Sustainability in Action: Unraveling the Drivers Behind Purchase Intent for Circular Products

Gonçalo Luz

Dissertation written under the supervision of Marta Bicho

Dissertation submitted in partial fulfilment of requirements for the MSc in Management with specialization in Strategy, Entrepreneurship & Impact, at the Universidade Católica Portuguesa, 3rd of January of 2022.

Abstract

The circular economy, an innovative approach towards the pivotal and ever-growing discourse on sustainability. The circular economy presents itself as a concept applicable at the many levels of our society through businesses, governmental policies, and individual daily practices. The circular economy embodies a transformative economic approach. Despite its acknowledged benefits, mainly at the social and environmental level, in relation to the conventional economic models, the circular economy seems to be experiencing a degree of stagnation in its widespread adoption worldwide.

This thesis seeks to explore factors that influence individuals in their intention of purchasing goods derived from the circular economy. The latter is done through an empirical study conducted on the general public through an online experiment. The selection of variables has been thoughtfully considered, drawing from their widespread use in sustainability discourse. The dissertation utilizes an extended version of the well-known Theory of Planned Behavior, including a total of five variables. Attitude, Subjective Norm, Perceived Behavioral Control, Environmental Awareness and Green Brand Awareness are the variables that have been chosen for this study.

The findings of the study indicate a strong correlation between attitude and environmental awareness with the purchase intention of circular goods. Moreover, the study reveals that subjective norm and green brand awareness exert a medium sized effect on purchase intention. Perceived behavioral control emerges as a variable with no significant impact on the decision to purchase circular products. These findings contribute towards building a stronger foundation in the yet underdeveloped literature on customer consumption within the circular economy.

Keywords: Circular Economy, Circular Product, Theory of Planned Behavior, Attitude, Subjective Norm, Perceived Behavioral Control, Environmental Awareness, Green Brand Awareness

Title: Sustainability in Action: Unraveling the Drivers Behind Purchase Intent for Circular Products

Author: Gonçalo Luz

Resumo

A economia circular, uma abordagem inovadora para o discurso crucial e sempre crescente sobre a sustentabilidade. A economia circular apresenta-se como um conceito aplicável aos vários níveis da nossa sociedade através das empresas, das políticas governamentais e das práticas diárias individuais. Apesar dos seus reconhecidos benefícios, principalmente a nível social e ambiental, a economia circular parece estar a sofrer um certo grau de estagnação na sua adoção generalizada em todo o mundo.

Esta tese procura explorar fatores que influenciam os indivíduos na sua intenção de adquirir bens derivados da economia circular. Isto é feito através de um estudo empírico realizado junto do público geral através de uma questionário online. A selecção de variáveis foi cuidadosamente considerada, com base na sua utilização generalizada no discurso da sustentabilidade. A dissertação utiliza uma versão estendida da conhecida Teoria do Comportamento Planeado, incluindo um total de cinco variáveis. Atitude, Norma Subjetiva, Controlo Comportamental Percebido, Consciência Ambiental e Consciencialização da Marca Verde são as variáveis escolhidas para este estudo.

Os resultados indicam uma forte correlação entre atitude e consciência ambiental com a intenção de compra de bens circulares. Além disso, o estudo revela que a norma subjetiva e o reconhecimento da marca verde exercem um efeito médio na intenção de compra. Por fim, o controlo comportamental percebido surge como uma variável sem impacto significativo na decisão de compra de produtos circulares. Estas descobertas contribuem para a construção de uma base mais sólida na literatura ainda subdesenvolvida sobre o consumo dos clientes na economia circular.

Palavras-chave: Economia Circular, Produto Circular, Teoria do Comportamento Planeado, Atitude, Norma Subjetiva, Controlo Comportamental Percebido, Consciência Ambiental, Consciencialização da Marca Verde.

Acknowledgement

I would like to express my gratitude to all of those that have accompanied me and contributed both directly and indirectly towards the completion of this thesis. This study marks an end to an academic journey that has been both challenging and rewarding in many ways and I am deeply thankful for those that have supported me all the way through it.

First and foremost, I would like to thank all the faculty members with whom I have crossed paths throughout the five years I got to study at Católica Lisbon. A special word of gratitude towards my academic thesis supervisor Marta Bicho, for her guidance and support throughout the entire process. Her expertise and constructive feedback were very important towards the completion of this thesis.

On a personal level, delivering this thesis represents a significant achievement which would not have been possible without the continuous support of my parents. I would like to thank them for the encouragement and trust, even through the challenging times.

Finally, I would like to thank my friends, particularly those I made throughout my journey at Católica Lisbon. Without them this experience would not have been the same.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

- TPB – Theory of Planned Behavior
- PI – Purchase Intention
- SN – Subjective Norm
- PBC – Perceived Behavioral Control
- GBA – Green Brand Awareness

1. Introduction

1.1. Problem Definition and Relevance

The prevailing linear economy persists due to a lack of awareness about the circular model and its societal benefits (Turos, 2018). The circular economy disrupts the take-make-dispose approach, offering a regenerative alternative (Hopkinson et al., 2018). It has become a tangible solution amid disruptive trends, presenting social and economic advantages like reduced emissions, job creation, innovation, and economic growth (Ellen MacArthur Foundation, 2016).

Despite its potential, the circular economy's growth remains sluggish and inconsistent. The latter is represented by the global circularity rate which stands at only 7.2%, as reported in 2023 (Circle Economy, 2023), having declined from 8.6%, reported in 2022 (Circular Economy, 2022). All in all, the extent to which resources are being reused, reintegrated and recycled is minimal and shows little progression at a worldwide scale. Regarding the EU explicitly, its 27 members present a circular rate that is above the global average. Nevertheless, likewise to the global scene, the average remains rather stagnant as represented by a mere increase of 0.8% between 2010 and 2021, augmenting from 10.7% to 11.5% throughout this decade, respectively. (Fundaçao Francisco Manuel dos Santos, 2023).

Despite averaging a circularity rate that is above the global mean, Europe is no bed of roses when it comes to the implementation of the circular economy. Countries like Portugal, Greece, Romania, amongst others, lag notably behind both the global and EU average circularity rates (Fundaçao Francisco Manuel dos Santos, 2023). On the other hand, countries like the Netherlands, Belgium and France lead the way in Europe (Fundaçao Francisco Manuel dos Santos, 2023).

Persisting barriers explain the stagnation of the world's circularity rate, including a lack of private-sector leadership, insufficient investment in eco-innovation, and legislative constraints (European Environment Agency, 2023; Henriques et al., 2022; Santos et al., 2020). Achieving industrial symbiosis and involving various sectors, ministries, educational institutions, and the society at large are crucial for successful circular economy implementation (Santos et al., 2020). This dissertation aims to delve into the societal aspect in particular.

Despite a significant presence of papers thoroughly analyzing the obstacles that impede a greater success for the circular economy at a global scale, the focus tends to be more oriented towards non-societal related barriers, such as technological and legislational barriers (Kirchherr et al., 2018). This appears to be a tradition within this realm, as studies have shown that only 19% of circular economy definitions entail *'customer consumption'* (Kirchherr et al., 2017). Whilst the laterally mentioned barriers are in fact of large importance, as demonstrated by existing research, there is a clear lack of detailed research into the customer's influence on the matter. Thus, this is what this dissertation will thrive to examine.

1.2. Objective and Research Question

This dissertation aims to understand what factors influence consumers to adopt sustainable buying practices through the purchase of circular products. The study consists of selected psychological and awareness variables that have been proven, by existing literature, to have an impact on the purchase intention of sustainable goods. Henceforth, the focus is to examine how these factors influence the purchase intention of circular goods, as a subset within the broader category of sustainable goods.

There is a lack of empirical studies examining the psychological factors that drive customers to consider the purchase of circular goods. Existing research surrounding the circular economy focuses on the barriers towards its implementation, which include socio-cultural factors. In this domain, studies suggest that customer awareness and interest is a pivotal social barrier on the intention to adopt a circular economy model (Kirchherr et al., 2018, Grafstrom & Aasma, 2021). This dissertation will aim to complement these findings by examining the factors that influence customer purchase intention of individuals which are familiar with the circular economy. Simultaneously, the empirical study will also allow for an examination into the customer awareness level on the concept of circular economy.

Henceforth the following research question will be addressed:

RQ: To what extent do psychological and awareness factors influence consumers' intention to purchase circular products?

The research question characterizes the main objective of this research. The question intends to provide an understanding of what factors may cause an individual to consider the purchase of a circular product. The question will be addressed by studying variables which have been considered relevant by existing literature. For example, the study will utilize the variables of the Theory of Planned Behavior (Ajzen, 1991) towards understanding the extent to which psychological factors impact the customer's intention to purchase circular products.

1.3. Thesis Structure

As follows, this chapter will succinctly explain the manner in which this dissertation will be structured. Previously, the objective of this study has been clearly stated through an introduction explaining the gap in literature that will be addressed. Moreover, the research question of the study has been presented, further demonstrating what the objective of the study will be.

Chapter 1 has set the stage for the chapter that will now follow, which will consist of an overview of the relevant literature including the concept of circular economy, and the independent and dependent variables being studied. These include the three variables of the Theory of Planned Behavior (Ajzen, 1991), namely attitude, subjective norm and perceived behavioral control, as well as environmental awareness and green brand awareness.

The literature review will then be followed by the methodology and the analysis of the data obtained from the empirical study. Afterwards, the dissertation will present the concluding remarks via a discussion and then several sub-chapters including a look into the theoretical and managerial relevance, future research suggestions and limitations of the study.

2. Literature Review and Hypothesis Development

2.1. The Concept of Circular Economy

The *circular economy* can be defined as an economic model that aims at regenerating nature, through the minimization of waste and promotion of a sustainable use of natural resources, achieved through tactics such as recycling, smarter product designs, longer use, amongst others (UNDP, 2023). However, defining the concept of circular economy is challenging, as it is in constant evolution given the shifting state of environmental, technological, economic and socio-political contexts (Kirchherr et al., 2017).

The backbone of what we now know as the circular economic model was first proposed by Kenneth Boulding in 1966, back then under a different name (Boulding, 1966). The *'spaceman economy'*, represented the idea of a '*cyclical ecological system which is capable of continuous reproduction of material form'* (Boulding, 1966). This innovative idea challenged the traditional linear economy, which Boulding referred to as the '*cowboy economy'* (Boulding, 1966). Since then, the circular economic model has gained increased popularity, with more and more scholars addressing the topic, particularly in the last decade (Kirchherr et al., 2017; Alcalde-Calonge et al., 2022; Ghisellini et al., 2016). The latter is a result of the increasingly negative impacts of the take-make-dispose model at an economic and social level, through global warming, resource depletion, poor waste treatment and so forth (Ghisellini et al., 2016; Alcalde-Calonge et al., 2022).

Nowadays, according to the European Parliament, the circular economy model is best defined by its aims of extending the life cycle of products, reducing waste to minimum and creating added value through materials which can be used again and again (European Parliament, 2023). The Ellen MacArthur Foundation (2016) best explains the different processes of a circular economy system by dividing the concept into two key cycles, technical and biological. In the former, the theoretical model defines how products and materials can be reused, repaired, remanufactured and recycled, while in the biological cycle, nutrients from biodegradable materials can also be used to regenerate the land from which raw materials are collected (Ellen MacArthur Foundation; 2016). Companies such as well-known photography industry leader, *Canon*, have incorporated the strategic models of the technical cycle in their operations, towards reducing the

generation of waste (Circular Innovation Lab, 2022). On the other hand, *Nam Mushrooms* is a perfect example of a company applying the biological cycle to its operations. The company collects ground coffee waste from local restaurants in Lisbon and uses it to grow organic mushrooms via land regeneration (Circular Innovation Lab, 2022).

2.2. Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB), ultimately devised by Icek Ajzen in 1991, is a psychological theory that posits that human behavior is primarily determined by an individual's intention to perform a specific action, which in turn is influenced by their attitudes, subjective norms, and perceived behavioral control. In figure 1 below, is a visual illustration of the theory.

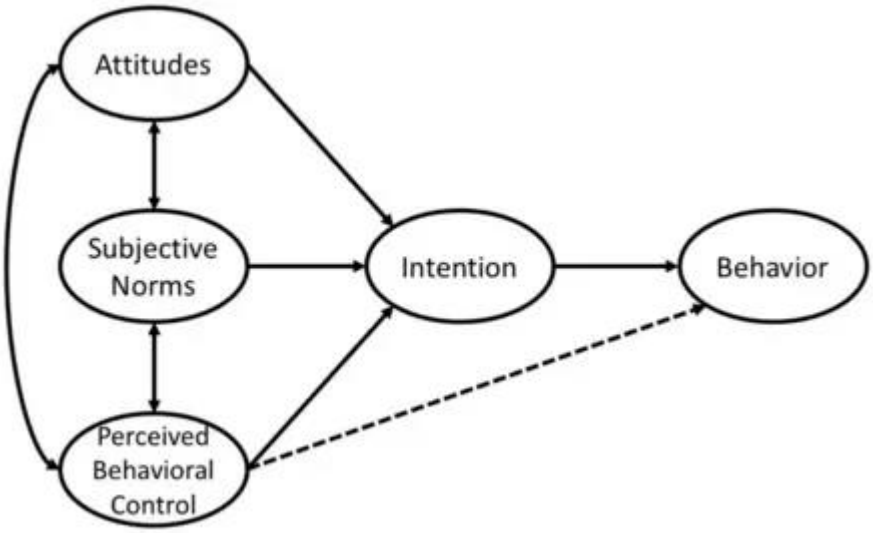

Figure 1 - Theory of Planned Behavior (Ajzen, 1991)

Since its proposal, the TPB has served as a benchmark for many studies within a ranging set of domains, including sport management, advertising, sustainability, amongst others (Cunningham & Kwon, 2003; Khoa, 2023; Leeuw et al., 2015). Within the realm of sustainability, the TPB is considered a powerful mechanism to understand customer behavior towards sustainable products in a variety of industries, such as in the fashion and food industry (Brandão & Costa, 2021; Rex et al., 2015).

As follows, this chapter will decompose and extend the TPB with the aim of explaining the relevancy of its aforementioned components towards the study on circular purchase intention. For each element, this chapter will examine the existing literature linking the variables to sustainability discourse.

2.2.1. Purchase Intention

Intentions are a pivotal aspect in the theory of planned behavior. Intention involves the effort that an individual is willing to exert in order to perform a behavior (Ajzen, 1991). Intentions have a direct influence on behavior, meaning that if the individual has the intention to perform a behavior, he/she will perform it if the required resources and opportunities are available (Ajzen, 1991). The latter has been subject to many studies with the majority of well-established literature asserting that there is a high degree of positive correlation between intention and behavior (Kumar et al., 2017).

The primary purpose of this study is to determine the factors that influence the intention to purchase circular products. Henceforth, despite its relevance, behavior has not been included in the framework.

2.2.2. Attitudes

According to Ajzen & Fishbein (1977), "*a person's attitude represents his evaluation of the entity in question"*. In other words, the extent to which the outcome is valued as positive or negative for the individual. In turn, attitude is impacted by behavioral beliefs which represent the subjective probability that the behavior will produce a specific outcome (Ajzen, 1991).

In the context of sustainable behavior, if the individual believes that the behavior produces positive consequences, then the attitude regarding the behavior will be favorable. On the other hand, if environmentally sustainable behavior is associated with negative outcomes, the attitude will be unfavorable (Leeuw et al., 2015). The belief that an individual holds with regards to a specific environmentally sustainable behavior will depend on the association of attributes. The latter may include characteristics, events, or objects (Ajzen, 1991). Studies have shown that attitude represents a very strong influence with regards to environmentally sustainable behaviors

(Swaim et al., 2014). Henceforth, the relevance of the *attitude* variable for this study gives rise to the first hypothesis.

H1. *Attitude positively influences circular purchase intention*.

2.2.3. Subjective Norms

The second variable of the TPB is subjective norm, which "*refers to the perceived social pressure to perform or not to perform the behavior*" (Ajzen, 1991). Likewise, to attitude, the more favorable the subjective norm, the stronger the intention to perform the behavior in question (Ajzen, 1991). Subjective norms are impacted by normative beliefs, which represent external pressures on individuals and groups that either approve or disapprove of a given behavior performed by the consumer (Ajzen, 1991). These may include family, friends, teachers, doctors, co-workers, and so on.

According to Swaim et al. (2014), research shows that professors, business leaders and politicians are important references for sustainability knowledge and consequently impact sustainable intentions. Other studies on the matter highlight the influence of the bigger picture. According to Minton et al. (2018), the manner in which consumers perceive their behaviors will depend on how these are perceived within one's national culture. The latter goes in line with Hofstede's (2015) findings on how culture shapes perceptions, values, and practices. Minton et al., 2018 concludes that countries which have a low pragmatism will have a lower participation in sustainable behaviors, demonstrating that the social norms that impact sustainable intentions may be as a result of an individual's national culture (Minton et al., 2018). Subjective norm has been shown to have a close connection with sustainable intentions. As such, it is of relevance for the study and allows for the formation of the following hypothesis.

H2. *Subjective Norm positively influences circular purchase intention*.

2.2.4. Perceived Behavioral Control

The third and final variable of the TPB, impacting the intention to perform a behavior, is perceived behavioral control. According to Ajzen (1991), this "*refers to people's perception of the ease or difficulty of performing the behavior of interest*". These perceptions are impacted by

control beliefs, which involve the perceived factors that may facilitate or impede a behavior from taking place (Ajzen, 1991). The higher the level of perceived behavioral control, then the higher the intention to perform a behavior (Notani, 1998).

In the realm of sustainable purchasing, studies have found that there is a positive link between perceived behavioral control and the purchase of green products (Chan & Lau, 2008). The studies of Chan & Lau (2008) also show the importance of culture in the strength of perceived behavioral control on sustainable behavior, mostly due to differences in cultural beliefs and environmental development. Existing research has shown that perceived behavioral control is elevated in individualistic cultures, mostly amongst western countries (La Barbera & Ajzen, 2020). The latter point becomes particularly pertinent, considering the inherent scope that may emerge in the survey, given that its distribution originates from Portugal.

The variable of perceived behavioral control gives rise to the third hypothesis of this study.

H3. *Perceived Behavioral Control positively influences circular purchase intention*.

2.3. Environmental Awareness (EA)

The concept of Environmental Awareness has been subject to many interpretations since it was first introduced in the 1960s (Fu et al., 2020). Fu et al. (2020) suggests that there are two roadways for interpreting this concept. The first is that environmental awareness can be referred to as a person's general understanding of environmental problems and how human behavior impacts the overall environment (Schuitema et al., 2013, as cited in Wang et al., 2020; Kollmuss and Agyeman, 2002, Zsoka, 2008, as cited in Fu et al. 2020). The alternative view involves a more '*hands-on'* approach in which one can carry on pro-environmental behaviors by understanding and taking in sensory information from the environment (Kikuchi-Uehara et al., 2016, as cited in Fu et al., 2020). For the purpose of this investigation, the concept of environmental awareness will be limited to the knowledge and understanding that an individual has with regards to the environment.

The role of consumer environmental awareness has become crucial towards the field of sustainability (Zameer & Yasmeen, 2022). Over the years, an increasing number of scholars have examined the impact of environmental awareness on consumption patterns and intentions across

many industries and regions. Most of the available literature considers environmental awareness regarding polluting goods to be an important element towards sustainable practices (Iosifidi, 2016; Laureti et al., 2018). Studies show that consumers with strong green awareness are willing to demand and pay for green products as they understand the environmental benefits of doing so (Ogiemwonyi, 2022).

Moreover, many studies have also associated environmental awareness indirectly with purchase intention via the Theory of Planned Behavior (Fishbein & Ajzen, 1991). The study of Paul et al. (2016) indicates a close connection between the role of environmental awareness and the three variables of the TPB on green purchase intentions. Xu et al. (2020) found that subjective norm and perceived behavioral control are impacted by environmental awareness when determining purchasing intention of green furniture, while attitude is not.

It is of particular relevance for this study, that the Theory of Planned Behavior is extended to include environmental awareness. Environmental awareness is a recurrent variable in studies on sustainable consumption and in the great majority positively related, both indirectly and directly, to green product purchase intention. Henceforth, this study considers it can be useful in explaining circular purchase intentions. The following hypothesis has therefore been formed.

H4. *Environmental Awareness positively influences circular purchase intention*.

2.4. Green Brand Awareness (GBA)

Brand awareness is a concept that refers to the degree to which a consumer is aware of a label and how strong the brand's presence is in a consumer's mind (Hutter et al., 2013). Furthermore, the concept of brand awareness may be considered as the most basic level of brand knowledge, involving at the very least the consumers' recognition of the brand's name (Hoyler & Brown, 1990). Brand awareness represents the most habitual decision tactic when consumers are faced with new consumption decisions, but also when it comes to familiar or repeat choice purchase intentions (Macdonald and Sharp, 2000; Hoyler & Brown, 1990). Experimental studies reveal how consumer brand awareness may on its own determine choice (Hoyler & Brown, 1990; Hutter et al., 2013). Infact, in many models of customer purchase intention and behavior, it is

argued that brand awareness is the first step for choosing a brand (Hoyler & Brown, 1991; Alkhawaldeh et al., 2017).

Considering all of the above, green brand awareness can be considered as the ability for a consumer to acknowledge and simultaneously recall a brand and its environmental features (Aaker, 1992, as cited in Tariq, 2014; Chang & Chen, 2014; Mourad & Ahmed, 2012). Previous studies have demonstrated a positive relation between GBA and green purchase intention, incentivizing companies to use *'green marketing'* strategies to improve awareness (Doszhanov & Ahmad, 2015; Kassaye, 2001). For the purpose of this study, GBA will be added to the already extended version of the Theory of Planned Behavior. The latter will be done as a means to examine whether individuals are able to recall the existence of green brands and whether this has an influence on their intention to purchase green goods, such as circular products.

The final hypothesis is the following:

H5. *Green Brand Awareness positively influences circular purchase intentio*n.

3. Conceptual Framework

Below is a visual representation of the conceptual framework that will be addressed in the following study.

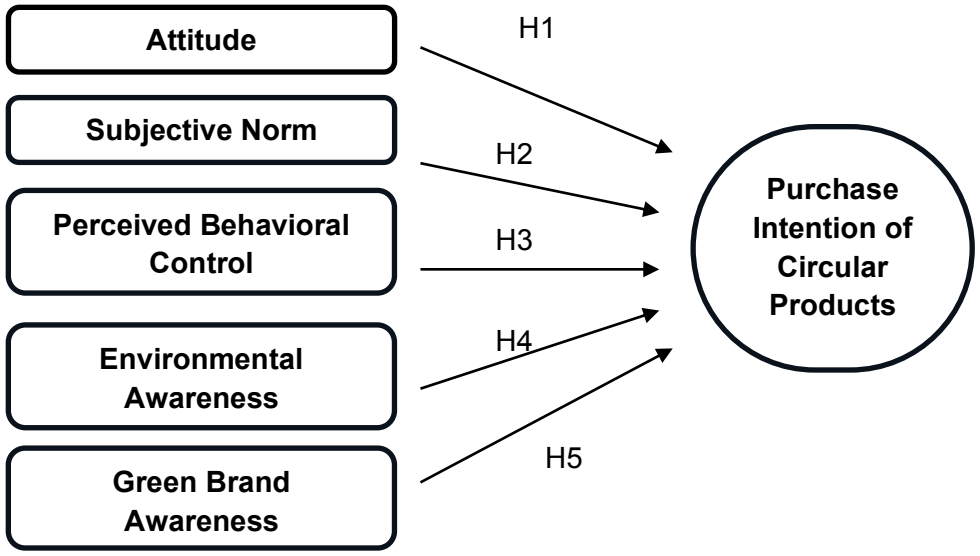

Figure 2 – Conceptual Framework

4. Methodology

The following chapter will explain the methodology that has been utilized towards addressing the research questions that the study aims at answering. Before conducting a thorough analysis of the data collected, this chapter will go over the research design that was put in place to collect such data as well as the sampling method that was followed.

4.1. Research Approach

This study had the primary intention to investigate the factors that influence customer's intention to purchase circular products. Henceforth, in order to answer the research question proposed by this study, a quantitative research design was applied via a questionnaire distributed amongst the general public. As previously shown, relevant variables were chosen, and the research design aimed at collecting primary data that would help the study towards identifying the influential strength of each variable on customer purchase intention.

The use of a survey allows for the measurement of different variables on the purchase intention of customers and the consequent possibility to identify trends in consumer preferences. Furthermore, the questionnaire method provides an opportunity to reach a larger and diverse range of respondents, with regards to demographic characteristics. The latter provides opportunities to delve into consumer behavior across different age groups, income levels, educational levels and so forth.

4.2. Instrumentation

The quantitative research design was constructed with the Qualtrics platform. A useful platform for the collection of large sums of data and the creation of clear and well-structured questionnaires.

The process of data analysis was conducted through the use of a reliable statistical tool known as SPSS Statistics. This software, created by IBM, was useful for managing, processing and organizing all of the data that had been collected. The tool also allowed for the observation of patterns and trends towards making data informed conclusions which will be presented later on in this paper.

4.3. Research Design

The respondent to the survey was first presented with the usual socio-demographic questions. These included gender, age group, educational level, annual income, and country of residence. These were useful demographic variables to understand the composition of the sample and to compare the responses of different demographic groups.

Afterwards, a succinct description on the circular economy was given, followed by two multiple choice questions that measured the awareness level on the concept of circular economy. If the respondent was to some degree aware, then he/she would be directed towards answering the remainder of the survey that contained 16 questions with a 5-point Likert scale addressing the variables of interest. The 5-point Likert scale went from "*Strongly Disagree*" to "*Strongly Agree*", for all variables.

Given the primary focus of the study and in order to reduce potential biases, if the respondent was not aware, to any extent, of the concept of circular economy, then the survey would end.

4.4. Population of Interest and Sampling Method

The survey was primarily designed to target respondents who demonstrate at the very least some understanding of the circular economy. This design was constructed to get more detailed and accurate answers on the variables affecting consumers' intentions to buy circular products. In this way and as previously mentioned, the survey attempts to reduce potential bias by removing individuals who are not familiar with the concept of circular economy. This allows for a more accurate study of the specific variables that have been identified as relevant in the context of circular product purchasing intention.

Despite the deliberate targeting present in this study, the latter permits a simultaneous investigation on the awareness levels of respondents with regards to the concept of a circular economy. This measurement was relevant towards understanding why consumers may never consider purchasing circular products. If this was the case, respondents that are unaware of the concept would not deliver relevant and applicable responses on the variables at hand.

The sampling method that was applied to this study is non-probabilistic, via convenience sampling. The questionnaire was distributed amongst known connections from the 11th to the 18th of December mostly via messaging platforms such as WhatsApp and Facebook Messenger and social media applications like Instagram. The initial respondents were asked to further disseminate the survey amongst their known connections resulting in many of the participants of this study having been reached through chain referral, where initial participants have referred others to participate in the study.

5. Results

This chapter will go over the results that were collected from the study that was carried on and described in the previous chapter.

5.1. Pilot-test

In the initial stage of the research, a pilot-test inadvertently arose as a result of an unintended error in the main study. Inadvertently, this occurrence provided the opportunity to evaluate the feasibility and internal consistency of the chosen independent variables. Moreover, it provided an unexpected possibility to test the scales, as well as the overall structure of the survey.

5.1.1. Scale Reliability of Pilot-Test

The internal consistency of the independent variables was measured through the application of Cronbach's alpha. According to Bland & Altman (1997), the minimum alpha scores for a questionnaire to have minimum satisfactory internal validity are between 0.7 and 0.8. The pilot-test showed all variables to have an alpha of over 0.7, with three of the five variables presenting values of over 0.8, as seen in table 1 below. These scores are even more satisfactory for scholars that consider a Cronbach Alpha of over 0.6 to be satisfactory (Hair et al., 2006). Therefore, all items were kept for the main study.

Variable	Nº Items	Cronbach's Alpha
Environmental Awareness	4	.772
Green Brand Awareness	3	.881
Attitude	3	.857
Subjective Norm	2	.826
Perceived Behavioral Control	4	.785

Table 1 – Scale Reliability of Pilot-test

Regarding the structure of the questionnaire, fractional changes were made to improve the overall experience, including changes in the order of questions. Moreover, the omitted single-item dependent variable was included as well as a new demographic query which questioned the country of residence of the respondent.

Finally, an effort was made to share the main study amongst people that had not completed the pilot-study.

5.2. Main Study

5.2.1. Data Preparation

The survey was answered by 141 respondents, of which 23 individuals did not fully complete the survey. Henceforth these 23 data sets were eliminated and the remaining 118 fully completed responses were considered for the purpose of this study.

5.2.2. Demographic Data Collection

The gender distribution of the 118 participants consisted of 67 (56.8%) male and 51 (43.2%) female respondents. Regarding the country of residence of these individuals, the majority live in Portugal (85.6%), followed by the United Kingdom (4.2%) and Spain (3.4%). Other respondents currently reside in Austria, Brazil, Ireland, Italy, Netherlands, and Poland. The country of residence is relevant as studies have shown culture to have an impact on the psychological variables of the Theory of Planned Behavior, as presented in the literature review. Nevertheless, the distribution in the nationalities of the respondents of this study is too low to make any cross-cultural conclusions.

Other demographic variables collected were age, education level and annual income. The age of the study´s respondents was measured across four groups, the most common age group selected was “more than 50 years” (37.3%), followed by “20-35” and “36-50” with 28% and 27.1%, respectively. The most common education level selected was “Graduate”, with almost 50% of the respondents selecting this option. Finally, the most selected income level was “More than 50,000€” with 37.3%. The descriptive statistics table in the appendix (Appendix 4) shows the demographic values in greater detail.

5.2.3. Scale reliability

The items representative of each variable utilized in the study have been previously used in existing literature and their scales considered reliable. Nonetheless, the author of this study made slight adaptations to the items which for authenticity reasons required that a reliability test was once again performed. The latter was done using Cronbach's Alpha. The results are visible in the table below.

Variable	Nº Items	Cronbach’s Alpha
Environmental Awareness	4	.775
Green Brand Awareness	3	.831
Attitude	3	.857
Subjective Norm	2	.901
Perceived Behavioral Control	4	.754
Purchase Intention	2	.446

Table 2 – Scale Reliability of Main Study

In line with the results visible in the pilot-test, the five independent variables appear to be consistent as they all present a satisfactory alpha score of over 0.7. The latter is aligned with Bland & Altman (1997) considerations on reliability scores.

5.2.4. Awareness Level

The awareness level was measured as a by-product of the main research purpose on the factors influencing circular purchase intention. In order to understand the awareness level with regards to the circular economy, firstly, both in the pilot test and the main study the following description was given:

> *The circular economy is a concept that promotes the idea of minimizing waste and making the most of resources. Instead of the traditional linear, "take, make, dispose" model, the circular economy aims to create a sustainable system where resources are used efficiently, and waste is minimized through practices like recycling, remanufacturing, and designing products for longevity.*
>
> *Companies like Patagonia and IKEA have been at the forefront of the circular economy movement with regards to consumer goods, through circular fashion products and furniture respectively.*

The respondents were then asked to answer the following question: *"Considering the previous description, have you previously heard of the circular economy?"*. In the pilot test (N=167) 22% of respondents answered "*No*" to being aware of the concept, while in the main study (N=118), 14% of the respondents answered that they were unaware of the concept. These results show that the degree of unawareness regarding the circular economy is small but still present.

Furthermore, for those that answered "*Yes*", the questionnaire followed up with another question measuring the level of awareness. The pilot-test and the main study presented useful results on the matter. In the pilot test, when questioned, "*How well do you understand what a circular economy is?*", the answers were as follows: 23% answered "*slightly well*", 46% answered "*moderately well*", while 26% chose "*very well*". In the main study, the same question was posed. The answers were similar: 24% chose "*slightly well*", 49% selected "*moderately well*" and 26% opted for "*very well*".

The results of both tests are beneficial in showing that a majority of respondents are in fact aware of the concept of circular economy. The follow up question demonstrates that both in the pilot-test and in the main study, respondents have a moderate to very well understanding of the circular economy, 72% and 75% respectively.

5.2.5. Hypothesis Testing

In the following chapter, this study will examine the collected data via statistical inference with the aim of making data-driven conclusions. An examination of the correlation between the independent variables and dependent variable will take place. Two association metrics have been

chosen in order to conduct this examination. Namely, the *Pearson Correlation Coefficient* (Pearson, 1904) and *Fisher's Exact Test* (Fisher, 1922). Both models present the opportunity to observe and quantify the relationship between two interval variables, independent and dependent. For Pearson's model, a one-tail test was put into practice given the nature of the study's hypothesis as directional.

Naturally, the necessary assumptions to utilize both models have been taken into account, including the normality assumption for Pearson´s *r*. The Kolmogorov-Smirnov and Shapiro-Wilk tests for normality were performed for each variable to test for normality. Nevertheless, this assumption is covered by the Central Limit Theorem, which states that for most population distributions where n > 30, the sampling distribution of the mean will be approximately normal (Berenson, 2012; Chang; 2006). The Pearson coefficient has also been shown to be insensitive to extreme violations of the assumption of normality (Havlicek & Peterson, 1976; Schmidt & Finan, 2018, Poole & O'Farrell, 1971). The latter is particularly relevant with regards to the *'point estimate',* which for Pearson´s *r* remains robust even under conditions of non-normality (Bishara & Hittner, 2016).

Regarding the assumption of homoscedasticity, for each correlation, the Breusch-Pagan test (Breusch & Pagan, 1979) has also been applied in order to test for heteroskedasticity. Moreover, residual plots were used to test for heteroskedasticity, including histogram of residuals, regression of standardized residuals and a regression of the standardized residuals against the predicted values.

The Pearson Chi-square test holds the assumption that the expected count in at least 80% of the cells should be greater than 5 (Field, 2009). This assumption was violated in all cases. Henceforth, the Fisher-Freeman-Halton Exact Test (Fisher, 1922) was utilized instead, as it is more adequate for smaller sample sizes and applicable when the expected count is under 5 in at least 20% of cells (Field, 2009). Furthermore, Cramer's V was used to measure the strength of association between the variables, considering the size of the contingency table (Field, 2009).

Before concluding the chapter, the study will present a model created through a multiple linear regression. The main aim is to understand the variability in the dependent variable that can be accounted for by the independent variables of this study. The level of the explanatory power of

the chosen independent variables is important towards understanding if there are other variables that the study could have incorporated in order to better answer the research question.

5.2.5.1. Impact of Attitude on Purchase Intention

H1. Attitude positively influences circular purchase intention.

The Breusch-Pagan test and visual interpretation of residual plots confirmed the variable data to be homoscedastic. On the other hand, the Kolmonorov-Smirnov and Shapiro-Wilk tests showed that the variable was seen as not being normally distributed.

Independent Variable	Dependent Variable	*r*	*Exact Test*
Attitude	Purchase Intention	.538***	40.975***

Note:
*** Correlation is significant at the 0.001 level
** Correlation is significant at the 0.01 level
* Correlation is significant at the 0.05 level

Table 3 – Attitude-PI Coefficients

The first hypothesis measured the impact of attitude against circular purchase intention, hypothesizing a positive relationship. The coefficient of 0.538 is representative of a positive and large effect correlation, given that it is over the value of 0.5 (Field, 2009). Moreover, this number represents a notable connection between the two variables, in which the increase of attitude towards circular products is parallelly represented in the intention to purchase through a considerable increase as well. This is reinforced by the statistical significance level of 0.1% which implies that there is strong evidence to suggest that the correlation that is observed is not due to randomness.

Regarding Fisher's exact test, a statistical significance at the 0.001 level further reinforces the association between both values. Moreover, Cramer's V delivered a value of 0.380, significant at the 0.001 level, representing a medium strength association (Field, 2009).

All in all, given the information provided above, the data-driven decision was to support the first hypothesis (H1)

5.2.5.2. Impact of Subjective Norm on Purchase Intention

H2. Subjective norm positively influences circular purchase intention.

Independent Variable	Dependent Variable	*r*	*Exact Test*
Subjective Norm	Purchase Intention	.291**	26.539**
Note: *** Correlation is significant at the 0.001 level ** Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level			

Table 4 – SN-PI Coefficients

The Brusch-Pagan test and visual interpretation of residual plots confirmed the variable to be homoscedastic and the two tests performed on the normality of the variable showed it to be non-normal.

The second hypothesis placed the subjective norm as having a positive influence on circular purchase intention. The Pearson coefficient of 0.291 confirms the hypothesis as a positive relationship does in fact exist. Nevertheless, the magnitude of 0.291 represents the variable, subjective norm, as having a small to medium effect on purchase intention (Field, 2009). The value is significant to 1% meaning that this relationship is unlikely to be due to chance.

Fisher's exact test yet again goes in line with Pearson's *r*, showing the presence of an association via a statistically significant value to the 0.01 level. Cramer's V, used to measure the effect size delivered a statistically significant value of 0.291, representing a small to medium sized effect.

Overall, despite there being a weak correlation, the second hypothesis is partially supported as a result of a positive medium sized correlation that is statistically significant.

5.2.5.3. Impact of Perceived Behavioral Control on Purchase Intention

H3. Perceived behavioral control positively influences circular purchase intention.

Independent Variable	Dependent Variable	*r*	*Exact Test*
Perceived Behavioral Control	Purchase Intention	-.107	15.449
Note: *** Correlation is significant at the 0.001 level ** Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level			

Table 5 – PBC-PI Coefficient

The variable of perceived behavioral control is homoscedastic as shown by the Breusch-Pagan test and visual interpretation of residual plots. The normality tests performed showed the variable to be non-normal.

The correlation of -0.107 suggests a negative relationship between perceived behavioral control and purchase intention. This value demonstrates a very small negative relationship as well as a value that is not statistically significant to any level. Henceforth, it is difficult to make any deductions on the impact of perceived behavioral control on purchase intention from this correlation. The latter is reinforced by Fisher's exact test which shows no statistical significance with regards to an association between the variables.

These findings permit a rejection of H3, as there are no signs of a significant positive correlation between the variables. Furthermore, the results found in this study do not permit any further conclusions with regards to the relationship between PBC and purchase intention.

5.2.5.4. Impact of Environmental Awareness on Purchase Intention

H4. Environmental awareness positively influences circular purchase intention.

Independent Variable	Dependent Variable	*r*	*Exact Test*
Environmental Awareness	Purchase Intention	.556***	33.174***
Note: *** Correlation is significant at the 0.001 level ** Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level			

Table 6 – EA-PI Coefficient

The Breusch-Pagan test and visual interpretation of residual plots revealed there to be no signs of heteroscedasticity. Additionally, the Kolmogorov-Smirnov and Shapiro-Wilk tests showed the variable to be non-normal.

The correlation of 0.556 suggests that the independent variable of environmental awareness has a positive large effect on the dependent variable of purchase intention (Field, 2009). Moreover, the value is statistically significant at the 0.001 level, showing that this relationship is trustworthy.

Regarding Fisher's exact value, the value shows that there is a statistically significant association to the level of 0.1%. Moreover, Cramer's V delivered a value of 0.431 that is statistically significant and demonstrates a medium effect association.

The data in this study goes in line with the hypothesis created and therefore H4 was supported

5.2.5.5. Impact of Green Brand Awareness on Purchase Intention

H5. Green brand awareness positively influences circular purchase intention.

Independent Variable	Dependent Variable	*r*	*Exact Test*
Green Brand Awareness	Purchase Intention	.319**	25.838*
Note: *** Correlation is significant at the 0.001 level ** Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level			

Table 7 – GBA-PI Coefficient

The normality tests performed showed the data to be non-normal. The Breusch-Pagan test and visual interpretation of residual plots showed the data to be homoscedastic.

The final hypothesis delivered an *r* value of 0.319 between green brand awareness and purchase intention, denoting a medium effect relationship (Field, 2009). Furthermore, the value is statistically significant. Similarly, the exact test demonstrates an association that is statistically significant to 5% and shows a medium effect strength of 0.308 according to Cramer's V.

Despite not showing a very strong correlation, H5 is partially supported as a result of the positive and medium sized correlation.

5.2.6. Multiple Linear Regression

A model was generated through a multiple linear regression in order to understand how the independent variables are associated with changes in the dependent variable. The R square measure was used in order to measure how well the model generalized and the proportion of the variance in the dependent variable that is explained by the independent variables. The R square delivered a value of 0.464, meaning that the model explains 46.4% of the variance in the dependent variable. This is a substantial portion of the variability in the dependent variable.

Moreover, the magnitude of each beta represents the average change in the dependent variable for a one unit change in the independent variable, holding the remaining variables constant. This allows for an assessment of the relative importance of each independent variable in explaining the variation in purchase intention. In table 8 we see that the variables *attitude* and *environmental awareness* create the greatest impact on purchase intention when they increase/decrease. The latter is further reinforced by the statistical significance level to the 0.001 level.

Finally, unlike the value presented above through the Pearson's coefficient and Fisher's exact test, it is observable from table 8 that in this model *subjective norm* is not statistically significant while *perceived behavioral control* is, to the 0.01 level. Furthermore, *perceived behavioral control*, likewise to *green brand awareness*, yet again show a weak direction of relationship with the dependent variable. In addition, perceived behavioral control is negatively correlated with purchase intention once again.

The key findings from the multiple linear regression model go in line with the findings obtained through Pearson's coefficient and Fisher's exact test and as a result do not permit any alterations in the data-driven conclusions made above, towards supporting, or not, the hypotheses of the study.

	Coefficient (β)	**t-test**
Attitude	.423	3.543***
Subjective Norm	-.040	-.488
Perceived Behavioral Control	-.272	-2.777**
Environmental Awareness	.425	3.301***
Green Brand Awareness	.282	3.336***
Note: Dependent Variable - *Purchase Intention* R Square - 0.464 *** Correlation is significant at the 0.001 level ** Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level		

Table 8 – Multiple Linear Regression

5.2.7. Hypothesis Summary

H1	Attitude positively influences circular purchase intention.	Supported
H2	Subjective norm positively influences circular purchase intention.	Partially Supported
H3	Perceived behavioral control positively influences circular purchase intention	Not Supported
H4	Environmental awareness positively influences circular purchase intention	Supported
H5	Green brand awareness positively influences circular purchase intention	Partially Supported

Table 9 – Hypothesis Summary

6. Conclusions

6.1. Discussion

The goal of this study, as presented by the research question, was to understand the factors, including psychological and awareness, that impact the consumers decision to consider the purchase of circular goods of any kind. In order to do so, an empirical study in the form of a questionnaire was performed and shared with the public, particularly addressing those that had previously heard of the circular economy.

The study used the well-established Theory of Planned Behavior (Ajzen, 1991) as a pillar towards understanding the psychological reasons for consumers to have a purchase intention towards circular products. Nevertheless, the variables of attitude, subjective norm and perceived behavioral control showed differing results. All three variables were hypothesized to positively support purchase intention, but only attitude was fully supported. The variable of subjective norm, through a medium-effect positive correlation was only partially supported, while perceived behavioral control showed a weak negative correlation with no statistical significance. The latter meant that the hypothesis pertaining to perceived behavioral control was not supported.

The results support existing literature in showing that attitude is usually the strongest predictor of sustainable purchase intention (Paul et al., 2016; Han & Stoel, 2016; Armitage & Conner, 2001). Hans & Stoel (2016) presented a size-effect between attitude-intention of $r=0.53$, in a study that looks into the explaining the socially responsible consumer behavior. More broad studies, such as Armitage & Conner (2001)'s analysis on 185 studies on the theory of planned behavior, delivered an r of 0.49 between attitude-intention. The latterly mentioned results go in line with the r of 0.538 present in this study.

Regarding subjective norm, Armitage & Conner (2001) conclude that subjective norm is usually found to be a weak indicator of intentions. Nevertheless, regarding sustainable consumption, literature shows that differing results are possible. This study goes in line with research that finds subjective norms to be a weak predictor of sustainable purchase intentions (Paul et al., 2016; Tarkiainen and Sundqvist, 2005).

Finally, the last variable of the TPB is perceived behavioral control. The study presented a result that is not statistically significant and does not support the hypothesis of a positive relation with purchase intention. Regarding the literature, studies show PBC as being the second strongest predictor of purchase intention (Paul et al., 2016; Armitage & Conner: 2001). This study fails to confirm these findings.

In order to answer the research question, the theory of planned behavior was extended to include two awareness factors: environmental awareness and green brand awareness. The hypothesis pertaining to environmental awareness was fully supported given the positive relationship with purchase intention. This finding goes hand-in-hand with the majority of existing literature that also finds environmental awareness to have a large effect relationship with sustainable purchase intention (Zameer & Yasmeen, 2022; Xu et al., 2019; Ogiemwonyi, 2022).

The empirical study shows green brand awareness to have a medium effect on purchase intention and hence the hypothesis was partially supported. There is a limited amount of literature on the influence of green brand awareness on sustainable purchase intention. Nonetheless, the positive relationship found in this study goes in line with the literature that is available. As an example, Doszhanov & Ahmad (2015)'s study presents a very positive *r* of *0.97* between intention to use green products and GBA.

Finally, the multiple linear regression allowed for an understanding on whether the variables of the study are useful in explaining the variability of purchase intention. A value of 46.4% suggests a moderate level of explanatory power. The latter indicates that there is significant room for improvement in improving the model towards understanding what other variables impact purchase intention. Nevertheless, after looking at the individual variable contributions it is important to note that attitude and environmental awareness present themselves as important variables in this aspect.

6.2. Theoretical Relevance

Within the realm of sustainability, there is a trend of growing literature on the circular economy (Kirchherr et al., 2017). Nevertheless, as touched upon in the very first chapter of this study, the circular economy rate at a worldwide scale is sub-par. As such, many scholars have approached this by examining the barriers that are preventing a greater implementation of the principles of a circular economy. Nonetheless, and despite its growing popularity amongst scholars, the available literature on the circular economy remains scarce in examining many of its aspects. For the purpose of this study, one of these factors was approached, namely, the customer consumption aspect, which as per Kirchherr et al., (2017) has the tendency to be neglected by scholars. This study therefore adds to the growing literature on the circular economy and addresses an area that is of less popularity amongst scholars.

This study also employs an extended version of the theory of planned behavior, integrating environmental factors as well as psychological factors, to dive into the rather underexplored realm of literature regarding the circular economy. The current state of literature pertaining to this area contains a number of diverse theories and perspectives, further reflecting the state of underdevelopment that is present within the literature. This study both validates and challenges some of the existing theories, serving as a step towards building a more solid foundation in this particular aspect of the circular economy.

6.3. Managerial Relevance

This study provides an opportunity for managers to understand what drives customers towards considering the purchase of circular products. Understanding these factors may be crucial for the success of brands within circular markets. Knowing what motivates customers to choose circular goods allows managers to capitalize on these findings and align the marketing strategies with the identified drivers. To set an example, this study clearly demonstrates that environmental awareness has an influence on the purchase intention of circular products. Henceforth, marketing strategies that promote environmental awareness may be beneficial towards driving customers to purchase circular products.

The incorporation of green brand awareness is a unique aspect of this study as this is rarely seen within the literature on circular economy. This variable holds an important implication for managers as it demonstrates the important role that brands have in driving purchase intention. The observed positive correlation, despite not very strong, between green brand awareness and purchase intention, highlights the importance of cultivating an association between the brand and its circularity initiatives to steer customers towards considering purchasing circular products.

6.4. Limitations

The following section will outline the two notable limitations of this study. The first observable limitation of the study is the sampling technique and size of the sample utilized. A total of 118 respondents fully completed the survey, representing a small sample size. Such a small number proves to be a limitation when it comes to making generalizations. The latter is further reinforced by the limited lack of demographic diversity, namely with regards to country of residence. This prevents any cross-cultural examinations and limits the scope of the study, in great majority, to the country of Portugal.

The second limitation was also at the experiment level, specifically regarding the respondents. Despite attempts to prevent respondents from answering both the pilot test and the main study, it is of high probability that some repeat responses took place. The latter may have had an impact on the authenticity of the study as respondents' awareness level could have changed from one survey to the other. Moreover, given that the majority of the questions in both surveys were the same or similar, respondents that answered both of the surveys could have been impacted by lower attention and sincerity levels when answering the main survey.

6.5. Future Research

The previous study focused on the purchase intention of customers towards purchasing circular products. Future research could take this study a step forward in analyzing how this purchase intention is reflected on purchase behavior.

Future studies could also look into testing different variables and their impact on the circular economy. The R square of this study shows that there might be other variables that better help in explaining the variability of purchase intention. There is an immense amount of scholarly

literature on the factors influencing sustainable purchase intention. Applying these variables in the context of circular economy may be an area of interest. While this study did apply a variety of these variables, there remains many others which have been proven to impact sustainable intentions. Examples may include, greenwashing concerns, willingness to pay, certification, knowledge of eco-labels and so forth.

Finally, as mentioned throughout the course of the study, a cross-cultural examination on the factors impacting circular purchase intention could be beneficial in understanding the influence of culture on the matter. Nonetheless, this study fails at making this cross-cultural examination as a result of the limited diversity of respondents in the questionnaire. As such, future studies could look into the differing trends and patterns amongst different cultures and hence examine how culture impacts circular purchase intention as well.

7. Appendix

Appendix 1 – Questionnaire for Main Study

Dear Participant,

This survey is part of my master's dissertation at Católica Lisbon School of Business & Economics.

The estimated duration is 4 minutes.

This research study is being conducted to gain more insights into the publics perceptions on the concept of circular economy.

The survey is anonymous and no personal information is collected.

Thank you for your participation!

Block 1

Gender

- ○ Male
- ○ Female

Age

- ○ Less than 20 years
- ○ 20 - 35
- ○ 36 - 50
- ○ More than 50 years

Education

- ○ Less than high school
- ○ High school graduate
- ○ Graduate
- ○ Post-graduate
- ○ Doctorate

Annual Income

- ○ Less than €10,000
- ○ €10,000 - 30,000
- ○ €30,001 - €50,000
- ○ More than €50,000

Block 3

What country do you live in?

Please read the following text before answering the questions that follow:

The circular economy is a concept that promotes the idea of minimizing waste and making the most of resources. Instead of the traditional linear "take, make, dispose" model, the circular economy aims to create a sustainable system where resources are used efficiently, and waste is minimized through practices like recycling, remanufacturing, and designing products for longevity.

Companies like Patagonia and IKEA have been at the forefront of the circular economy movement with regards to consumer goods, through circular fashion products and furniture respectively.

Considering the previous description, have you previously heard of the circular economy?

- ○ Yes
- ○ No

Block 2

How well do you understand what circular economy is?

- ○ Slightly well
- ○ Moderately well
- ○ Very well

Block 5

Classification of environmental awareness

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
I am extremely worried about the world's environment	○	○	○	○	○
To achieve sustainable development, I think people should live in harmony with nature	○	○	○	○	○
Major social/political changes are necessary to protect the natural environment.	○	○	○	○	○
I think individuals have the responsibility to protect the environment	○	○	○	○	○

Block 6

Green brand awareness

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
I can recognize a brand among other competing brands because of its environmental commitments	○	○	○	○	○
I am aware of a brand because of its environmental reputation	○	○	○	○	○
I can quickly recall the green image of a known brand	○	○	○	○	○

Block 7

Attitude towards circular products

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
I like the idea of purchasing circular products.	○	○	○	○	○
Purchasing circular products is a good idea.	○	○	○	○	○
I have a good attitude towards purchasing circular products.	○	○	○	○	○

Block 8

Subjective norms towards circular products

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
People who are important to me, would want me to purchase circular products	○	○	○	○	○
People who influence my decisions think that I should purchase circular products	○	○	○	○	○

Block 9

Perceived behavioral control towards circular products

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
I have resources, time and opportunities to buy eco-friendly products generated from the circular economy	○	○	○	○	○
I am confident that if I want to, I can buy sustainable circular product at place of conventional non-green product	○	○	○	○	○
It is easy to differentiate circular products from other products	○	○	○	○	○
I feel that purchasing circular products is totally within my control	○	○	○	○	○

Block 10

Purchase intention for circular products

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
I definitely want to purchase circular products in the near future.	○	○	○	○	○

Appendix 2 – Variable adaptation

Variable	Items	Source
Attitude	I like the idea of purchasing circular products.	Taylor & Todd (1995)
	Purchasing circular products is a good idea.	Yadav & Pathak (2017)
	I have a good attitude towards purchasing circular products.	Paul et al (2016)
Subjective Norm	People who are important to me would want me to purchase circular products.	Taylor & Todd (1995)
		Yadav & Pathak (2017)
	People who influence my decisions think that I should purchase circular products	Paul et al. (2016)
Perceived Behavioral Control	I have resources, time and opportunities to buy eco-friendly products generated from the circular economy.	Liobikiene et al. (2016)
		Yadav & Pathak (2017)
	I am confident that if I want to, I can buy sustainable circular products at place of conventional non-green	Paul et al. (2016)

	product. It is easy to differentiate circular products from other products. I feel that purchasing circular products is totally within my control	
Environmental Awareness	I am extremely worried about the world's environment. To achieve sustainable development, I think people should live in harmony with nature. Major social/political changes are necessary to protect the natural environment. I think individuals have the responsibility to protect the	Paul et al. (2016) Xu et al. (2020)

	environment.	
Green Brand Awareness	I can recognize a brand among other competing brands because of its environmental commitments. I am aware of a brand because of its environmental reputation. I can quickly recall the green image of a known brand	Yoo et al. (2000) Chang & Chen (2014)
Purchase Intention	I definitely want to purchase circular products in the near future.	Kumar (2017) Taylor and Todd (1995)

Appendix 3 – Variable Descriptive Statistics

	Mean	Std. Deviation	N
EA	4.2966	.56148	102
GBA	3.1848	.85955	102
Attitude	4.1503	.62516	102
SN	3.3137	.85284	102
PBC	3.2402	.71140	102
Purchase Intention	3.93	.787	102

Appendix 4 – Demographic Variables Descriptive Statistics

Sample Demographics

	Demographics	Total Sample (rounded)
Gender	Male/Female	57%/43%
Age	Less than 20	8%
	20-35	28%
	36-50	27%
	More than 50	37%
Education	Less than high school	2%
	High school degree	18%
	Graduate	49%
	Post-Graduate	29%
	Doctorate	2%
Annual Income	Less than €10,000	25%
	€10,000 - 30,000	16%
	€30,001 - €50,000	22%
	More than €50,000	37%
Country of Residence	Portugal	86%
	UK	4%
	Spain	3%
	Other	7%

Appendix 5 – Hypothesis Testing

Independent Variables	**Dependent Variable**	***r***	***Exact Test***	***Cramer V***
Attitude	Purchase Intention	.538***	40.975***	.380***
Subjective Norm	Purchase Intention	.291**	26.539**	.291***
Perceived Behavioral Control	Purchase Intention	-.107	15.449	.218
Environmental Awareness	Purchase Intention	.556***	33.174***	.431***
Green Brand Awareness	Purchase Intention	.319**	25.838*	.308***

Note:

***** Correlation is significant at the 0.001 level**

**** Correlation is significant at the 0.01 level**

*** Correlation is significant at the 0.05 level**

8. Reference List

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-t

Ajzen, I., & Fishbein, M. (1977). Attitude-Behavior Relations: A theoretical analysis and review of empirical research. Psychological Bulletin, 84(5), 888-918. https://doi.org/10.1037/0033-2909.84.5.888

Alcalde-Calonge, A., Sáez-Martínez, F. J., & Ruiz-Palomino, P. (2022). Evolution of Research on circular Economy and related trends and topics. A thirteen-year review. Ecological Informatics, 70, 101716. https://www.sciencedirect.com/science/article/pii/S1574954122001662?via%3Dihub

Alkhawaldeh, A. (2017). The Effect of brand awareness on brand loyalty: Mediating role of brand commitment. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3097398

Antunes, J. C. C., Eugénio, T., & Branco, M. C. (2022). Circular economy for cities and sustainable development: the case of the Portuguese city of Leiria. Sustainability, 14(3), 1726. https://doi.org/10.3390/su14031726

Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: A Meta-analytic review. British Journal of Social Psychology, 40(4), 471-499. https://bpspsychub.onlinelibrary.wiley.com/doi/10.1348/014466601164939

Berenson, M. L., Levine, D. M., & Krehbiel, T. C. (2012). Basic Business Statistics : Concepts and applications. https://lib.ugent.be/en/catalog/rug01:001952470

Bishara, A. J., & Hittner, J. B. (2016). Confidence intervals for correlations when data are not normal. Behavior Research Methods, 49(1), 294-309. https://link.springer.com/article/10.3758/s13428-016-0702-8

Bland, J. M., & Altman, D. G. (1997). Statistics notes: Cronbach's alpha. The BMJ, 314(7080), 572. https://doi.org/10.1136/bmj.314.7080.572

Brandão, A., & Da Costa, A. G. (2021). Extending the theory of planned behaviour to understand the effects of barriers towards sustainable fashion consumption. European Business Review, 33(5), 742-774. https://doi.org/10.1108/ebr-11-2020-0306

Breusch, T S & Pagan, A R, 1979. "A Simple Test for Heteroscedasticity and Random Coefficient Variation," Econometrica, Econometric Society, 47(5), pages 1287-1294.

CGR 2022. (s. f.-b). https://www.circularity-gap.world/2022

Chan, R. Y. K., & Lau, L. B. Y. (2002). Explaining green purchasing behavior. Journal of International Consumer Marketing, 14(2-3), 9-40. https://doi.org/10.1300/j046v14n02_02

Chang, C. H., & Chen, Y. S. (2013). Managing Green Brand Equity: The perspective of Perceived Risk Theory. Quality & Quantity, 48(3), 1753-1768. https://doi.org/10.1007/s11135-013-9872-y

Chang, Horng-Jinh & Huang, Kuo-Chung & Wu, Chao-Hsien. (2006). Determination of sample size in using central limit theorem for Weibull distribution. International Journal of Information and Management Sciences. 17.

Chekima, B., Chekima, S., Wafa, S. A. W. S. K., Igau, O. A., & Sondoh, S. L. (2015). Sustainable consumption: the effects of knowledge, cultural values, environmental advertising, and demographics. International Journal of Sustainable Development and World Ecology, 23(2), 210-220. https://doi.org/10.1080/13504509.2015.1114043

Circular Economy: Definition, importance and benefits | News | European Parliament. (2023). https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits

Circular Innovation Lab. (s. f.). CIL. https://www.circularinnovationlab.com/

Circular material use rate in Europe. (2023). https://www.eea.europa.eu/en/analysis/indicators/circular-material-use-rate-in-europe

Closing the Loop Film. (2019). Closing The Loop (Full Film) - English with Multi-Language subtitles [Vídeo]. YouTube. https://www.youtube.com/watch?v=6g0AYbEoOGk

Cunningham, G. B., & Kwon, H. (2003). The theory of planned behavior and intentions to attend a sport event. Sport Management Review, 6(2), 127-145. https://doi.org/10.1016/s1441-3523(03)70056-4

Davies, A., Titterington, A. J., & Cochrane, C. (1995). Who buys organic food? British Food Journal, 97(10), 17-23. https://doi.org/10.1108/00070709510104303

De Leeuw, A., Valois, P., Ajzen, I., & Schmidt, P. (2015). Using the theory of planned Behavior to identify key beliefs underlying pro-environmental behavior in high-school students: Implications for Educational Interventions. Journal of Environmental Psychology, 42, 128-138. https://doi.org/10.1016/j.jenvp.2015.03.005

De Oliveira, F. R., Antunes, P., França, S. L. B., & Rangel, L. A. D. (2020). Strategies and challenges for the circular Economy: a case study in Portugal and a panorama for Brazil. Brazilian Archives of Biology and Technology, 63. https://doi.org/10.1590/1678-4324-2020180646

Doszhanov, A., & Ahmad, Z. A. (2015). Customers' intention to use green products: the impact of green brand dimensions and green perceived value. SHS web of conferences, 18, 01008. https://www.semanticscholar.org/paper/Customers%E2%80%99-Intention-to-Use-Green-Products%3A-the-of-Doszhanov-Ahmad/7a2332ac1f5e7c2b3394ed94f88f249159785d7b

Field, A. P. (2009). Discovering statistics using SPSS: (and Sex, Drugs and Rock "n" Roll). SAGE.

Fonseca, L., Domingues, P., Pereira, M., Martins, F., & Zimon, D. (2018). Assessment of circular economy within Portuguese organizations. Sustainability, 10(7), 2521. https://doi.org/10.3390/su10072521

Fu, L., Sun, Z., Zha, L., Feng, L., He, L., Sun, X., & Jing, X. (2020). Environmental awareness and pro-environmental behavior within China's road freight transportation industry: Moderating role of perceived policy effectiveness. Journal of Cleaner Production, 252, 119796. https://doi.org/10.1016/j.jclepro.2019.119796

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular Economy: the expected transition to a balanced interplay of environmental and economic systems. Journal of Cleaner Production, 114, 11-32. https://doi.org/10.1016/j.jclepro.2015.09.007

Grafström, J., & Aasma, S. (2021). Breaking circular economy barriers. Journal of Cleaner Production, 292, 126002. https://doi.org/10.1016/j.jclepro.2021.126002

Growth within: A Circular Economy vision for a Competitive Europe. (s. f.). https://ellenmacarthurfoundation.org/growth-within-a-circular-economy-vision-for-a-competitive-europe

Han, T., & Stoel, L. (2016). Explaining Socially Responsible Consumer Behavior: A Meta-Analytic Review of Theory of Planned Behavior. Journal of International Consumer Marketing, 29(2), 91-103. https://www.tandfonline.com/doi/full/10.1080/08961530.2016.1251870

Havlicek, L. L., & Peterson, N. L. (1976). Robustness of the Pearson correlation against violations of assumptions. Perceptual and Motor Skills, 43(3_suppl), 1319-1334. https://journals.sagepub.com/doi/10.2466/pms.1976.43.3f.1319

Hawkins, D. I., & Mothersbaugh, D. L. (2010). Consumer behavior: Building Marketing Strategy. McGraw-Hill College.

Henriques, J., Ferrão, P., & Iten, M. (2022). Policies and Strategic Incentives for circular Economy and Industrial symbiosis in Portugal: a Future perspective. Sustainability, 14(11), 6888. https://doi.org/10.3390/su14116888

Hofstede, G. J. (2015). Culture's Causes: The next challenge. Cross Cultural Management: An International Journal, 22(4), 545-569. https://doi.org/10.1108/ccm-03-2015-0040

Hope, B. (2022). What makes a circular economy circular, rather than green? Sustainability Magazine. https://sustainabilitymag.com/sustainability/what-makes-a-circular-economy-circular-rather-than-green-sustainability-supply-chain

Hopkinson, P., Zils, M., Hawkins, P. N., & Roper, S. (2018). Managing a complex global Circular Economy Business Model: Opportunities and challenges. California Management Review, 60(3), 71-94. https://journals.sagepub.com/doi/10.1177/0008125618764692

Hoyer, W. D., & Brown, S. P. (1990). Effects of brand awareness on choice for a common, Repeat-Purchase product. Journal of Consumer Research, 17(2), 141. https://doi.org/10.1086/208544

Hutter, K., Hautz, J., Dennhardt, S., & Füller, J. (2013). The impact of user interactions in social media on brand awareness and purchase intention: the case of MINI on Facebook. Journal of Product & Brand Management, 22(5/6), 342-351. https://doi.org/10.1108/jpbm-05-2013-0299

Iosifidi, M. (2016). Environmental awareness, consumption, and labor supply: Empirical evidence from household survey data. Ecological Economics, 129, 1-11. https://doi.org/10.1016/j.ecolecon.2016.05.007

Jarrett, H. (2013). Environmental quality in a growing economy: Essays from the Sixth RFF Forum. Routledge.

Kassaye, W. W. (2001). Green Dilemma. Marketing Intelligence & Planning, 19(6), 444-455. https://doi.org/10.1108/eum0000000006112

Khoa, B. T. (2023). The role of self-efficacy and firm size in the online advertising services Continuous adoption Intention: Theory of Planned Behavior Approach. Journal of Open Innovation: Technology, Market, and Complexity, 9(1), 100025. https://doi.org/10.1016/j.joitmc.2023.100025

Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. P. (2018). Barriers to the circular Economy: evidence from the European Union (EU). Ecological Economics, 150, 264-272. https://doi.org/10.1016/j.ecolecon.2018.04.028

Kirchherr, J., Reike, D., & Hekkert, M. P. (2017). Conceptualizing the Circular Economy: An analysis of 114 definitions. Resources, Conservation and Recycling, 127, 221-232. https://doi.org/10.1016/j.resconrec.2017.09.005

Kumar, B., Manrai, A. K., & Manrai, L. A. (2017). Purchasing behaviour for environmentally sustainable products: A conceptual framework and empirical study. *Journal of Retailing and Consumer Services*, *34*, 1–9. https://doi.org/10.1016/j.jretconser.2016.09.004

La Barbera, F., & Ajzen, I. (2020). Moderating role of perceived behavioral control in the theory of planned Behavior: a preregistered study. Journal of theoretical social psychology, 5(1), 35-45. https://onlinelibrary.wiley.com/doi/epdf/10.1002/jts5.83

Laureti, T., & Benedetti, I. (2018b). Exploring pro-environmental food purchasing behaviour: An Empirical analysis of Italian consumers. Journal of Cleaner Production, 172, 3367-3378. https://doi.org/10.1016/j.jclepro.2017.11.086

Liobikienė, G., Mandravickaitė, J., & Bernatonienė, J. (2016). Theory of Planned Behavior Approach to Understand the green Purchasing Behavior in the EU: a Cross-cultural study. Ecological Economics, 125, 38-46. https://doi.org/10.1016/j.ecolecon.2016.02.008

Liu, Q., Li, H., Zuo, X., Zhang, F., & Wang, L. (2009). A survey and analysis on public awareness and Performance for Promoting circular economy in China: a case study from Tianjin. Journal of Cleaner Production, 17(2), 265-270. https://doi.org/10.1016/j.jclepro.2008.06.003

Liu, Y., & Yin, B. (2014). An exploration of firms' awareness and behavior of developing circular Economy: an empirical research in China. Resources, Conservation and Recycling, 87, 145-152. https://doi.org/10.1016/j.resconrec.2014.04.002

Macdonald, E. K., & Sharp, B. (2000). Brand awareness effects on consumer decision making for a common, repeat purchase product: a replication. Journal of Business Research, 48(1), 5-15. https://doi.org/10.1016/s0148-2963(98)00070-8

Minton, E. A., Spielmann, N., Kahle, L. R., & Kim, C. (2018). The Subjective Norms of Sustainable Consumption: a cross-cultural exploration. Journal of Business Research, 82, 400-408. https://doi.org/10.1016/j.jbusres.2016.12.031

Mohammad, S. A., & Abdelrahim, M. Z. (2016). Impact of green brand trust, green brand awareness, green brand image, and green perceived value on consumer's intention to use green products: An empirical study of Jordanians consumers. Int. J. of Adv. Res. 4 (Feb). 1423-1433] (ISSN 2320-5407). https://www.journalijar.com/article/8078/impact-of-green-brand-trust-green-brand-awareness-green-brand-image-and-green-perceived-value-on-consumers-intension-to-use-green-products-an-empirical-study-of-jordanian-consumers/

Mourad, M., & Ahmed, Y. S. E. (2012). Perception of green brand in an emerging innovative market. European Journal of Innovation Management, 15(4), 514-537. https://doi.org/10.1108/14601061211272402

Notani, A. S. (1998). Moderators of Perceived Behavioral Control's Predictiveness in the Theory of Planned Behavior: A Meta-Analysis. Journal of Consumer Psychology, 7(3), 247-271. https://doi.org/10.1207/s15327663jcp0703_02

Ogiemwonyi, O. (2022). Factors influencing generation Y green behaviour on green products in Nigeria: An application of theory of planned behaviour. Environmental and Sustainability Indicators, 13, 100164. https://doi.org/10.1016/j.indic.2021.100164

Paul, J., Modi, A., & Patel, J. D. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. Journal of Retailing and Consumer Services, 29, 123-134. https://doi.org/10.1016/j.jretconser.2015.11.006

Poole, M. A., & O'Farrell, P. N. (1971). The assumptions of the linear regression model. Transactions of the Institute of British Geographers, 52, 145. https://doi.org/10.2307/621706

Rex, J. E., Lobo, A., & Leckie, C. (2015). Evaluating the Drivers of sustainable Behavioral Intentions: an application and extension of the theory of planned behavior. Journal of Nonprofit & Public Sector Marketing, 27(3), 263-284. https://doi.org/10.1080/10495142.2015.1053342

Rossi, E., Bertassini, A. C., Ferreira, C. R., Amaral, W. A. N. D., & Ometto, A. R. (2020). Circular Economy Indicators for organizations considering sustainability and business models: plastic, textile and electro-electronic cases. Journal of Cleaner Production, 247, 119137. https://doi.org/10.1016/j.jclepro.2019.119137

Sarja, M., Onkila, T., & Mäkelä, M. (2021). A Systematic literature review of the transition to the circular economy in business organizations: obstacles, catalysts and ambivalences. Journal of Cleaner Production, 286, 125492. https://doi.org/10.1016/j.jclepro.2020.125492

Schmidt, A. F., & Finan, C. (2018). Linear regression and the normality assumption. Journal of Clinical Epidemiology, 98, 146-151. https://doi.org/10.1016/j.jclinepi.2017.12.006

Swaim, J. A., Maloni, M. J., Napshin, S., & Henley, A. B. (2013). Influences on student intention and behavior toward environmental sustainability. Journal of Business Ethics, 124(3), 465-484. https://doi.org/10.1007/s10551-013-1883-z

Tariq, M. Z. (2014). Impact of Green Advertisement and Green Brand Awareness on Green Satisfaction with Mediating Effect of. . . ResearchGate. https://www.researchgate.net/publication/301780191

Taxa de utilização de material circular. (s. f.). Pordata. https://www.pordata.pt/europa/taxa+de+utilizacao+de+material+circular-3612

Taylor, S., & Todd, P. (1995). Understanding household garbage reduction Behavior: a test of an integrated model. Journal of Public Policy & Marketing, 14(2), 192-204. https://www.jstor.org/stable/30000128?saml_data=eyJzYW1sVG9rZW4iOiJmNjAzNGI5NC05ODFhLTQ1ZjAtODMyMC0yZGNkMmIxNmU1MTAiLCJpbnN0aXR1dGlvbklkcyI6WyI0MmEyMjRmNS01NWZlLTRlZTMtYTY4Yi1jYjM5ZjYxNDIwZjEiXX0&seq=11

Wang, Y., Wang, S., Wang, J., Wei, J., & Chen, Z. (2018b). An Empirical study of consumers' intention to use ride-sharing services: using an Extended Technology acceptance model. Transportation, 47(1), 397-415. https://doi.org/10.1007/s11116-018-9893-4

What is circular economy and why does it matter? (2023). UNDP Climate Promise. https://climatepromise.undp.org/news-and-stories/what-is-circular-economy-and-how-it-helps-fight-climate-change

White, H., & MacDonald, G. (1980). Some Large-Sample tests for nonnormality in the linear regression model. Journal of the American Statistical Association, 75(369), 16-28. https://doi.org/10.1080/01621459.1980.10477415

Xu, L., Prybutok, V. R., & Blankson, C. (2019). An environmental Awareness Purchasing intention model. Industrial Management and Data Systems, 119(2), 367-381. https://www.emerald.com/insight/content/doi/10.1108/IMDS-12-2017-0591/full/html

Xu, X., Wang, S., & Yu, Y. (2020). Consumer's intention to purchase green furniture: Do health consciousness and environmental awareness matter? Science of The Total Environment, 704, 135275. https://doi.org/10.1016/j.scitotenv.2019.135275

Yadav, R., & Pathak, G. S. (2017). Determinants of consumers' green purchase behavior in a developing nation: Applying and extending the theory of planned behavior. Ecological Economics, 134, 114-122. https://doi.org/10.1016/j.ecolecon.2016.12.019

Yoo, B., Donthu, N., & Lee, S. H. (2000). An examination of selected marketing mix elements and brand equity. Journal of the Academy of Marketing Science, 28(2), 195-211. https://doi.org/10.1177/0092070300282002

Zameer, H., & Yasmeen, H. (2022). Green innovation and environmental awareness driven green purchase intentions. Marketing Intelligence & Planning, 40(5), 624-638. https://doi.org/10.1108/mip-12-2021-0457