable (Pallant, 2020).

TABLE III – RELIABILITY AND INTERNAL CONSISTENCY ANALYSIS

Constructs	Cronbach's alpha (α)
Environmental Concern	0.717
Willingness to Pay	0.941

Source: Own elaboration based on SPSS output.

Considering that both indices presented acceptable values ($\alpha > 0.7$), reliability and internal consistency was confirmed. The detailed results analysis can be found in Appendix 5.

4. ANALYSIS AND RESULTS DISCUSSION

The following chapter aims to answer the research questions and objectives of this work, through hypotheses validation and statistical results analysis.

4.1. Sample Characterization

TABLE IV- SOCIODEMOGRAPHIC AND BEHAVIORAL SAMPLE CHARACTERIZATION

Index	Response options	N	%
Age (N=150)	Less than 24 years old	11	7.3%
	24 to 35 years old	47	31.3%
	36 to 45 years old	17	11.3%
	46 to 65 years old	66	44.0%
	Older than 65 years old	9	6.0%
Sex (N=147)	Male	62	41.3%
	Female	85	56.7%
Education Level (highest level completed) (N=149)	Basic or High School	57	38.0%
	Bachelors	46	30.7%
	Masters, Post-Graduate or Doctorate	46	30.7%
Household (N=150)	1	21	14.0%
	2	42	28.0%
	3	35	23.3%
	4	43	28.7%
	5 or more	9	6.0%
Household net monthly income (N=139)	Less than 1000€	15	10.0%
	1001-1500€	30	20.0%
	1501-2000€	30	20.0%
	2001€-2500€	16	10.7%
	More than 2500€	48	32.0%
Current Professional situation (N=150)	Student	5	3.3%
	Working Student	11	7.3%
	Self-employed	12	8.0%
	Dependent worker	98	65.3%
	Unemployed	6	4.0%
	Retired	16	10.7%
	Other	2	1.3%
Olive oil frequency buying (N=150)	3 or more times per month	9	6.0%
	2 times per month	23	15.3%
	Once per month	54	36.0%
	Every 2 months or more	64	42.7%

Source: Own elaboration based on SPSS output.

As presented in Table IV, the sample of this study is composed of 150 respondents that are Portuguese olive oil buyers. Within this sample, 41.3% are males and 56.7% are females. In terms of age, most respondents are between 46 and 65 years old (44%), followed by individuals between 24 and 35 years old (31.3%). In terms of educational background, the prevalence was the basic or high school level (38%), followed by a bachelor degree (30.7%) and master's, post-graduate, or doctorate (30.7%). In terms of

households, the prevalence was four people per household (28.7%), followed by two people (28%). Considering the monthly income per household, 11 respondents preferred not to respond and therefore were considered omitted values. Of the valid answers, 10% declared less than 1000€, 50.7% answered less than 2500€, and 32% answered more than 2500€.

Finally, in terms of the current professional situation, most respondents are dependent workers (65.3%), followed by retirement (10.7%) and self-employment (8%), working students (7.3%), unemployed (4%), and full-time students (3.3%). Also, most respondents declared to buy olive oil every two months or more (42.7%), followed by 36% that usually buy once a month and twice per month (15%), and 6% declared to buy olive oil three or more times per month.

4.2. Descriptive Statistics

TABLE V – DESCRIPTIVE STATISTICS

Index	Items	Minimum	Maximum	Mean	Std. Deviation
Environmental Concern (EC)	15	2.4	5	3.8036	0.4956
Willingness to Pay (WTP)	4	1	7	4.4883	1.6313

N=150
Source: Own elaboration based on SPSS output.

Regarding the descriptive statistics in Table V, the index with the highest mean and standard deviation represents Willingness to Pay (M=4.488; SD=1.631). Descriptive statistics per item are detailed in Appendix 4.

4.3. Hypotheses Validation Tests

To assess the research hypotheses, parametric and non-parametric tests were used. The significance level considered for the tests was 5% unless otherwise specified. To verify the statistical assumptions and considerations, the authors considered were Pallant (2016), Cohen (2013) and Fife-Schaw, C. (2006).

4.3.1 Profile of Environmentally Concerned Portuguese Olive Oil Buyers

The first hypotheses to be tested are H1a, H1b, H1c and H1d with the aim to determine the impact of sociodemographic characteristics on environmental concern of Portuguese olive oil buyers. Therefore, to compare the mean between 2 independent samples the

parametric test Independent Samples T-test was used. In turn, the means between more than 2 independent samples were compared through the parametric test One-Way Anova.

The normality of the samples was verified using the non-parametric normality test Kolmogorov-Smirnov for samples with N>50 and the Shapiro-Wilk for samples with N<50. The Asymmetry and Kurtosis values as well as the normality graphs were also considered. Normality was confirmed for all variables except for Age and Education level and the detailed results for all sociodemographic variables are presented in Appendix 6. In the cases where normality was not confirmed, both parametric and non-parametric tests were performed and considering that the results were consistent the parametric tests are presented (Fife-Schaw, C. 2006). When applicable, the non-parametric tests Kruskal-Wallis are presented in Appendix 8. In turn, the homogeneity of variances was confirmed for all variables with resource to Levene's Test for Equality of Variances.

The first hypothesis H1a states that environmental concern is the same for males and females. The parametric test for 2 Independent Samples t-Test was performed to compare if Environmental Concern differs between both groups.

TABLE VI – INDEPENDENT SAMPLES T-TEST FOR VARIABLE SEX

Sex	n	Mean	Std. Deviation	t (145)	p-value
Male	62	3.7118	0.46232	-2.092	0.038
Female	85	3.8824	0.50591		

Source: Own elaboration based on SPSS output.

Considering the results presented in Table VI, it is observed that Environmental Concern presents statistically significant differences between both groups (t(145)=-2.092; p=0.038). The mean was slightly superior for females meaning that female respondents reveal higher levels of environmental concern when compared to male respondents. Therefore, hypothesis H1a is rejected.

The following hypothesis H1b states that environmental concern is the same for all age groups. To test H1b the One-way Anova test was performed.

TABLE VII – ONE-WAY ANOVA TEST FOR VARIABLE AGE

Age	n	Mean	Std. Deviation	F (4,145)	p-value
Less than 24	11	3.4061	0.3983	3.060	0.019
24 to 35 years old	47	3.7957	0.4792		
36 to 45 years old	17	3.7137	0.5971		
46 to 65 years old	66	3.8586	0.4683		
Older than 65 years old	9	4.0963	0.4535		
Total	150	3.8036	0.4956		

Source: Own elaboration based on SPSS output.

The results presented in Table VII show statistically significant differences in environmental concern levels between at least two age groups (F(4,145)=3.060;p=0.019). Therefore, hypothesis H1b is rejected and considering the presence of multiple groups, the Tukey HSD test was performed.

TABLE VIII – MULTIPLE COMPARISONS TUKEY HSD FOR VARIABLE AGE

	Age		Mean Difference	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less than 24 years old	24 to 35 years old	-0.3897	0.1616	0.1181	-0.8361	0.0567
		36 to 45 years old	-0.3077	0.1867	0.4695	-0.8234	0.2081
		46 to 65 years old	-0.4525*	0.1571	**0.0364**	-0.8866	-0.0185
		Older than 65 years old	-0.6902*	0.2169	**0.0151**	-1.2893	-0.0912
	24 to 35 years old	Less than 24	0.3897	0.1616	0.1181	-0.0567	0.8361
		36 to 45 years old	0.0820	0.1365	0.9748	-0.2952	0.4592
		46 to 65 years old	-0.0628	0.0921	0.9600	-0.3172	0.1915
		Older than 65 years old	-0.3006	0.1755	0.4298	-0.7855	0.1844
	36 to 45 years old	Less than 24	0.3077	0.1867	0.4695	-0.2081	0.8234
		24 to 35 years old	-0.0820	0.1365	0.9748	-0.4592	0.2952
		46 to 65 years old	-0.1449	0.1312	0.8043	-0.5074	0.2176
		Older than 65 years old	-0.3826	0.1989	0.3096	-0.9320	0.1668
	46 to 65 years old	Less than 24	-0.4525*	0.1571	**0.0364**	0.0185	0.8866
		24 to 35 years old	0.0628	0.0921	0.9600	-0.1915	0.3172
		36 to 45 years old	0.1449	0.1312	0.8043	-0.2176	0.5074
		Older than 65 years old	-0.2377	0.1714	0.6373	-0.7113	0.2359
	Older than 65 years old	Less than 24	-0.6902*	0.2169	**0.0151**	0.0912	1.2893
		24 to 35 years old	0.3006	0.1755	0.4298	-0.1844	0.7855
		36 to 45 years old	0.3826	0.1989	0.3096	-0.1668	0.9320
		46 to 65 years old	0.2377	0.1714	0.6373	-0.2359	0.7113

*. Mean difference is significant at level 0.05.
Source: Own elaboration based on SPSS output.

As presented in Table VIII, the Tukey HSD test for multiple comparisons shows that the mean value of Environmental Concern was significantly different between the groups "Less than 24 years old" and "46 to 65 years old" and "Older than 65 years old".

As presented in Table VII, the younger respondents with less than 24 years old present a significantly lower level of environmental concern (M=3.4061;SD=0.3983) comparing with the respondents between 46 and 65 years old (M=3.8586;SD=0.4683) and older than 65 years old respondents (M=4.0963;SD=0.4535). This result is coherent with the non-parametric test Kruskal-Wallis presented in Appendix 8.

Hypothesis H1c states that environmental concern is the same for all education levels. To test H1c the One-way Anova test was performed.

TABLE IX – ONE-WAY ANOVA TEST FOR EDUCATION LEVELS.

Education level	n	Mean	Std. Deviation	F (2,146)	p-value
Basic or High school	57	3.8327	0.4646	0.267	0.766
Bachelors	46	3.8203	0.5388		
Master, Post-Graduate or Doctorate	46	3.7638	0.4933		
Total	149	3.8076	0.4948		

Source: Own elaboration based on SPSS output.

The results presented in Table IX show that there are no significant differences in Environmental Concern between the different education levels (F(2,146)=0.267;p=0.766). Therefore, hypothesis H1c is not rejected. The non-parametric test Kruskal-Wallis confirms this result and is presented in Appendix 8.

Finally, H1d states that environmental concern is the same for all income levels. To test H1d the One-way Anova test was performed.

TABLE X – ONE-WAY ANOVA TEST FOR VARIABLE INCOME.

Income	n	Mean	Std. Deviation	F (4,134)	p-value
Less than 1000€	15	3.6533	0.4474	0.691	0.599
1001€ - 1500€	30	3.8667	0.4426		
1501€-2000€	30	3.7667	0.4991		
2001€-2500€	16	3.8792	0.3686		
More than 2500€	48	3.8583	0.5813		
Total	139	3.8206	0.4987		

Source: Own elaboration based on SPSS output.

Considering the results presented in Table X ($F(4,134)=0.691;p=0.599$) there are no significant differences in Environmental Concern levels between the income groups. Therefore, H1d is not rejected.

4.3.2. Relationship between Environmental Concern and Willingness to Pay

To test H2, which states that there is a positive relationship between environmental concern and willingness to pay for recycled PET olive oil bottles, a correlation analysis was computed. Normality tests for Environmental Concern and Willingness to Pay are presented in Appendix 7.

TABLE XI - PARAMETRIC CORRELATION TEST PEARSON FOR EC AND WTP.

Variable	N	1	2
1. Environmental Concern	150	-	0.314**
2. Willingness to Pay	150	0.314**	-

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Own elaboration based on SPSS output.

Considering the results presented in Table XI, there is a positive correlation between Environmental Concern and Willingness to Pay ($r(150)=0.314;p<0.01$). According to the literature, this correlation is considered moderate (Cohen, 2013). Therefore, H2 is not rejected which means that when environmental concern levels increase, so does willingness to pay. The non-parametric test Spearman's rho agrees with the parametric result and is presented in Appendix 9.

4.3.3. Predictors of Willingness to Pay

A Multiple Linear Regression was performed with the goal to complement the previous analysis and understand if the relationship between Environmental Concern and Willingness to Pay is independent of sociodemographic characteristics age and sex. These variables were chosen because they revealed differences in environmental concern levels between segment groups. Because the variable Age was coded in groups, it had to be recoded into two categories based on the cumulative proportion of frequencies, namely "Until 45 years old" and "Older than 46 years old".

To ensure that the multiple linear regression assumptions were met, the independence of observations, absence of multicollinearity, absence of outliers affecting the model and

normality of residuals were tested prior to the performing of the multiple linear regression. The detailed results and previous analysis of the assumptions necessary to the performing of a linear regression are presented in Appendix 10. The authors considered were Mooi&Sarstedt (2014) and Pallant (2016).

Two models were used in a hierarchical regression approach. Model 1 predicted the dependent variable "Willingness to Pay" using the independent variable "Environmental Concern", whereas Model 2 included the predictors "Age" and "Sex" as control variables.

TABLE XII – WILLINGNESS TO PAY PREDICTORS.

	Model	Coefficients (β)	F	df	Sig.	Adjusted R Squared
Model 1	Environmental Concern	0.316*	16.109	1	<0.001	0.094*
Model 2	Environmental Concern	0.313*	6.158	3	<0.001	0.096*
	Age	0.096				
	Sex	-0.071				

Dependent variable: Willingness to Pay
*p-value<0.001
Source: Own elaboration based on SPSS output.

The regression results are summarized in Table XII. Based on the results from model 1, Environmental Concern significantly contributed to the regression model ($F(1,145)=16.109$; $p<0.001$) and accounted for about 9.4% of the total variance in Willingness to Pay (Adjusted R Squared=0.094). Moreover, Environmental Concern is a statistically significant predictor of Willingness to Pay ($\beta=0.316$; $p<0.001$).

In the case of model 2, which is the final model, although Environmental Concern continues to be statistically significant in explaining Willingness to Pay, the introduction of the variables Sex and Age is not statistically significant ($F(2,143)=1.165$;$p=0.315$). In fact, adding those variables only increased the variation accounted for in Willingness to Pay to 9.6% (Adjusted R Squared=0.096). Concerning the influence of each variable, Age ($\beta=0.096$; $p=0.231$) and Sex ($\beta=-0.071$ $p=0.373$) were not statistically significant predictors of WTP, however Environmental Concern remained relevant in explaining WTP ($\beta=0.313$; $p<0.001$). Concluding, Environmental Concern is a significant positive predictor of Willingness to Pay, and that impact is independent of the sociodemographic characteristics Age and Sex.

4.4. Results Summary

The results obtained from the hypotheses tests t-Test, One-way Anova and Correlation analysis performed are summarized in Table XIII. Out of the 5 hypotheses formulated to answer the two research questions, 3 were empirically supported.

TABLE XIII – SUMMARY OF HYPOTHESES RESULTS

Research hypotheses	
H1a: Environmental concern is the same for females and males.	Not Supported
H1b: Environmental concern is the same in all age groups.	Not Supported
H1c: Environmental concern is the same among all education levels.	Supported
H1d: Environmental concern is the same for all income levels.	Supported
H2a: There is a positive relationship between environmental concern and willingness to pay for recycled PET olive oil bottles.	Supported

Source: Own elaboration.

4.5. Results Discussion

In the following section, the previous hypotheses results are discussed. As previously stated in the methodology chapter, the goal was to understand how consumers will react to the change in legislation mandating recycled PET percentages in olive oil bottles and to establish a profile of environmentally concerned consumers who will be more open to this new packaging, as well as to analyse how being environmentally conscious impact willingness to pay for olive oil bottles made from recycled PET.

4.5.1 Profile of Environmentally concerned consumers

Considering the first research question results, Environmental concern levels differed between males and females and between age segments, therefore the sociodemographic characteristics that impact the level of Environmental Concern are Sex and Age. The findings from this study showed that women and individuals aged between 46 and 65 years old and individuals older than 65 years old show higher levels of environmental concern when compared with the other segment groups. Therefore, the profile of environmentally concerned consumers who are more open to recycled PET packaging for the sample of this study is characterized specially by women and individuals aged over 45 years old. The findings from this study showed no differences in environmental concern between education and income levels. These results are congruent with Laroche

et al. (2001), Finisterra Do Paço et al (2009) and Witek & Kuzniar (2021) that state that women are more concerned with environmental issues and overall show a more positive attitude towards green products and green purchasing behavior than men. One of the reasons presented in the literature is the fact that women are overall more concerned with social relationships and frequently take on roles that require caring for others which can translate into greater concern for the environment and increased inclination to engage in social and environmental causes (Van Doorn & Verhoef, 2011; Winterich et al., 2009).

In terms of Age, the findings from this study showed that environmental concern is higher for older individuals (older than 45 years old) in contrast with individuals aged less than 24 years old that show lower levels of environmental concern. These results are contrary to older research studies that showed mainly that younger individuals are overall more associated with environmental concern and sustainable behavior (Howell & Laska, 1992; Liere & Dunlap, 1980). One of the reasons pointed by Liere & Dunlap (1980) is that younger individuals are usually less integrated in the existing social and economic systems than older individuals. Since the solution to environmental issues are usually viewed as threatening to these systems and require changes in traditional habits and values, then it makes sense that younger individuals are more sensitive to environmental issues and more prone to show support to environmental initiatives. However, this discrepancy seems to be reducing as time passes as some recent studies show that older individuals are becoming more conscious of environmental issues and green consumers are now slightly older (Finisterra Do Paço et al., 2009; Witek & Kuźniar, 2021).

While this study found a significant impact of age in environmental concern, it is important to acknowledge that the age composition of the sample from this study may have contributed to this outcome. Specifically, only 7.3% of the respondents were under the age of 24, while 50% were over the age of 45. This age distribution may have influenced these findings.

In relation to education background and income levels, the findings from this study showed no significant differences in environmental concern levels between the different segment groups. These results are contrary to Liere & Dunlap (1980), Finisterra Do Paço et al (2009) and Witek & Kuzniar (2021) that state that highly educated individuals with higher income levels show higher levels of environmental concern. The author's

justification is that education and income are major indicators of social class and therefore are also important predictors of environmental concern and green purchasing behavior. Liere & Dunlap (1980) state that upper and middle classes show more interest in environmental initiatives and green purchasing behavior because their basic needs have been satisfied and therefore are more financially available to focus on other issues such as related with the environment. Considering that the sample from this study is composed by a high proportion of highly educated individuals (61.4% have a bachelor's degree or higher education), this may have resulted in a ceiling effect and therefore showing no significant differences in environmental concern between education levels.

Considering the previously discussed results, the findings suggest that women and individuals aged over 45 show higher levels of environmental concern when compared to men and other age segments. However, there were no significant differences found in environmental concern levels based on education or income within this sample.

4.5.2. Environmental Concern impact on Willingness to Pay

Regarding the second research question, the findings from this study showed a positive relationship between environmental concern and willingness to pay. The results showed that higher levels of environmental concern translate into greater willingness to pay for recycled olive oil bottles. This result is congruent with the views from authors Khan & Danish Kirmani (2015) and O'Rourke & Ringer (2016). The authors showed that environmentally concerned consumers are willing to pay more for environmentally friendly products. O'Rourke & Ringer (2016) states that consumers that have previously showed concern for the environment appear to use that information in their purchasing decision and therefore are more likely to choose green products and be willing to pay for it. The author also states that this impact is particularly significant when consumers are informed about sustainability issues and sustainable characteristics of the products they are buying. One of the reasons presented by Khan & Danish Kirmani (2015) is that when consumers show concerns for environmental issues and are environmentally conscious then they are emotionally attached to the environment and are easily persuaded to pay more for green products.

The findings from this study are contrary to the views of the authors Manaktola & Jauhari (2007) and Öberseder et al. (2011) that state that there is no positive relationship

between environmental concern and willingness to pay for sustainable products or services. Manaktola & Jauhari (2007) state that showing consciousness and concern for environmental issues does not result in an increase in willingness to pay for green products. In fact, this study showed that consumers are generally unwilling to renounce from price aspects and believe that companies should bear the extra cost of implementing sustainable solutions and invest in environmental practices. Öberseder et al. (2011) states that while consumers may show concern for the environment, that attitude is not frequently translated to actual purchase behavior and willingness to pay. This view is particularly prominent during periods of economic constraints where price is a major factor in purchasing decisions.

To have a deeper understanding of the relationship between Environmental Concern and Willingness to Pay and how sociodemographic factors moderate that impact, a regression analysis was performed. The regression analysis results showed that the relationship between environmental concern and willingness to pay is independent of sociodemographic characteristics, specifically sex and age. This result is supported by Maaya et al. (2018) and Khan & Danish Kirmani (2015). These authors found that environmental concern is significantly associated with higher willingness to pay for environmentally friendly products. Maaya et al. (2018) showed that environmentally concerned consumers are more likely to engage in pro-environmental behavior and willing to pay more for green products despite the sociodemographic groups where they are inserted. Khan & Danish Kirmani (2015) refer to environmental concern as an important predictor of willingness to pay.

The results from this study showed that the relationship between both variables remains consistent throughout different sex and age groups suggesting that environmental concern impact on willingness to pay is independent of these sociodemographic characteristics. These results can also be related and a consequence of respondents' bias. As explained by Vesely & Klöckner (2020), respondents may have given responses that are more socially accepted and appear environmentally friendly rather than stating their true beliefs since surveys are fully based on self-report. Also, as sustainability trends grow, environmental concern is also generally increasing and becoming more important throughout different consumer groups (Manaktola & Jauhari, 2007). Therefore, the differences in environmental concern due to sociodemographic factors are getting

attenuated. Also, it is possible that respondent's high level of environmental concern overshadowed the influence of sociodemographic characteristics on their willingness to pay. Overall, environmental issues are increasingly becoming a global concern affecting all sociodemographic groups. Therefore, it is expected that environmental concern would be a significant predictor of willingness to pay regardless of sociodemographic factors.

5. CONCLUSION

In this chapter, the main findings and conclusions of this study will be presented. Following, the practical and theoretical contributions are also presented as well as the limitations of this study and future research suggestions.

5.1. Conclusion

The goal of this study was to respond to the issues identified by the Portuguese company regarding the implementation of mandatory recycled PET percentages in olive oil bottles. The first goal of this research was to identify the profile of consumers that are environmentally concerned and therefore more receptive to the implementation of this sustainable packaging solution. The second aim was to determine whether environmental concern translates into increased willingness to pay for recycled PET because the increased cost of implementing recycled PET will be transposed to consumer. A conceptual model and research questions were defined based on these key aims, and the literature reviewed on the issue. The first research question was to define a sociodemographic profile of Portuguese olive oil buyers concerned about the environment and the second research question was to determine the influence of environmental concern on willingness to pay for recycled olive oil bottles. A third analysis was also conducted with the purpose to determine whether the influence of environmental concern on willingness to pay was independent of sociodemographic characteristics. After empirical analysis and statistical tests, it is possible to respond to the defined research questions.

Regarding the first research question, this study found that only two sociodemographic characteristics showed differences in environmental concern levels between the segment groups among Portuguese olive oil consumers: sex and age. Specifically, the findings showed that women and individuals aged over 45 years old have

higher levels of environmental concern when compared with men and younger individuals. In contrast, education and income showed no differences in environmental concern levels between segment groups which is contrary to the reviewed literature that states that higher education and income levels typically translate into higher environmental concern. With that being said, the findings from this study suggest that consumers who are environmentally concerned and most receptive to the introduction of recycled PET olive oil bottles into the market are mainly women and individuals aged 46 or older.

Regarding the second research question, this study found that the relationship between environmental concern and willingness to pay is positive, meaning that when environmental concern levels increase so does willingness to pay. The findings showed that individuals with higher levels of environmental concern are associated with greater willingness to pay for recycled PET olive oil bottles, even if higher prices are associated. These results suggest that consumers who are environmentally conscious are willing to pay more for sustainable packaging solutions in detriment to traditional plastic packaging. Additionally, the study tested if the impact of environmental concern on willingness to pay was independent of sociodemographic characteristics. The results indicated that environmental concern is a significant predictor of willingness to pay and that the effect is independent of sociodemographic characteristics.

Considering all findings, this study suggests that consumers in general are becoming more mindful of ecological issues, which is likely to benefit enterprises who are already investing in recycled PET packaging solutions as it can potentially translate into increased revenues. Given the current worldwide emphasis on sustainability, environmentally concerned consumers are bound to be very interested in brands who provide sustainable packaging solutions. Even so, it is critical that businesses successfully convey their sustainability efforts to consumers, particularly through focused sustainability marketing initiatives towards women and individuals over the age of 45. This study emphasizes the need of green marketing strategies in response to mandatory regulations being implemented to boost sustainable packaging in the market, as consumers become more conscious of the environmental effect of their purchase decisions. Companies that prioritize sustainability in their operations and communication strategies are more likely to gain a competitive advantage in the market due to environmentally conscious

consumers who are willing to pay more for sustainable packaging solutions while also contributing to a more sustainable future.

5.2. Practical Contributions

In terms of practical contributions, this study provides guidance for companies that are dealing with the imposition of this new legislation. These contributions are particularly relevant for companies operating in the food industry such as the Portuguese olive oil company that identified the issues addressed in this study. By identifying a profile of consumers who are more likely to respond positively to the introduction of recycled PET olive oil bottles, companies can tailor their marketing efforts to this consumer segment. For example, companies can use targeted marketing campaigns that appeal to environmentally conscious women and individuals over 45 years old. The fact that environmental concern was found to be a strong predictor of willingness to pay for olive oil recycled PET bottles has also important practical contributions. Corporations that are seeking to promote sustainable products should use environmental messages and green marketing initiatives that would promote environmental concern to increase demand for sustainable products. By incorporating environmental considerations into their packaging solutions and marketing strategies companies can tap into this growing market and potentially increase their revenues. These practical and corporate contributions are particularly important for companies that are dealing with these strict policies while seeking to promote sustainable products and packaging to consumers.

5.3. Theoretical Contributions

The present study provides several theoretical contributions to the literature on the relationship between environmental concern and consumer behavior. Although there is a vast literature on sustainable packaging, there is still a gap in the literature regarding the specific issue of recycled PET mandatory percentages implementation because legislations are recent. Although pro-environmental behavior is widely researched, it is not commonly studied the impact of environmental concern on willingness to pay. Therefore, this study is quite relevant as it provides meaningful findings on a subject that is not widely researched in the literature. By finding that higher levels of environmental concern are associated with greater willingness to pay, this study provides further evidence that environmental concern is an important determinant of consumer behavior.

The finding that sociodemographic characteristics don't significantly impact the relationship between environmental concern and willingness to pay suggests that environmental concern is becoming a wider individual characteristic independent of sociodemographic characteristics which is an important theoretical implication for the subject of pro-environmental behavior. Overall, these theoretical and academic contributions have important implications for future research on pro-environmental behavior and sustainable consumption.

5.4. Study Limitations

In terms of limitations, there are a few that should be considered when interpreting the results of this study and be considered for future research. The fact that the sample of this study is quite homogenous, made it not possible to capture the full range of sociodemographic characteristics that could impact the relationship between environmental concern and willingness to pay. This could have led to results being biased and therefore should not be generalized to larger populations. Also, regarding the sample characteristics, it was not representative of the target population which is a limitation for the results. For example, the sample has a higher proportion of highly educated individuals and a higher proportion of women which could have had caused the results to be biased. Considering that this study was applied to Portuguese olive oil consumers it should not be generalized to other regions with different sociodemographic characteristics. This study was done through a survey which can also be subject to bias considering that the responses were self-reported therefore respondents could have provided answerers that were more desirable than the reality. Overall, there was a limitation of resources such as time and money, therefore this study should not be generalized to other populations.

5.5. Future Research Suggestions

For future research, a larger scale study should be conducted with a more representative sample of the target population. Other variables should also be included and studied such as moderating variables of the relationship between environmental concern and willingness to pay and additional sociodemographic characteristics. Secondly, future research can investigate the factors that influence consumers' willingness to pay for sustainable packaging solutions in more detail. This study found

that environmental concern was a significant driver of willingness to pay, but future research can explore other factors such as product characteristics, brand reputation, and product labelling that may also influence consumers' willingness to pay for sustainable packaging solutions. The relationship between environmental concern and actual purchase behavior should also be studied to determine if there are discrepancies between consumers stated preferences and intentions and their actual purchasing behavior.

The potential role of government policies should also be studied, for example to understand if the new regulations that are being imposed are impacting and increasing consumers environmental concern and willingness to pay for sustainable packaging. In terms of green marketing, it would be important to focus on the long-term impact of the introduction of recycled PET on consumer behavior and explore ways to encourage long-term adoption of pro-environmental behavior. Overall, these avenues for future research can help to expand our understanding of consumer behavior and environmental sustainability and provide practical insights for industry stakeholders and policymakers seeking to promote sustainability in the packaging industry.

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APPENDICES

Appendix 1 – Survey English Version

Buying Behavior

English

This questionnaire is part of a Master's dissertation in Management at the Lisbon School of Economics and Management, University of Lisbon.
This study aims to understand the environmental awareness of olive oil buyers and their willingness to pay for a product packaged with a higher percentage of recycled material.

All data collected is for the exclusive use of this study and will be kept private.
The time to complete this questionnaire is approximately 3 minutes.

Thank you for your response, which is essential to the accomplishment of this work.

Do you usually buy olive oil?

- ○ Yes
- ○ No

Within 1 year, how often do you usually buy olive oil?

- ○ 3 or more times per month
- ○ 2 times per month
- ○ 1 time per month
- ○ Every 2 months or longer

Environmental Concern

Below you will find a list of statements about the relationship of humans with the environment. Please indicate your degree of agreement with each statement:

	Completely disagree	Partially disagree	Neither agree nor disagree	Partially agree	Completely agree
We are approaching the limit of the number of people the earth can support.	○	○	○	○	○
Humans have the right to modify the natural environment to suit their needs.	○	○	○	○	○
When humans interfere with nature it often produces disastrous consequences.	○	○	○	○	○
Human ingenuity will insure that we do NOT make the earth unlivable.	○	○	○	○	○
Humans are severely abusing the environment.	○	○	○	○	○
The earth has plenty of natural resources if we just learn how to develop them.	○	○	○	○	○
Plants and animals have as much right as humans to exist.	○	○	○	○	○
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	○	○	○	○	○

	Completely disagree	Partially disagree	Neither agree nor disagree	Partially agree	Completely agree
Despite our special abilities humans are still subject to the laws of nature.	○	○	○	○	○
The so-called "ecological crisis" facing humankind has been greatly exaggerated.	○	○	○	○	○
The earth is like a spaceship with very limited room and resources.	○	○	○	○	○
Humans were meant to rule over the rest of nature.	○	○	○	○	○
The balance of nature is very delicate and easily upset.	○	○	○	○	○
Humans will eventually learn enough about how nature works to be able to control it.	○	○	○	○	○
If things continue on their present course, we will soon experience a major ecological catastrophe.	○	○	○	○	○

Willingness to Pay

The following image contains two bottles of olive oil. Bottle A is made entirely of plastic (PET). Bottle B is made of 30% recycled plastic (recycled PET). This is the only difference between olive oil bottles A and B.

Bottle A

Bottle B

Based on the image above, please indicate your degree of agreement for each statement:

	Completely disagree	Disagree	Partially disagree	Neither agree nor disagree	Partially agree	Agree	Completely agree
"It is acceptable to spend more money in order to buy bottle B because it is made from recycled plastic PET and is more sustainable."	○	○	○	○	○	○	○
"I am willing to pay more to buy bottle B instead of bottle A."	○	○	○	○	○	○	○
I would pay more for bottle B because it is made from recycled plastic PET and more sustainable.	○	○	○	○	○	○	○
It is acceptable to pay 15% more for bottle B because it is made from recycled plastic PET and more sustainable.	○	○	○	○	○	○	○

Sociodemographic Information

What is your age?

- ○ Under 24 years old
- ○ 24 to 35 years old
- ○ 36 to 45 years old
- ○ 46 to 65 years old
- ○ Over 65 years old

What is your gender?

- ○ Male
- ○ Female
- ○ Prefer not to say

What is the highest degree or level of school you have completed?

- ○ Less than high school
- ○ High school degree or equivalent (e.g. GED)
- ○ Bachelor's degree (e.g. BA, BS)
- ○ Master's degree (e.g. MA, MS, MEd)
- ○ PhD
- ○ Other:

How many people constitute your household (yourself included)?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5 or more

Please indicate your household's net monthly income:

- ○ Less than 500€
- ○ 500€ - 1000€
- ○ 1001€ - 1500€
- ○ 1501€-2000€
- ○ 2001€-2500€
- ○ More than 2500€
- ○ Don't know
- ○ Prefer not

What is your current employment status?

- ○ Student
- ○ Working student
- ○ Self-employed
- ○ Employed full time
- ○ Unemployed
- ○ Retired
- ○ Other

Place of Current Residence:

- ○ Portugal
- ○ Other. Which one?

***Appendix 2** – Survey Portuguese Version*

Buying behavior

Portugues

O presente questionário enquadra-se no âmbito da realização de uma dissertação de mestrado em Gestão no Instituto Superior de Economia e Gestão, Universidade de Lisboa.

O objetivo deste estudo é analisar a consciência ambiental dos compradores de azeite e a sua disposição a pagar por um produto embalado com uma maior percentagem de material reciclado.

Todos os dados recolhidos são para uso exclusivo do presente estudo e será mantida a sua confidencialidade.

O tempo de realização deste questionário é de, aproximadamente, 6 minutos.

Agradeço a sua resposta que é fundamental para a realização deste trabalho.

Costuma comprar azeite?

- ○ Sim
- ○ Não

No espaço de 1 ano, com que frequência costuma comprar azeite?

- ○ 3 ou mais vezes por mes
- ○ 2 vezes por mês
- ○ 1 vez por mês
- ○ 2 em 2 meses ou mais

Environmental Concern

Abaixo encontra uma lista de afirmações sobre a relação do ser humano com o ambiente. Por favor indique o seu grau de concordância com cada afirmação:

	Discordo totalmente	Discordo parcialmente	Nem concordo nem discordo	Concordo parcialmente	Concordo totalmente
Estamos a aproximar-nos do limite do número de pessoas que a Terra pode suportar.	○	○	○	○	○
Os seres humanos têm o direito de modificar a natureza de acordo com as suas necessidades.	○	○	○	○	○
Quando os humanos interferem com a natureza, muitas vezes isso tem consequências desastrosas.	○	○	○	○	○
A ingenuidade humana vai assegurar que NÃO tornaremos o planeta inabitável.	○	○	○	○	○
Os seres humanos estão a abusar gravemente do ambiente.	○	○	○	○	○
O planeta tem recursos naturais suficientes se aprendermos a explorá-los.	○	○	○	○	○
As plantas e os animais têm tanto direito como os seres humanos a existir.	○	○	○	○	○

	Discordo totalmente	Discordo parcialmente	Nem concordo nem discordo	Concordo parcialmente	Concordo totalmente
O equilíbrio da natureza é suficientemente forte para aguentar os impactos dos países industriais modernos.	○	○	○	○	○
Apesar das nossas capacidades únicas, os seres humanos ainda estão sujeitos às leis da natureza.	○	○	○	○	○
A chamada "crise ecológica" que a humanidade enfrenta tem sido muito exagerada.	○	○	○	○	○
A terra funciona como uma nave espacial com espaço e recursos muito limitados.	○	○	○	○	○
Os seres humanos deviam dominar face ao resto da natureza.	○	○	○	○	○
O equilíbrio da natureza é muito delicado e facilmente perturbável.	○	○	○	○	○
Os humanos vão acabar por aprender o suficiente sobre como a natureza funciona para a poderem controlar.	○	○	○	○	○
Se as coisas continuarem no seu rumo atual, em breve vamos assistir a uma grande catástrofe ecológica.	○	○	○	○	○

Willingness to Pay

A seguinte imagem contém duas garrafas de azeite. A garrafa A é totalmente feita de plástico (PET). A garrafa B tem na sua constituição 30% de plástico (PET) reciclado. Esta é a única diferença entre as garrafas de azeite A e B.

Garrafa A

Garrafa B

Com base na imagem acima, indique o seu grau de concordância para cada afirmação:

	Discordo totalmente	Discordo	Discordo parcialmente	Nem concordo nem discordo	Concordo parcialmente	Concordo	Concordo totalmente
É aceitável despender mais dinheiro para comprar a garrafa B porque é fabricada com plástico reciclado e mais sustentável.	○	○	○	○	○	○	○
Eu estou disposto(a) a despender mais dinheiro para comprar a garrafa B em detrimento da garrafa A.	○	○	○	○	○	○	○

	Discordo totalmente	Discordo	Discordo parcialmente	Nem concordo nem discordo	Concordo parcialmente	Concordo	Concordo totalmente
Eu pagaria mais pela garrafa B porque é fabricada com plástico reciclado e mais sustentável.	○	○	○	○	○	○	○
É aceitável pagar mais 15% pela garrafa B porque é fabricada com plástico reciclado e mais sustentável.	○	○	○	○	○	○	○

Sociodemographic Information

Indique a sua idade:

- ○ Menos de 24 anos
- ○ 24 a 35 anos
- ○ 36 a 45 anos
- ○ 46 a 65 anos
- ○ Mais de 65 anos

Identifique o seu sexo:

- ○ Masculino
- ○ Feminino
- ○ Prefiro não dizer

Indique o seu grau de escolaridade mais elevado (concluído):

- ○ Ensino básico (1º ao 9ºano)
- ○ Ensino secundário ou equivalente (10º ao 12ºano)
- ○ Licenciatura
- ○ Mestrado ou Pós-Graduação
- ○ Doutoramento
- ○ Outro: ____

Quantas pessoas constituem o seu agregado familiar (consigo incluído)?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5 ou mais

Indique o rendimento líquido mensal do agregado familiar:

- ○ Menos de 500€
- ○ 500€ - 1000€
- ○ 1001€ - 1500€
- ○ 1501€-2000€
- ○ 2001€-2500€
- ○ Mais de 2500€
- ○ Não sei
- ○ Prefiro não responder

Indique a sua situação profissional atual:

- ○ Estudante
- ○ Trabalhador(a) - Estudante
- ○ Trabalhador(a) por conta própria
- ○ Trabalhador(a) por conta de outrem
- ○ Desempregado(a)
- ○ Reformado(a)
- ○ Outro

Appendix 3 - *Table of Constructs Measurement Scales*

Constructs	Definition	Reference Authors	Original items	Adapted items EN	Hypothesis
Environmental Concern (EC)	The intensity of positive or negative thoughts about environmental issues.	Dunlap et al. (2000)	We are approaching the limit of the number of people the earth can support.	**EC1:** We are approaching the limit of the number of people the earth can support.	H1a. H1b. H1c. H1d.
			Humans have the right to modify the natural environment to suit their needs.	**EC2:** Humans have the right to modify the natural environment to suit their needs. (I)	
			When humans interfere with nature it often produces disastrous consequences.	**EC3:** When humans interfere with nature it often produces disastrous consequences.	
			Human ingenuity will ensure that we do NOT make the earth unliveable.	**EC4:** Human ingenuity will insure that we do NOT make the earth unliveable. (I)	
			Humans are severely abusing the environment.	**EC5:** Humans are severely abusing the environment.	
			The earth has plenty of natural resources if we just learn how to develop them.	**EC6:** The earth has plenty of natural resources if we just learn how to develop them. (I)	
			Plants and animals have as much right as humans to exist.	**EC7:** Plants and animals have as much right as humans to exist.	
			The balance of nature is strong enough to cope with the impacts of modern industrial nations.	**EC8:** The balance of nature is strong enough to cope with the impacts of modern industrial nations. (I)	
			Despite our special abilities humans are still subject to the laws of nature.	**EC9:** Despite our special abilities humans are still subject to the laws of nature.	
			The so-called “ecological crisis” facing humankind has been greatly exaggerated.	**EC10:** The so-called “ecological crisis” facing humankind has been greatly exaggerated. (I)	
			The earth is like a spaceship with very limited room and resources.	**EC11:** The earth is like a spaceship with very limited room and resources.	
			Humans were meant to rule over the rest of nature.	**EC12:** Humans were meant to rule over the rest of nature. (I)	
			The balance of nature is very delicate and easily upset.	**EC13:** The balance of nature is very delicate and easily upset.	
			Humans will eventually learn enough about how nature works to be able to control it.	**EC14:** Humans will eventually learn enough about how nature works to be able to control it. (I)	
			If things continue on their present course, we will soon experience a major ecological catastrophe.	**EC15:** If things continue on their present course, we will soon experience a major ecological catastrophe.	
Willingness to Pay (WTP)	Maximum price a given consumer accepts to pay for a given product or service.	Wei et al. (2018)	I would pay more for custom t-shirts that are made using environmentally friendly materials.	**WTP1:** I would pay more for bottle B because it is made from recycled plastic PET and more sustainable.	H2a.
			I am willing to spend more money in order to buy custom t-shirts that are environmentally friendly.	**WTP2:** I am willing to pay more to buy bottle B instead of bottle A.	
			I believe it is acceptable to pay 25% more for custom t-shirts that are made using environmentally friendly materials.	**WTP3:** It is acceptable to pay 15% more for bottle B because it is made from recycled plastic PET and more sustainable.	
			I believe it is acceptable to spend extra money for t-shirts that are made using environmentally friendly materials.	**WTP4:** It is acceptable to spend more money in order to buy bottle B because it is made from recycled plastic PET and is more sustainable.	

Appendix 4 - *Descriptive Statistical Table of the Indices and respective Items.*

Constructs	Items	N Statistic	Minimum Statistic	Maximum Statistic	Sum Statistic	Mean		Median	Mode	Std. Deviation
						Statistic	Std. Error			
Environmental Concern (EC)	**EC1**	150	1	5	534	3.56	0.098	4	4	1.196
	EC2		1	5	532	3.55	0.105	4	4	1.288
	EC3		2	5	657	4.38	0.067	5	5	0.825
	EC4		1	5	482	3.21	0.100	3	3	1.224
	EC5		1	5	657	4.38	0.072	5	5	0.880
	EC6		1	5	358	2.39	0.097	2	2	1.192
	EC7		1	5	662	4.41	0.079	5	5	0.964
	EC8		1	5	602	4.01	0.094	4	5	1.153
	EC9		1	5	663	4.42	0.066	5	5	0.813
	EC10		1	5	535	3.57	0.108	4	5	1.328
	EC11		1	5	564	3.76	0.093	4	4	1.139
	EC12		1	5	586	3.91	0.094	4	5	1.149
	EC13		1	5	622	4.15	0.084	4	5	1.026
	EC14		1	5	461	3.07	0.106	3	2	1.296
	EC15		1	5	643	4.29	0.073	5	5	0.900
Willingness to Pay (WTP)	**WTP1**	150	1	7	733	4.89	0.141	5	6	1.732
	WTP2		1	7	671	4.47	0.154	5	6	1.881
	WTP3		1	7	654	4.36	0.151	5	6	1.844
	WTP4		1	7	635	4.23	0.131	5	5	1.607

Appendix 5 – *Reliability and Internal Consistency Analysis*

Construct	Item	N	Cronbach Alpha	Total item statistics	
				Corrected Item-Total Correlation	Cronbach alpha if item excluded
EC	1	150	0.717	0.233	0.713
	2			0.320	0.703
	3			0.374	0.699
	4			0.079	0.731
	5			0.517	0.685
	6			0.163	0.721
	7			0.335	0.701
	8			0.400	0.693
	9			0.267	0.708
	10			0.419	0.689
	11			0.251	0.710
	12			0.451	0.687
	13			0.369	0.697
	14			0.315	0.704
	15			0.46	0.69
WTP	1	150	0.941	0.820	0.935
	2			0.893	0.913
	3			0.890	0.913
	4			0.846	0.929

Appendix 6 *– Normality tests for Sociodemographic Variables*

Normality Test (Sex)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
Sex	Statistic	df	Sig.	Statistic	df	Sig.
Male	0.089	62	0.200*	0.976	62	0.272
Female	0.088	85	0.152	0.989	85	0.692

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Normality Test (Age)

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Age	Statistic	df	Sig.	Statistic	df	Sig.
Environmental Concern	Less than 24	0.142	11	0.200*	0.975	11	0.934
	24 to 35 years old	0.099	47	0.200*	0.97	47	0.259
	36 to 45 years old	0.126	17	0.200*	0.955	17	0.536
	46 to 65 years old	0.124	66	0.013	0.982	66	0.453
	Older than 65 years old	0.255	9	0.095	0.899	9	0.244

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Normality Test (Education level)

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Education	Statistic	df	Sig.	Statistic	df	Sig.
Environmental Concern	Basic and High school	0.1296	57	0.0183	0.9695	57	0.1590
	Bachelors	0.0995	46	0.200*	0.9734	46	0.3668
	Masters, Post-Graduate or Doctorate	0.1380	46	0.0282	0.9561	46	0.0807

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Normality Test (Income)

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Income	**Statistic**	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Environmental Concern	Less than 1000€	0.2010	15	0.1051	0.9098	15	0.1347
	1001€ - 1500€	0.1077	30	0.200*	0.9590	30	0.2924
	1501€-2000€	0.1133	30	0.200*	0.9692	30	0.5173
	2001€-2500€	0.0994	16	0.200*	0.9747	16	0.9077
	More than 2500€	0.1099	48	0.1963	0.9759	48	0.4198

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source: Own elaboration based on SPSS Outputs (All Tables).

Appendix 7 *– Normality Tests (Environmental Concern and Willingness to Pay)*

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Environmental Concern	0.083	150	0.013	0.99	150	0.328
Willingness to Pay	0.12	150	<0.001	0.932	150	<0.001

a. Lilliefors Significance Correction

Source: Own elaboration based on SPSS Outputs.

Appendix 8 – *Non-Parametric Tests for Variables Age and Education*

Kruskal-Wallis Test (Age)

Ranks		
Age	**N**	**Mean Rank**
Less than 24	11	40.09
24 to 35 years old	47	75.74
36 to 45 years old	17	66.88
46 to 65 years old	66	79.92
Older than 65 years old	9	101.39
Total	150	

Test Statistics[a,b]	
	ECTotal
Kruskal-Wallis H	11.884
df	4
Asymp. Sig.	0.018

a. Kruskal Wallis Test

b. Grouping Variable: Age

Source: Own elaboration based on SPSS Output.

Kruskal-Wallis Test (Education levels)

Ranks		
Education	**N**	**Mean Rank**
Basic and High school	57	76.70
Bachelors	46	75.71
Masters, Post-Graduate or Doctorate	46	72.18
Total	149	

Test Statistics[a,b]	
	ECTotal
Kruskal-Wallis H	0.297
df	2
Asymp. Sig.	0.862

a. Kruskal Wallis Test

b. Grouping Variable: Education levels

Source: Own elaboration based on SPSS Output.

Appendix 9 – *Non-Parametric Spearman's rho Correlation between EC and WTP*

Variable	**N**	**1**	**2**
1. ECTotal	150	-	0.324**
2. WTPTotal	150	0.324**	-

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Own elaboration based on SPSS output.

Appendix 10 *– Multiple Linear Regression: Predictors of Willingness to Pay*

Model	Variable	N	Normality Test (1)		Observations Independence (2)	Residual Statistics (3)	Collinearity Statistics (4)	
			K-S	Sig.	Durbin-Watson	Residual Mean	Tolerance	VIF
Model 1	(Constant)	147	-	-		0.000	-	-
	Environmental Concern		0.081	0.019			1.000	1.000
Model 2	(Constant)	147	-	-	1.608	0.000	-	-
	Environmental Concern		0.081	0.019			0.945	1.058
	Age		0.346	<0.001			0.973	1.027
	Sex		0.381	<0.001			0.969	1.032

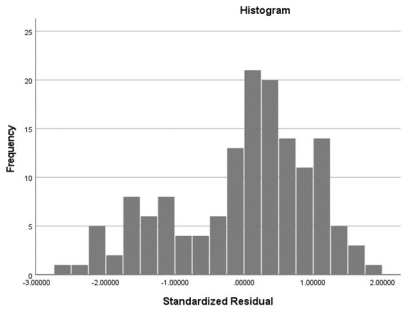
Predictors Model 1: (Constant), Environmental Concern.
Predictors Model 2: (Constant), Environmental Concern, Age, sex.
Dependent Variable: Willingness to Pay.
The significance level considered is 5%.
Source: Own elaboration based on SPSS output.

(1) According to the Kolmogorov-Smirnov (K-S) test, none of the variables follows a normal distribution in the population ($p<0.05$). However, the assumption of normality was guaranteed by the Central Limit Theorem (CCT) ($N=150>30$).

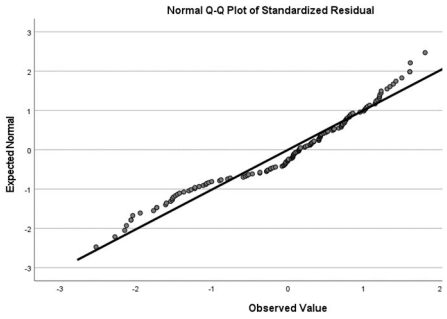
(2) Through the Durbin-Watson test, it was verified that its value was reasonably close to 2, that is, the assumption of no autocorrelation of errors was satisfied.

(3) The residual mean is zero, so the assumption of the expected error mean being equal to zero was verified.

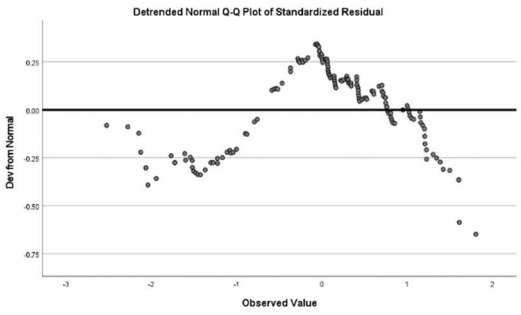
(4) The observed Tolerance and Variance Inflation Factor (VIF) values are all greater than 0.1 and smaller than 10, respectively, so the assumption of non-multicollinearity was confirmed.



The graph suggests the data is normally distributed.



The graph suggests a reasonable straight diagonal, therefore no large deviations from normality.



The graph suggests a pattern of variability around 0, satisfying the homoscedasticity assumption.

Model	Variable	R Squared	Adjusted R Squared	Std. Error of the Estimate	ANOVA			Coefficients			
					F	df	Sig	Unstandardized Coefficients (B)	Standardized Coefficients (B)	t	Sig.
1	(Constant)	0.100	0.094	1.55337	16.109	1	<0.001	0.514	-	0.514	0.608
	Environmental Concern							1.045	0.316	4.014	<0.001
2	(Constant)	0.114	0.096	1.55161	6.158	3	<0.001	0.529	-	0.529	0.598
	Environmental Concern							1.035	0.313	3.868	<0.001
	Age							0.312	0.096	1.203	0.231
	Sex							-0.235	-0.071	-0.89	0.373

Predictors Model 1: (Constant), Environmental Concern.
Predictors Model 2: (Constant), Environmental Concern, Age, sex.
Dependent Variable: Willingness to Pay.
Significance level considered of 5%.
Source: Own elaboration based on SPSS Output.