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Department of Marketing, Strategy and Operations

EXPLAINING CONSUMERS' PURCHASE INTENTION  
OF PRODUCTS MADE WITH RECYCLED PLASTIC IN A  
CIRCULAR ECONOMY CONTEXT.

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Marco Escadas, Invited Professor, University of Minho  
School of Economics and Management

2021



BUSINESS  
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## **Abstract**

The production of virgin plastic is set to increase by 40% in the next 10 years. At the same time, estimates show that plastic trash flowing into the seas will nearly triple by 2040 if nothing is done. Issues like plastic pollution and resource scarcity are on the top of the agenda of many eco-conscious consumers. In response to these new consumers' concerns, a handful of companies have started experimenting with recycled plastic and use this material in textiles, furniture, packaging, and other applications. Nonetheless, little is known about how consumers perceive products made with recycled plastic and which are the drivers that could encourage the purchase of such products. By applying the Theory of Planned Behavior, this research aims to study consumers' perception of products made with recycled plastic and to identify the biggest influencer for the purchase of such products. Through an online questionnaire, a sample of 346 respondents was collected and then analyzed using Structural Equation Modelling. The findings indicated Attitude, Perceived Behavioral Control and Subjective Norm, as well as the newly added variable Environmental Knowledge, as determinants of buying behavioral intention. The study adds to the literature around recycled products and consumers' behavior and confirms the validity of the theory of planned behavior in explaining consumers' intentions. Regarding the practical implications, the study suggests designing recycled plastic products in a recognizable, impactful way to communicate their green and environmental benefits and target "environmentally-conscious" consumers that were found to be the most willing to purchase recycled products.

Keywords: green marketing, consumers' behavior, theory of planned behavior, recycled products, circular economy

### **JEL Classification System:**

**M31 - Marketing**

**Q53 - Air Pollution • Water Pollution • Noise • Hazardous Waste • Solid Waste •**

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## Resumo

Está previsto que a produção de plástico virgem aumentará em 40% nos próximos 10 anos. Ao mesmo tempo, estudos mostram que o lixo plástico que flui para os mares quase triplicará até 2040 se nada for feito. Questões como poluição por plástico e escassez de recursos estão no topo da agenda de muitos consumidores verdes. Em resposta às preocupações desses novos consumidores, algumas empresas começaram a experimentar com plástico reciclado e usar esse material em várias aplicações. No entanto, pouco se sabe sobre como os consumidores percebem os produtos feitos com plástico reciclado e quais são os motivadores que podem estimular a compra desses produtos. Para estudar a percepção dos consumidores sobre produtos feitos com plástico reciclado e identificar o maior influenciador na compra desses produtos, esta tese aplicou a Teoria do Comportamento Planejado de Ajzen. Por meio de um questionário online, uma amostra de 346 respondentes foi coletada e analisada. Os resultados indicam as variáveis Atitude, Controle Comportamental Percebido e Norma Subjetiva, bem como a variável recentemente adicionada, Conhecimento Ambiental, como determinantes da intenção comportamental de compra. O estudo complementa a literatura sobre produtos reciclados e o comportamento dos consumidores e confirma a validade da teoria do comportamento planejado para explicar as intenções dos consumidores. Em relação às implicações práticas, o estudo sugere projetar produtos de plástico reciclado de uma forma reconhecível e impactante para comunicar seus benefícios verdes e ambientais e para atingir os consumidores "ambientalmente conscientes" que foram considerados os mais dispostos a comprar produtos reciclados.

Palavras-chave: marketing verde, comportamento do consumidor, teoria do comportamento planejado, produtos reciclados, economia circular

### **Sistema de Classificação JEL:**

**M31 - Marketing**

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## 1. Introduction

Plastic has been the material which more than any other helped shape our modern lifestyle (Thompson et al., 2009). Starting from 1907 when Bakelite, the first synthetic chemical plastic was created, this material took over our lives and it is now slowly taking over our planet (Parker, 2018). Plastic can be found in pretty much everything around us. It is incredibly resistant, resilient, and it can be molded into any shape ("Plastics | Uses, Benefits, and Chemical Safety Facts", 2021). However, among the thousands of advantages of this miraculous material lies one that has been causing our planet many troubles: it is basically indestructible. Because it is man-made, nature has yet to find a way to get rid of it, as it simply does not degrade. For this reason, all the plastic ever created by man, apart from a small part that has been incinerated, still exists today (Geyer, Jambeck, & Law, 2017). And it is polluting our oceans, waterways, and soil (Eriksen et al., 2014).

Every year, 8 million metric tons of plastics enter our marine environments, adding to the 150 million metric tons that are estimated to be present in our oceans (Jambeck et al., 2015). Whether by random plastic bags, plastic items finding their way into gutters or because of the mismanagement of plastic waste in rapidly growing economies, this material usually gathers at the end of our waterways: in the ocean. This incredible amount of plastic is bound to have an impact on ecosystems: for example, plastic bags and straws that float in our oceans can be mistaken for food by marine species that could eat them and suffer health consequences. Recently, special attention by researchers has been given to micro-plastics, tiny plastic particles usually formed by larger plastics breaking down or as a surplus of commercial products, that can be ingested by fish involuntarily and eventually end up in our stomachs once we ingest those same fish (GESAMP, 2015).

Despite these alarming facts, in 2017 global virgin plastic production was projected to rise by 40% in the next ten years and that is not reassuring (Taylor, 2017). If we continue with our "business-as-usual" scenario, it is estimated that by 2050 there will be more plastic than fish in the ocean by weight (Ellen Macarthur Foundation, 2013). Governments around the world have already started to address the plastic pollution problem by instituting bans on certain kinds of single-use plastic, with the European Union going as far as adopting a "European Strategy for Plastics in a Circular Economy" in 2018 that was intended to transform the way plastic products are designed, used, produced and recycled in the EU (A European Strategy for Plastics in a Circular Economy, 2018). Indeed, the Circular Economy (Pearce & Turner, 1990), a restorative economic system that is based on the continual use of resources, is often cited as a system that

can increase recycling rate for hard-to-recycle materials like plastic and reduce the amount of waste produced globally (Nußholz, 2017). Consequently, Circular Economy policies have already entered the agendas of 26 different nations and many governments are seeing the recovery from the COVID-19 pandemic as a chance to increase materials' sustainability (Savut, 2020).

In the business world, the advent of topics like sustainability and movements like *green consumerism* and *environmentalism*, together with the rise of more profound problems such as climate change and the issue of ocean plastic pollution, have been leading companies to a shift in their behaviors (Albino et al., 2009). Many of these companies started embracing sustainable practices by adopting Circular Economy initiatives such as the remanufacturing and reuse of certain products and components, the increased use of recycled materials for product manufacturing and the extension of product lifespans, all with the aim of minimizing the environmental and social costs of their product lines (Circular Business Models - Sustainability Guide, 2020). Simultaneously, because of the growing concerns around the sustainability of certain business practices, many consumers have decided to take action and embrace a new era of consumption. Ethical and environmental issues are thus at the base of the so-called "sustainable purchase behavior" and "green consumption" (Moisander, 2007). The main characteristics that define these consumption behaviors, and the "green" consumers carrying them out, are the preferences towards products that are less harmful to our planet and often ethically manufactured (e.g. without employing child or forced labor).

Nowadays, businesses that fail to address the growing concerns of such consumers on environmental issues, with plastic pollution being number one on the agenda of many eco-conscious consumers, can face online firestorms and customers' backlash (Laville, 2018). As a matter of fact, recent years have seen a surge in the number of consumers motivated to be more environmentally conscious (Nielsen, 2018). A recent survey found out that eight out of ten consumers think their own behavior and choices can help address global environmental and social challenges and, in addition, suggested that consumers are becoming more influenced by environmental concerns in their purchase decisions (Longitude, 2020). Moreover, four out of ten of the surveyed consumers claimed they actively stopped buying a company's products after discovering that the company was not environmentally responsible. Consumers are therefore realizing the weight and impacts of their purchase choices. Indeed, how much and what we buy, together with how much we throw away, can have a big impact on our planet's health. Consequently, companies that do not respond to sustainability demands could face a real threat to profitability in today's world.

In this context, following the principles of Circular Economy, that aims to re-use materials as much as possible and reduce the amount of waste created, the billions of tons of plastic already manufactured have an enormous potential: while a small percentage of that plastic has been incinerated or covered in landfills, a major part of it lies in our environment and can be collected, treated, recycled, and, finally, re-used to manufacture new products, contributing beneficially to the health of our planet, creating job opportunities and satisfying this new demand for sustainable products. For these reasons, companies have started to seize the opportunity to use resources discarded by consumers to create new products, accelerating the transition towards a more circular, sustainable world by reducing the use of natural resources.

The growing momentum of this trend can be highlighted by the development of the recycled plastic market. As of 2016, the global recycled plastics market was valued at USD 34,804.1 million. It is projected to reach USD 50,356.1 million by 2022, with a growth rate of 6.4% during the forecast period (Markets And Markets, 2018). The pollution caused by plastic disposal and the environmental benefits of recycling, such as energy savings<sup>1</sup>, are the factors driving the growth of this market, that sees packaging as its fastest-growing segment (Markets And Markets, 2018). Making plastic from other plastic has many other advantages as well: recycled plastic has a much lower carbon footprint compared to virgin plastic and compared to other heavier materials like glass and aluminum (Brock & Williams, 2020); and using plastic to produce plastic means saving natural resources like gas and oil that are necessary for the creation of virgin plastic. Finally, recycling plastic means diverting plastic waste from ending up in landfills or, worst, in the ocean.

In light of these facts, today there is a huge possibility for companies to include more recycled plastic content in their products. Unfortunately, despite the many advantages of using recycled plastic, there are still many limitations to its use, especially in consumer products. First, companies can be reluctant to use recycled plastic because its virgin counterpart is often less expensive and of higher quality. Second, goods made with recycled materials can sometimes not be in line with regulations or safety standards (Komolprasert & Bailey, 2008). Indeed, companies cannot afford to jeopardize their reputations or potentially harm their customers, for instance, through contamination from toxic chemicals derived from the recycled products. As a result, they usually rely on the guarantee of virgin plastic.

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<sup>1</sup> The EPA estimated that there is an energy saving of approximately 88% by producing plastic from plastic as opposed to manufacturing plastic from the raw materials of oil and gas.

On a broad level, considering that i) the problem of plastic pollution and its impact has been set as a priority by researchers globally (Vegter et al., 2014); ii) plastic is and will continue to be the most used material in consumer products and in packaging (Markets and Markets, 2018); and iii) the need for a shift to a Circular Economy is implicit, it can be argued that finding ways to promote recycled plastic products is of primary importance, since these have the potential to help transition from a Linear to a Circular Economy. In a business context, however, in addition to manufacturing products in an eco-friendlier way, firms should also put care into considering consumers' needs and evaluating how to successfully market those products.

Nonetheless, as far as products made with recycled materials are concerned, it is not clear how consumers perceive them and whether or not they will be accepted and purchased. Previous studies on the topic have demonstrated that the presence of recycled material can have a positive influence on consumers regardless of the kind of product (Mobley et al., 1995) and that consumers might even be willing to pay a premium price for it. On the other hand, barriers to consumers' acceptance of recycled goods have also been pointed out: for example, the fact that a product is recycled might change consumers' perception and decrease their expectations about the quality of the item (Lin & Chang, 2012).

Despite these differences of opinion, experts have unanimously underlined the importance of the role of consumers in the transition towards a more Circular Economy. In particular, efforts to support environmental improvements cannot be realized without a market for recycled materials: even if consumers participate in the recycling activities no real environmental benefit is achieved unless they are willing to purchase recycled products (Guagnano, 2001). As such, the study of consumers' behavior in this context is of paramount importance. Despite this, to the best of the author's knowledge, little to no research has specifically been conducted on consumers' acceptance of products made with recycled plastic. Because it is still unclear how consumers perceive and feel about products made of recycled plastic, managers face today a big challenge and need to find the answers to a variety of questions if they want to include recycled plastic in their products, including: will consumers accept recycled plastic products? And what drives the purchase intention of these products? Thus, the main aim of this research is to understand consumers' evaluation and their purchase intention of products made with recycled plastic.

Answering these questions will benefit the theory in various ways: first, it will expand the scarce literature around recycled products with a study focused on recycled plastic, one of the most used material in the manufacturing of consumers' goods. Second, it will contribute to the existing literature around green consumers' behavior by providing clarity behind consumers'

intentions when it comes to recycled goods. Third, the study will test the applicability of the Theory of Planned Behavior - the selected model for the research -in a new context (i.e., the realm of recycled products). The study would also be beneficial in practical terms to marketers and businesses that will hopefully find some answers to their questions regarding the acceptance of products made with recycled plastic.

The remainder of this thesis is structured as follows: the second section will present a literature review of the relevant topics. While the study will be open to all kinds of consumers, in order to clarify the drivers behind consumers' choice of environmentally friendly products like recycled items, the literature review will include an analysis of green consumers' behavior. The third part of the thesis will outline the model chosen together with the development of the research hypotheses, while the methodology will be presented in the fourth part. After the analysis of the obtained results, the final chapters will be organized as follows: first, the results will be discussed, then a section with the implications for both the theory and the practice will be presented and, finally, a section about the limitations and suggestions for future research will conclude the thesis.

## 1. Literature Review

Given the dissertation topic – explaining consumers’ purchase intention of products made with recycled plastic in a Circular Economy context - the literature review presented covers the topics of Circular Economy, consumers' behaviors, and recycled products. To begin, the concept of Circular Economy and its main principles is presented. Second, a brief explanation of the role that recycling plays in a Circular Economy is discussed. The third segment is a link between the first two topics and the following ones: it analyzes the role of consumers in the Circular Economy and their behavior regarding green products, among which we can include products made with recycled plastic. Finally, we review the Theory of Planned Behavior - the proposed theoretical framework for the study – and explain the reasons behind the choice of this theory, why it is relevant and how it can help to explain consumer’s purchase behavior.

### 1.1. Circular Economy

The concept of Circular Economy (CE) has gained importance in the literature starting from the 1980s and, in the last decade, it has gained traction with real-world applications in the business world and in policymaking (Lieder & Rashid, 2016). Pearce and Turner (1990) were the first to use the term in a formal matter in their book *Economics of Natural Resources and the Environment* where they pointed out that our traditional economic system had no tendency to recycle and was therefore treating the environment as a waste reservoir. The literature on the topic is vast and includes many different definitions, making it hard to obtain a straightforward analysis of key concepts. A recent publication underlined how more than 100 definitions of Circular Economy can be identified in academic literature alone (Kirchherr, Reike, & Hekkert, 2017). In simple terms, the Circular Economy aims to go beyond the linear take-make-dispose pattern of production and consumption that our current industrial system is built on. Following this linear model, firms in various sectors use natural resources to generate goods and sell them to customers, who then discard them as waste (Ellen MacArthur Foundation, 2013). This traditional linear model is built on the assumption that humanity will always have access to an unlimited supply of free, natural resources. In addition, it considers our environment as capable of absorbing unlimited quantities of waste and pollutants (Murray et al., 2015). Alternatively, The Circular Economy provides a different model of consumption and production, where resources are continuously used and kept in a circle of usage that allows the generation of greater value (Su et al. 2013).

Different authors have attempted to design frameworks and principles for an effective understanding of the concepts of CE (Kirchherr et al., 2017). The 3R approach of Reduce Reuse Recycle, later evolved as the 5R approach with the inclusion of Refuse and Repurpose ("What are the 5 R's of Waste Management? | Waste Reduction Process", 2020), is often indicated as the core CE paradigm (Yang et al., 2014; Kirchherr et al., 2017). Indeed, the 3R approach is considered as a mechanism capable to bring the concept of Circular Consumption (CC) to life, that is to say a consumption that favors sharing, as well as reusing, repairing and recycling for as long as possible. (Yang et al., 2014). Prior studies also highlight the "3R" principle as the main driving force for a circular economy and a principle that *"focus[es] on recapturing value from waste materials by circulating them across supply chains"* (Calvo-Porrall & Lévy-Mangin, 2020). In both the academic and business world, one of the most exhaustive and frequently cited definition of CE is that proposed by the Ellen MacArthur Foundation (2013). The foundation, which works with business, academia, policymakers, and institutions, to accelerate the transition to a circular economy defines the Circular Economy as *"an industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models."* (p.7).

The Ellen MacArthur Foundation thus proposed a comprehensive approach to CE defining its main aims as: i) design products in a way that cuts waste and pollution; ii) keep products and materials in a circle of use; iii) regenerate natural ecosystems. Following the line of this innovate approach, Rizos, Tuokko, and Behrens (2017) developed a practical framework consisting of eight main processes of the CE: i) recycling; ii) efficient use of resources; iii) utilization of renewable energy sources; iv) remanufacturing, refurbishment, and reuse of products and components; v) product life extension; vi) product as a service<sup>2</sup>; vii) sharing models; and viii) a shift in consumption patterns. These eight processes can then be further categorized into three different categories, which represent the foundations for a strong CE strategy namely i) using fewer primary resources; ii) maintaining the highest value of materials and products; and iii) changing utilization patterns (Rizos et. al, 2017).

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<sup>2</sup> Rather than selling physical products, manufacturers have found a way to "rent them out" to customers that do not need to buy them anymore. Philips, for example, is shifting from selling light bulbs to offering lighting-as-a-service to its customers, allowing them to save money by paying only for the light they use, and not for the bulbs themselves ("How Philips became a pioneer of circularity-as-a-service | Greenbiz", 2018).



### 2.1.1 Circular Economy and Recycling

Among the various practical approaches to CE, material recycling has frequently been considered an effective tool in the transition towards a CE and among the most urgent measures to take to accelerate this transition (Di Maio & Rem, 2015). The reason why recycling has been considered so essential is that *“in order to move towards a more sustainable development, it is necessary not only to minimize the use of materials in the design stage and to find new materials as alternatives to nonrenewable ones but also to reclaim as much as possible material value through effective recycling.”* (Di Maio & Rem, 2015, p.1). Recycling has already been implemented within the traditional linear economy system thanks to the various policies that have promoted it throughout the years (Korhonen, Nuur, Feldmann & Eshetu-Birkie, 2018). The European Commission proposes that *“materials from products at the end of their lifecycle should be recovered through dismantling and recycling”*, because *“re-injecting these materials into the beginning of the product lifecycle reduces environmental impact and costs of production.”* It also affirms that *“recycling is a precondition for a Circular Economy”* (European Commission, 2015, p.1). The benefits of recycling have been largely discussed and documented by various authors and studies (Michaud, Farrant, & Jan, 2010): it is by far the waste management option that offers more environmental benefits and lower environmental impact – compared to composting, incineration, and landfilling (Michaud et. al, 2010).

Plastic recycling, in particular, has been the center of much discussion in the last decade. Currently, only 2% of the planet’s annual plastic production is reused (i.e., recycled or remanufactured) for the creation of plastic products. Ninety eight percent of plastic packaging is being lost outside of the Circular Economy, with the majority of it being piled up in landfills and a staggering 32% of plastic packaging ending up polluting our land and oceans as litter (Ellen MacArthur Foundation, 2016, p.7). The reasons behind the failures of plastic recycling are various. First, unlike aluminum and glass, there is a huge range of different types of plastic used in disposable products and packaging (EPA). Some products are not only made using various types of plastic but also often mixing different kinds of materials and these are especially difficult and expensive to separate. Tetra Pak, for example, the ubiquitous packaging carton that usually contains liquids like milk and juice, is actually made of 75% paperboard, 20% polyethylene (plastic) and 5% aluminum. Unfortunately, despite being 100% recyclable (according to Tetra Pak website), because it is made of this mix of paper, plastic and aluminum, few recyclers have the ability to treat this packaging (Taylor, 2019). Secondly, creating plastic from raw, virgin materials is still cheaper than creating plastic from recycled materials (Walkers, 2017). Finally, without the participation of consumers and their willingness to

recycle and buy recycled goods, there will not be enough material to drive an effective Circular Economy for plastics. As pointed out by Di Maio and Rem (2017): “*in order to move towards a more sustainable development and at the same time create opportunities for economic growth, a fundamental transformation in producer and consumer behavior is needed.*” (p. 2).

## **1.2. Green Consumers’ Behavior towards recycled products**

Consumers thus play a vital role in Circular Economy (Gallaud & Laperche 2016), and as such, understanding their acceptance of circular and recycled products is of paramount importance. To a certain extent, the development of the Circular Economy is dependent upon a better understanding of consumers’ attitudes and behaviors. The growing demand and supply of environmentally friendly products suggests that the environment has become an important driver of consumers' and producers' decisions. Throughout the years, consumers have become increasingly concerned about the environmental impacts of their purchases and studies have shown that they might even be willing to pay an environmental premium for certain products (Sammer and Wüstenhagen, 2006). Notwithstanding, despite the recognition that consumers’ concerns about the environmental and social impacts of their own activities are strong, their actions do not always reflect their worries (Bhamra et al., 2011).

Over the years, concepts like green consumption, ethical consumption, and sustainable consumption have appeared and gained momentum (Carrington et al., 2012). Behind all these concepts lies the idea that the actions people take and the choices they make – to consume certain products and services rather than others or to live in certain ways rather than in others – all have direct and indirect environmental and social impacts (Jackson, 2014). The need to provide clarity over the usage of these concepts is therefore implicit, as they can appear interchangeable.

The ideas of ethical and sustainable consumption are often presented side-by-side (Hobson, 2006; Carrington et al., 2012): in fact, it is hard to imagine a sustainable world that lacks some sort of moral, ethical foundation. More specifically, ethical consumption focuses on the effect that a purchase might have on people and communities, with choices like buying local or fair-trade verified products typical of ethical consumerism. It therefore emphasizes the social and moral side of a purchase (Carrington et al., 2012). On the other hand, sustainable consumption has a more holistic definition, taking into account all of the various aspects of our development as a society and of our future needs. It is, in fact, defined as “*the use of services and related*

*products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or products as not to jeopardize the needs of future generations”* (Norwegian Ministry of the Environment, 1994).

Finally, green consumption is part of a bigger set of activities and behaviors that are included in the discussion around sustainability (Gilg et al., 2005). Lately, the list of activities and products that can be included in green consumption has expanded so much that the single environmental aspect has blended with various alternatives that relate more to sustainability in general (Gilg et al., 2005). Nevertheless, green consumption and green consumers’ behavior differ from ethical and sustainable consumption because of their major focus on the environmental and ecological impact of the product purchase more than any other aspect (Moisander, 2007).

For the purpose of this study, a focus on green consumption and green purchase behavior will be preferred, as these concepts are the ones that better relate to the acceptance and adoption of products made with recycled plastic. In fact, recycled plastic products not only have a lower environmental impact than conventional products (i.e., those made with virgin material), but also help divert the plastic used in their production from ending up in the environment. Therefore, it is worthwhile to analyze the concept of consumers’ behavior and the main factors influencing consumers’ intention in the purchase of green and recycled goods. In particular, the purchase of environmentally friendly products like those made from recycled materials can be explained by the so-called green consumer behavior.

The literature about green consumers’ behavior is vast and often controversial. Antonides (2017) has pointed out that consumer behavior is too complex to be described by one overarching theory, hence why there are myriad theories and insights that exist in the field. He adds that green or sustainable consumer behavior “*may be approached from different perspectives, including—among others—the policy maker’s view, the marketing view, the consumer interest focus, and the ethical focus.*” (p. 1). Moisander (2007) tried to clarify the concept and its many meanings, defining green consumer behavior as “*the process of purchasing and non-purchasing decisions made by consumers, based on environmental and sustainable criteria*” (Moisander, p. 27). As underlined in the definition, it is important to include, in the realm of green behavior, the “non-consumption”. In fact, consumers can also manifest green behavior by actively avoiding the purchase and use of certain products or services that are harmful for the planet. Non-consumption is, therefore, too a manifestation of green behavior. Nonetheless, when they do purchase, green consumers prefer products that

minimize the use of natural resources and have lower emissions of waste over their life, to not put the needs of future generations at risk (Ofstad, 1994).

These so-called green products share some main characteristics that define them. A product can be considered as *green* if i) it has a lower environmental impact than its alternative, conventional products; ii) it has a null impact on the environment; or iii) it positively contributes to the environment (Dangelico & Ponfradolfo, 2013). Another guideline to identify “green” and “environmentally friendly” products was proposed by Dagnoli (1991) claiming these products should have at least one of the following characteristics: 1) reducing water and air pollution, 2) reducing waste, 3) avoiding cruelty to animals, and 4) being made of recycled material. In summary, products made with recycled materials can be considered *green* for the following reasons: first, recycling avoids the use and depletion of precious natural resources; second, it saves enormous amounts of energy that are usually used in the extraction of fossil fuels for the creation of virgin plastic. Consequently, it indirectly reduces the infamous greenhouse gas emissions that are contributing to climate change. Finally, recycling diverts plastic from ending up in landfills or, worst, in the ocean, because it keeps this resource in the economy using it over and over again. Therefore, recycled products or products made with recycled materials like plastic are defined as *green* for all intents and purposes (Dangelico & Ponfradolfo, 2013).

While it appears clear that both companies and consumers are ready for a “green” transition, many doubts still remain. Indeed, despite the fact that individuals claiming to be willing to purchase green and especially recycled products have grown in numbers, the purchase of green products does not appear to have increased concomitantly. In the UK, for example, more than one third of consumers describes themselves as “ethical purchasers”, but the share of green products only represents a weak 1-3% of the entire market (Bray, Johns, & Killburn, 2011). This gap between consumers’ favorable attitudes towards green alternatives and actual purchase behavior of green products has been described in the literature as ‘green purchasing inconsistency’ or ‘green attitude-behavior gap’. The potential reasons behind this behavioral inconsistency can be various. At a broad level, it can be argued that embedding ethical and environmental issues into everyday life is a difficult and challenging task (Carrington, Neville & Whitwell, 2014). Consumers usually lead busy lives and might not have the time to get informed about sustainable alternatives. Additionally, in today’s world there is an enormous range of ethical and environmental issues to consider, and consumers tend to prioritize one or two of them to avoid being paralyzed by all of their concerns during the purchase decisions (Carrington, Neville & Whitwell, 2014).

Specific studies have tried to investigate the factors behind green consumer consumption and intention with the aim of tackling this so-called “attitude-behavior gap”. Joshi and Rahman (2015) gained a precious overview of the topic by reviewing 53 high-quality publications about green consumption. The authors discovered that, among others, ecological knowledge and environmental concern were the variables most identified as affecting green purchase behavior, while price and lack of trust in green products were identified as the most frequent factors that negatively affected green purchase behavior (Joshi & Rahman 2015).

While the literature is abundant with analyses of consumers’ relationship with green products in general (Lin & Chang, 2012; Paul, Modi, & Patel, 2016; Chen & Hung, 2016; Yadav & Pathak, 2016), only a few studies focus specifically on the consumer’s interaction with recycled products. Research on the factors potentially influencing the consumption of recycled products shows that environmental benefits have the biggest positive effect on consumers’ perception of these products. Furthermore, previous studies have shown that recycling and consumption of recycled products are seen by consumers as effective ways to treat the environment fairly (Guagnano, 2001) and that consumers can be positively influenced by the presence of recycled content regardless of the type of product (Mobley et al., 1995).

However, during the evaluation phase of a product, consumers are also heavily influenced by various types of perceived risk. For instance, in the evaluation phase of a product made with recycled plastic, consumers might perceive a functional risk (e.g., the product will not function correctly) or even a physical risk (e.g., the product might be contaminated and cause health problems) (Magnier, Mugge & Schoormans, 2019). Essoussi and Linton (2010) discovered that the perceived functional risk of products made with recycled material has a significant impact on consumer purchase decisions. The quality of recycled products has also been found to be a barrier, since consumers might not be willing to buy products made with recycled material, which they perceive or believe to be of poorer quality.

In order to explore the complex world of consumers’ psychology, the author decided to rely on a theory that has been extensively used to explain the complicated reality of consumers’ intentions and decision-making processes, the Theory of Planned Behavior.

### **1.3. Explaining consumers’ behavior: the Theory of Planned Behavior**

The Theory of Planned Behavior (TPB) (Ajzen, 1991) has been extensively used to investigate consumers’ decision-making in various contexts. Instead of relying on the evaluation or utility of a product or a service, this theory focuses on the antecedents of a specific

consumer behavior. It is of particular interest, since it has been frequently used to study the relationship between people's beliefs, attitudes, and behavioral intentions, including green consumption behavior, ecological behavior, and the marketing of environmentally friendly products (Chen & Hung, 2016). In particular, the theory of planned behavior has been proved to offer a robust and reliable framework to study green purchasing behavior and its related antecedents (Chan & Lau, 2002). Of paramount importance in the theory is the individual's intention to perform a given behavior. Intentions are defined as the motivational factors that influence behavior; they are indications of how much effort individuals are willing to put in to perform the behavior (Ajzen, 1991). Consequently, intentions are directly linked with behavior, because people usually tend to engage in behaviors they *intend* to perform. Assuming intention can explain the behavior, Ajzen (1991) identifies three determinants that, in turn, can explain behavioral intention (BI):

**1. The attitude towards the behavior.** Attitudes are the overall evaluations of the behavior by the individual or, quoting Ajzen, (1991, p.188): “*the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question*”.

In other words, they refer to the perceived positive or negative consequences of performing the behavior. A person may purchase recycled goods because she or he holds a specific positive attitude about this behavior: for example, she or he may feel that purchasing a product containing recycled plastic is the right thing to do because it supports environmentally conscious businesses, for instance.

**2. The subjective norm** (the opinions of others about the behavior). This includes the perceived expectations and behaviors of important referent groups. Referent groups are groups of people who are significant to an individual, and can influence one's behavior (Ajzen, 1991). Previous studies that investigated green purchases identified family, friends and colleagues as three important referent groups to consumers (Chan & Lau, 2002). In short, the subjective norm refers to what an individual thinks that others who matter to her want her to do (Ajzen, 1991).

**3. The perceived behavioral control.** This concerns the perceived presence of factors that can influence a person's ability to perform the behavior (Ajzen, 1991). Individuals who believe they lack the necessary resources or opportunities to perform the behavior are less likely to form strong intentions towards that same behavior. In other words, perceived behavioral control is the individual's perception about whether or not the behavior in question is easy or difficult

to perform. Perceived behavioral control is of paramount importance because, in some cases, a positive attitude and favorable subjective norms towards the behavior are not enough to trigger a behavioral intention (Ajzen, 1991). For example, a consumer may believe that buying a recycled good is the right thing to do and that her referent groups pressure her to do so. However, if the recycled product has a premium price and the consumer lacks the financial resources to purchase it (i.e. the consumer has low perceived behavioral control), then she might decide to avoid the purchase even though her attitude and subjective norm were favorable.

To summarize, according to the TPB, consumer behavior can be explained by behavioral intention, that is in turn a function of three factors, namely, attitude (ATT) toward the behavior in question, normative pressures defined as subjective norm (SN) and the perceived behavioral control (PBC) over the behavior. In the same way behavioral intention is determined by the three above-mentioned variables, these three variables are themselves influenced by other factors, which can be considered indirect determinants of behavioral intention. Indeed, because the theory was created to *explain* human behavior and not just predict it, it also deals with the antecedents of these variables. Specifically, the theory postulates that behavior is a function of salient beliefs, so-called because they are considered as the prevailing determinants of a person's intentions and actions. In particular:

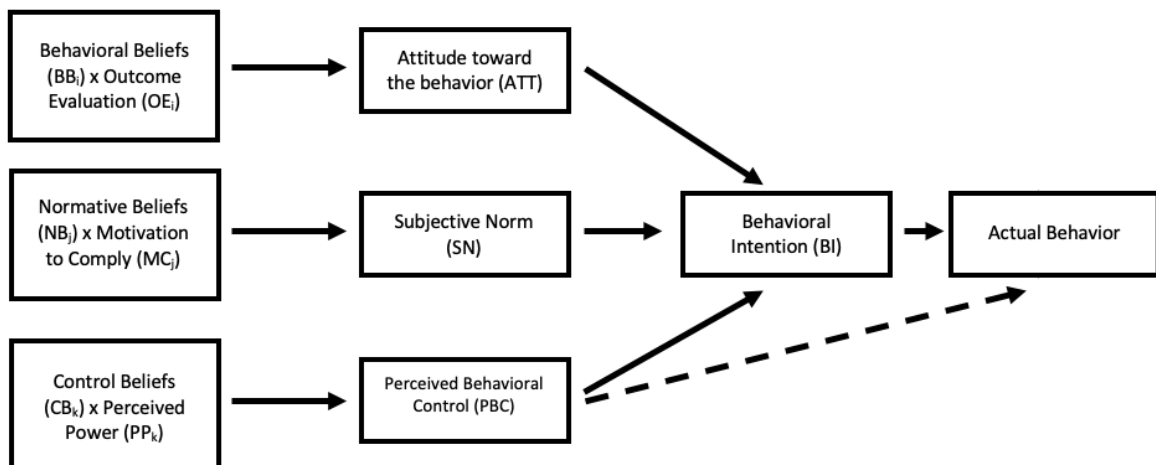
1. Attitudes (ATT) are determined by an individual's salient behavioral beliefs (BB) and by the outcome evaluation (OE). A behavioral belief is the subjective probability that the behavior will produce a given outcome or experience (Ajzen, 1991). Although a person may hold many beliefs with respect to any behavior, only those that easily come to the person's mind when he/she is thinking about the behavior in question influence the outcome evaluation (Ajzen, 1991). For example, a consumer who believes that the purchase of a product made with recycled plastic will have a positive environmental consequence (and cares about the environment), is likely to have a positive attitude toward the purchase of that product. According to Ajzen (1991), to obtain the so-called belief-based measure of an attitude, the strength of each behavioral belief ( $BB_i$ ) should be multiplied by the corresponding evaluation of the outcome ( $OE_i$ ), and these products then aggregated to estimate attitude ( $\sum BB_i OE_i$ ) (Ajzen, 1991).
2. Subjective norm (SN) is a function of normative beliefs (NB), which represent the perceptions of specific salient groups' expectations about whether one should or should

not engage in the behavior, and one's motivation to comply (MC) with these expectations. Numerically, to obtain the belief-base measure of subjective norm, the strength of each normative belief (NB<sub>j</sub>) is weighted by the corresponding motivation to comply (MC<sub>j</sub>), and the products are summed to determine the measure of subjective norm ( $\sum NB_j MC_j$ ) (Ajzen, 1991).

3. Perceived Behavioral Control (PBC) is a function of control beliefs (CB) – an individual's perception of the presence/absence of the resources/opportunities necessary to perform the behavior, and his/her evaluation of each factor that can facilitate or prevent the behavior, the so-called perceived power (PP). Here too, perceived behavioral control can be calculated by using the result obtained by multiplying each control belief (CB<sub>k</sub>) to a corresponding perceived power (PP<sub>k</sub>) ( $\sum CB_k PP_k$ ) (Ajzen, 1991).

The theory is graphically summarized in Figure 2.

**Figure 2. The Theory of Planned Behavior (Ajzen, 1991)**





### 3. Conceptual Model & Research Hypotheses

The main objective of the dissertation is to provide insights into consumers' relation with products made with recycled plastic. In particular, the research presented here aims at determining how much attitude, perceived behavioral control, subjective norm and their antecedents contribute to explain the intention of purchasing such products. Thus, the applicability and appropriateness of TPB in the context of consumers' behavior and recycled products will be tested in order to establish the statistical significance of the variables in the model and their nature. The results will hopefully shed light on which variables have the strongest influence on consumers' purchase intention of recycled plastic products. Furthermore, one additional variable will be included in the model: that of Environmental Knowledge, in order to test its contribution to the theory and explore its validity.

According to Ajzen (1991), the belief-based measures of attitude ( $\Sigma BB_i OE_i$ ), perceived behavioral control ( $\Sigma CB_k PP_k$ ) and subjective norm ( $\Sigma NB_j MC_j$ ) should all correlate positively with their direct measures. Various studies that applied the TPB in *green* context supported these assumptions. Han, Hsu and Sheu (2010) applied the TPB for green hotel's choice and proved that the linkages between  $BB_i OE_i$  and attitude, between  $NB_j MC_j$  and subjective norm, and between  $CB_k PP_k$  and perceived behavioral control were all positive and significant. Yadav & Pathak (2017) used the TPB to investigate consumers' green purchase behavior and found that all of the belief components in the study had a significant impact on their direct outcome of ATT, SN and PBC. Given the previous findings and based on the reliability of the TPB, it is plausible to assume that the beliefs-based measures of attitude, subjective norm and perceived behavioral control will also correlate positively with their direct measures in the current study. Thus, the following hypothesis are stated:

*H1:  $BB_i OE_i$  has a positive influence on attitude towards recycled plastic products (where  $BB_i$  is the belief that purchasing recycled plastic products has consequence  $i$ ;  $OE_i$  is the evaluation of consequence  $i$ ).*

*H2:  $NB_j MC_j$  has a positive influence on subjective norm (where  $NB_j$  is the belief that important referent  $j$  thinks he/she should purchase recycled plastic products;  $MC_j$  is the motivation to comply with the referent  $j$ ).*

*H3:  $CB_k PP_k$  has a positive influence on perceived behavioral control (where  $CB_k$  is one's perception of the presence/absence of resource/opportunity  $k$  required to purchase recycled plastic products;  $PP_k$  is his/her assessment of the significance of resource/opportunity  $k$ ).*

### **Attitude**

Various authors have underlined that attitude is the most important predictor of behavioral intention (Kotchen & Reiling, 2000, Yadav & Pathak, 2016). In the context of green products, a positive relationship between attitude and behavioral intention has been established by numerous authors and even across different cultures (Mostafa, 2007, Paul and Patel, 2015). Paul and Patel (2015) conducted a study to predict Indian's green product consumption and discovered that attitude was the strongest predictor of intention to purchase green products. Studies in the green hotel context also support the idea that intention is positively influenced by attitude: Han, Hsu & Sheu (2010) found that attitude positively affected intention to stay at a green hotel and Han & Kim (2010) discovered that the attitude dimension was the key driver of intention to pay regular prices for green hotels. Finally, Han and Stoel (2016) applied the Theory of Planned Behavior to explain socially responsible behavior and found that behavioral intention correlated very strongly with both attitude and subjective norms.

To sum up, previous research reveals the expectation that a positive shift in attitude towards the purchase of recycled plastic products would increase the purchase intention for those same products. Thus, we propose that:

*H4 - Attitudes towards recycled plastic products will positively influence consumers' intentions to purchase them*

### **Subjective Norm**

According to the TPB, the second determinant of behavioral intention is the Subjective Norm. A recent study on recycling behavior in South Africa (Strydom, 2018) found that the subjective norm had a greater influence than either attitude or perceived behavioral control on intention to recycle, confirming the importance of the variable. Interestingly, in that case subjective norms influenced intention to recycle in a negative way: given that the majority of South Africans did not recycle, they exerted a negative pressure on others not to recycle and discouraged them to

do so. Oskamp, Cameron, Lipsey, Mindick and Weissbach (1991) found that individuals were more likely to recycle if they had friends with recycling habits, indicating the efficacy of the subjective norm on this behavior. Regarding the purchase of eco-friendly products, Chan and Lau (2002) discovered that subjective norm rather than attitude exerted the strongest influence on Chinese consumers. Given these findings, we postulate that:

*H5 - Subjective norm will positively influence consumers' purchase intention of recycled plastic products;*

### **Perceived Behavioral Control**

The third determinant of behavioral intention is perceived behavioral control. Taylor and Todd (1995) applied the TPB to waste management behavior to discover the determinants of recycling and composting intentions. They found that intention to recycle was positively influenced by the perceived control that individuals held about the behavior under analysis.

Chen & Hung (2016) also proved a positive correlation between perceived behavioral control and green purchase intention. Their study revealed that as consumers increased their resources and confidence (i.e. their perceived behavioral control) they increased their intention to use green products. Given the above-mentioned findings and the closeness of the topic, we can expect a positive direct relationship between perceived behavioral control and the intention to purchase recycled plastic products. Thus, we propose that:

*H6 - Perceived Behavioral Control will positively influence consumers' purchase intention of recycled plastic products;*

### **A new variable for an extended TPB: Environmental Knowledge**

While the aforementioned studies agree that Theory of Planned Behavior can accurately predict different behaviors, others have suggested that more predictors should be added to theory to increase its explanatory ability (Chan and Lau, 2002; Sniehotta, Pesseau & Araújo-Soares, 2014). In fact, Ajzen (1991) himself has opened the model to the incorporation of new predictors to enhance its predictability, if it can be shown that they capture a significant proportion of the variance in intention (Ajzen, 1991).

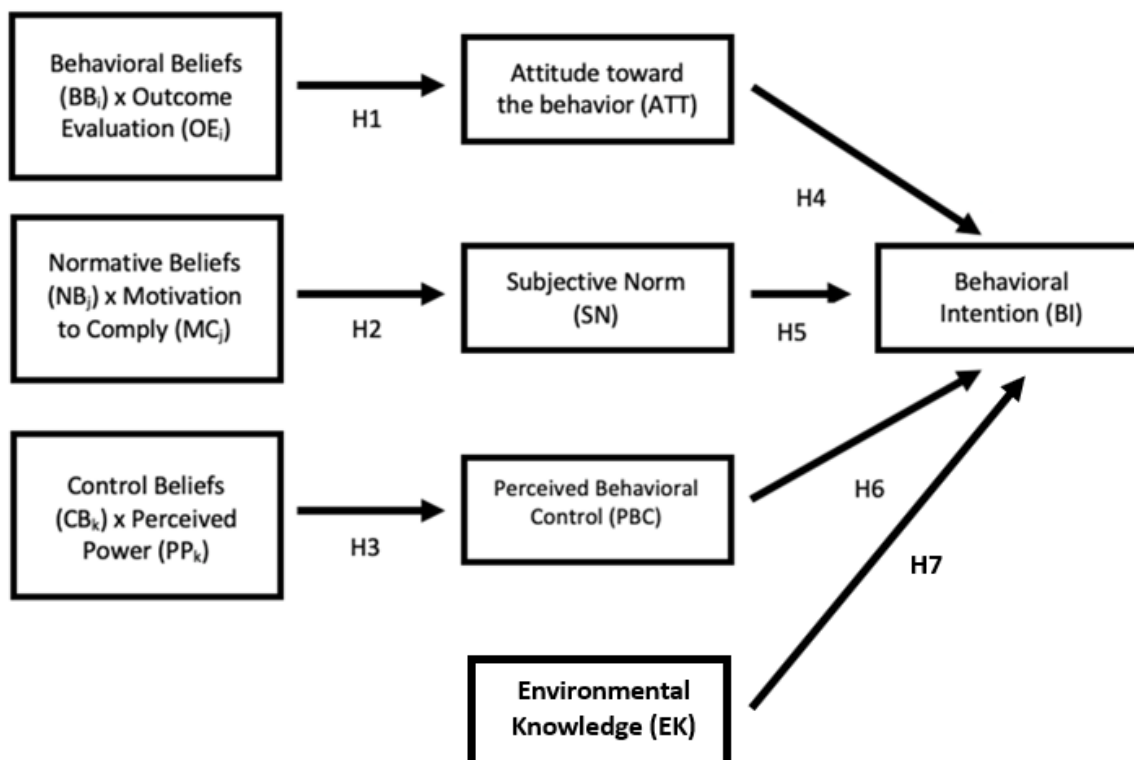
The literature defines Environmental Knowledge as “people’s knowledge about environment, key relationship leading to environmental impact and collective responsibilities

*of individual necessary for sustainable development*” (Fryxell and Lo, 2003). Environmental knowledge is considered a factor of fundamental importance in the study of the variables that lead the consumer to express the intention to purchase environmentally friendly products like recycled ones (Joshi & Rahman 2015). According to Peattie (2010) knowledge about environmental issues can result in pro-environmental/eco-friendly behavior and also influences consumers’ eco-friendly purchase intentions. Mostafa (2009) showed environmental knowledge to be one of the most important variables that affects consumer intention and behavior of buying green products. Yadav and Pathak (2016) found that the inclusion of the constructs *environmental knowledge* and *environmental concern* improved the reliability and predictive power in measuring the consumer purchase intention towards green products. Furthermore, knowledge about a social or an environmental issue may influence how people react to products created to tackle this issue (Schwepker and Cornwell, 1991). Given the valuable importance of this variable, the present research uses “environmental knowledge” as a variable capable of influencing the purchase intention of products made from recycled plastic. Based on previous studies that included the variable, we expect that individuals with a high awareness of the environmental issues related to plastic mismanagement will be more prone to buying products made with discarded plastic, to lower their environmental impact. Consequently, we hypothesize that:

*H7: Environmental knowledge about plastic will positively influence consumers’ purchase intention of recycled plastic products.*

Figure 3 summarizes the proposed extended model where Environmental Knowledge serves as an immediate predictor of intention.

Figure 3. Proposed Model for the Study



## 4. Methodology & Measurement Scales

A quantitative research approach was used for the study. In order to obtain the necessary data for the statistical analysis, an online questionnaire was distributed to a sample of Italian consumers. Questionnaires are a well-established way of collecting data. They allow researchers to gather data quickly and formulate accurate results (Kabir, 2016). In addition, they provide anonymity to the audience that can participate in the survey without discrimination or judgmental biasing (Kabir, 2016). To gather the data, both convenience and snowball sampling were applied. While the convenience sample simply includes the most accessible individuals to the researcher, snowball sampling allows recruiting participants via other participants.

### 4.1 Measurement Scales

Since different people might have different interpretations of what constitutes a recycled product, the questionnaire started with an introduction about what recycled plastic is and what are products made of recycled plastic: *“Artificially synthesized plastics are mainly derived from crude oil, coal and natural gas. Alternatively, plastic can be created from other plastic and, in this case, we talk about recycled plastic. [...] Common products made from recycled plastic include packaging bottles (e.g. shampoo bottles, cosmetic containers), clothing items (e.g. t-shirts, jackets, shoes and backpacks) and even durable goods like chairs, tables and appliances.”*

The construction of the questionnaire followed the instructions by Ajzen (2002; 1991) and was based on the work of Han et al. (2010) and Han and Kim (2010), who employed the TPB to investigate consumers' intentions towards staying at a green hotel, and on the work of Chan and Lau (2002) who applied the TPB to green purchasing behavior. As previously mentioned, to the best of the author's knowledge, there has been no previous application of TBP to investigate consumers' purchase intentions towards recycled products. Nonetheless, considering the intrinsic *green* characteristics of recycled products, it was deemed appropriate to follow the aforementioned studies, with the necessary adaptations as required.

The respondents were asked to answer each item measuring TPB components on a seven point Likert-type scale as most applications of TPB do (Ajzen, 1991). Ajzen (1991) points out that the three determinants of intention (ATT, SN, PBC) may be measured directly or indirectly with both methods being equally suggested. In order to gain a deeper understanding of consumers' behavior for recycled plastic products, the author chose to use both the direct and

indirect measures of ATT, SN and PBC by employing the respective measures in the questionnaire, focusing on the global measures of the constructs as well as and on their antecedents. Behavioral Beliefs (BB) and Outcome Evaluation (OE) were measured by five items, Normative Beliefs (NB) and Motivation to Comply (MC) by three items, Control Beliefs (CB) and Perceived Power (PP) by three, Perceived Behavioral Control by five, Attitude, and Behavioral Intention by three items and lastly Subjective Norm by two.

#### **Global Measure of Attitude (ATT)**

Attitude was measured on a seven-point semantic differential scale adopting three items. Based on the suggestions of Ajzen (1991), the anchor points of the three items were labelled: bad/good (ATT1), useless/useful (ATT2), and not at all necessary/extremely necessary (ATT3), respectively (e.g. *Buying recycled plastic products is: extremely bad (1)/extremely good (7)*).

#### **Global Measure of Subjective Norm (SN)**

Subjective norm was measured using two items on a scale from 1 (strongly disagree) to 7 (completely agree) (for example: *most people who are important to me would want me to purchase products made with recycled plastic*).

#### **Global Measure of Perceived Behavioral Control (PBC)**

PBC was measured using five items adopted in part from Kim and Han (2010) on a scale from 1 (strongly disagree) to 7 (completely agree) (e.g., *Whether or not I buy a product made with recycled plastic in place of conventional virgin plastic product is completely up to me*).

#### **Behavioral Intention (BI)**

The behavioral intention, in this case the purchase intention of products made with recycled plastic, was measured adopting three items from Kim et al. (2013), (e.g., *I am willing to buy a product made with recycled plastic*).

#### **Environmental Knowledge (EK)**

The variable Environmental Knowledge was developed by the author and was measured with three items with the anchor point Not at all knowledgeable/Extremely knowledgeable (e.g., *How knowledgeable do you consider yourself to be about the environmental issues related to plastic pollution?*).

### **Belief Constructs**

In addition to the global measures above, the belief-based attitude ( $\sum BB_i OE_i$ ), perceived behavioral control ( $\sum CB_k PPP_k$ ) and subjective norm ( $\sum NB_j MC_j$ ) were also computed in this study. To this end, it was necessary to first identify the relevant salient attitudinal beliefs, important referents, and salient control beliefs (Ajzen, 1991). Previous studies applying the TPB have approached the construction of beliefs in two different ways: according to Ajzen (1991) the ideal way would be to elicit these beliefs from the respondents themselves, or in pilot work from a sample of respondents that is representative of the research population (p.192). This method has been applied in various studies. Alternatively, it is possible to estimate them based on an intuitively selected set of beliefs (Ajzen, 1991) (e.g., extracting them from previous studies or literature around the research topic (Ajzen, 1991)). The experimental conditions, in particular the time constraint imposed by the study, led the author to opt for the second method. Thus, the items for beliefs' constructs and referents were developed based on a review of the literature and on previous research in the realm of green purchase behavior.

Once the strength of each salient belief (BB) is multiplied with the subjective evaluation of the belief's attribute (OE), and the resulting products are summed over the  $n$  salient beliefs, these belief-based measures of ATT, SN, and PBC should correlate well with the standard measures of ATT, SN and PBC (refer to Figure 2 for more clarity).

### **Beliefs-based measure of attitude**

Based on the literature around consumer's perception of recycled and green products, five salient attitudinal beliefs were identified for the consumers, namely: protection of the environment, saving natural resources, performance, quality and safety. Further, their consequent outcome evaluations were also measured (e.g., *for me, protecting the environment is*) on 7-point scale (not at all important (1)/extremely important (7)).

### **Beliefs-based measure of subjective norm**

To calculate normative beliefs, three important referents were identified: family/relatives, friends, colleagues. Three items (one item for each referent) using a 7-point scale (strongly disagree (1)/strongly agree (7)) were used. After, respondents were asked for their motivation to comply with each referent (e.g., "*How important it is for you to do what your family thinks you should do?*") using a 7 point scale (not at all important (1)/extremely important (7)).



### Beliefs-based measure of behavioral control

Following the same procedure, based on previous research, three control beliefs were identified: price, availability, and time. Therefore, control beliefs were also measured using these 3 items on a 7-point scale (strongly disagree (1)/strongly agree (7)) and the consequent perceived power using 3 items (e.g., “*the price of products made with recycled plastic would affect my decision to purchase them.*”) on 7-point scale (strongly disagree (1)/strongly agree (7)).

Table 4 summarizes the measurement items and their sources.

**Table 4. Measurement Items**

Constructs and scale items	Sources / Adaptation
<p><b>Behavioral belief (BB): (strongly disagree (1)/strongly agree (7)).</b></p> <p>BB1 (protection of the environment): purchasing a product made with recycled plastic can help protecting the environmental</p> <p>BB2: (saving resources) purchasing a product made with recycled plastic can save natural resources</p> <p>BB3: (safety) products made with recycled plastic cannot guarantee safety</p> <p>BB4: (low performance) products made with recycled plastic have lower performances than traditional products</p> <p>BB5: (quality) products made with recycled plastic are of lower quality than traditional products</p> <p><b>Outcome evaluation (OE): (not at all important (1)/extremely important (7))</b></p> <p>OE1: to me helping to save the environment is</p> <p>OE2: to me saving natural resources is</p>	<p>Extracted from relevant literature</p>

OE3: to me purchasing safe products  
is

OE4: to me purchasing high-  
performance product is

OE5: to me purchasing quality  
product is

**Normative belief (NB): (strongly  
disagree (1)/strongly agree (7))**

NB1: my family thinks I should  
purchase recycled plastic products in  
place of conventional non-recycled  
products.

NB2: my friends think I should  
purchase recycled plastic products in  
place of conventional non-recycled  
products.

NB3: my colleagues think I should  
purchase recycled plastic products in  
place of conventional non-recycled  
products.

**Motivation to comply (MC)  
(extremely unlikely (1)/extremely likely  
(7)).**

MC1: how likely it is for you to do  
what your family thinks you should do?

MC2: how likely it is for you to do  
what your friends think you should do?

MC3: how likely it is for you to do  
what your colleagues think you should  
do?

**Control belief (CB): (strongly  
disagree (1)/strongly agree (7)). In my  
opinion, products made with recycled  
plastic:**

CB1: (price) are more expensive than  
conventional products

CB2: (availability) are hard to find

<p>CB3: (time) take more time and effort to find than conventional products</p> <p><b>Perceived power (PP): (strongly disagree (1)/strongly agree (7))</b></p> <p>PP1: the price of products made with recycled plastic would affect my decision to purchase them.</p> <p>PP2: the availability of products made with recycled plastic would affect my decision to purchase them</p> <p>PP3: whether I easily find products made with recycled plastic will affect my decision to purchase them.</p>	
<p><b>Attitude (ATT): buying recycled plastic product is:</b></p> <p>ATT1: extremely bad (1)/extremely good (7)</p> <p>ATT2: extremely useless (1)/extremely useful (7)</p> <p>ATT3: extremely unnecessary (1)/extremely necessary (7)</p>	Adapted from Kim and Han (2010)
<p><b>Subjective norm (SN)</b></p> <p>SN1: most people who are important to me would want me to purchase recycled plastic products.</p> <p>SN2: most of the people important to me would appreciate my decision If I were to purchase products made with recycled plastics.</p>	Adapted from Chan and Lau (2002)
<p><b>Perceived behavioral control (PBC)</b></p> <p>PBC1: whether or not I purchase products made with recycled plastic is completely up to me.</p>	Adapted from Kim and Han (2010)

<p>PBC2: recycled plastic products are generally available in stores where I usually shop.</p> <p>PBC3: I have the resources, time and opportunity required to purchase recycled plastic products.</p> <p>PBC4: I am confident that, if I want, I can purchase products made with recycled plastic instead of traditional virgin plastic products.</p> <p>PBC5: I will likely have many opportunities to purchase recycled plastic products.</p>	
<p><b>Behavioral Intention (BI)</b></p> <p>BI1: I am willing to buy a product made with recycled plastic.</p> <p>BI2: I intend to buy a product made with recycled plastic.</p> <p>BI3: over the next few months, I will make an effort to buy products made with recycled plastic rather than products made with virgin plastic.</p>	<p>Adapted from Kim et al. (2013)</p>
<p><b>Environmental Knowledge (EK)</b></p> <p>EK1: how knowledgeable do you consider yourself to be about the environmental issues related to plastic pollution?</p> <p>EK2: how knowledgeable do you consider yourself to be about the problems caused by the overproduction of plastic?</p> <p>EK3: how knowledgeable do you consider yourself to be about the impact of plastic on marine life?</p>	<p>Self-developed</p>

The questionnaire was built including the items shown in Table 4 and was created using the software Qualtrics. Then, it was shared among various online platforms including WhatsApp, Facebook, Instagram and LinkedIn. Before the release, the questionnaire was pre-tested on 10 participants. Subsequently, some items were reworded to achieve better clarity. The data were collected from the 21<sup>st</sup> of April until the 10<sup>th</sup> of May 2021 and no incentives were provided in exchange for participation. In the end, 351 respondents completed the questionnaire. After collection, the data was transferred to the statistical software SPSS 26 in order to be analyzed and, after cleaning and adjusting the data, a valid sample of 346 was obtained. The final statistical analysis was performed using AMOS 26.

## 5. Results

### 5.1 Sample description

Table 2 shows the demographic profile of the sample. The sample under analysis was constituted primarily by females (63.50 %), with males making up 36.50 % of the sample. Regarding age, 37.3% of the respondents were aged 25-34, 23% from 18 to 24, 4% from 35 to 44, 13% from 45 to 54 and 18% from 55 up (mean age=36). Overall, even though the “younger” segments (18-24; 25-34) represents the lion’s share of the database, the sample appears quite heterogeneous in terms of age.

Further, the majority of the respondents (61%) had a University level degree (this includes either a bachelor’s degree, Master’s degree or PhD). Regarding the annual income, 26.5% of the valid respondents had an annual income of less than 10.000€, 23% from 10.000€ to 20.000€, 21.1% had an income from 20.000€ to 30.000€ and the rest had an income above 30.000€. The sample is therefore relatively young, well-educated and with medium to low earnings.

**Table 5.1. Sample Profile**

(n=346)

Profile Variable	Variable description	Values (%)
Gender	Female	63.50%
	Male	36.50%
Age	18-24	24%
	25-34	38.3%
	35-44	5%
	45-54	14%
	55+	19%
Education	Primary School	0.3%
	Middle School	6.1%
	Secondary School	31.8%
	Bachelor's Degree	25.7%
	Master's Degree	34.1%
	PhD	2%
Annual income	From €0 to €10.000	26.5%
	From €10.000 to €20.000	23 %
	From €20.000 to €30.000	21.1%

From €30.000 to €40.000	11.5%
From €40.000 to €50.000	10.1%
More than €50.000	7.8%

## 5.2 Descriptive Statistics

After analyzing the demographic characteristics of our sample, it is useful to obtain information employing descriptive statistics of the main variables in the study. Starting from Behavioral Beliefs, two of the five salient beliefs elicited in the literature were “confirmed” with high scores (BB1 and BB2), indicating that individuals do feel like purchasing recycled plastic products can have a positive impact on the environment (BB1, mean=6.16) and save natural resources (BB2, mean=5.88). Beliefs 3, 4 and 5 respectively “cannot guarantee safety”, “have lower performance” and “have low quality” scored low, with means of 2.33, 2.35 and 2.27, indicating that consumers do not anticipate these beliefs when considering purchasing recycled products.

Regarding Normative Beliefs, individuals indicated that they did not perceive a particularly strong pressure to purchase recycled plastic products from their family (mean 4.52), their friends (4.53) or from their colleagues (4.28). As far as Control Beliefs are concerned, respondents did not feel like recycled plastic products are more expensive than virgin ones (mean 3.11), but they do feel like they are somewhat hard to find (3.68) and that they take more time and effort than conventional products to find (3.97).

As for the global measures, the three items calculating Global Attitude had a mean score of 5.82, indicating a relatively strong positive attitude towards the purchase intention of recycled plastic products. Subjective Norm - the opinions of important referent groups about the behavior – was not found to be particularly strong (mean 4.68). Regarding Perceived Behavioral Control, respondents only felt a slightly above average control over their purchase intention of recycled plastic products, indicating that there are, in fact, various factors impeding the behavior. Indeed, the means of PBC2 “recycled plastic products *are generally available in stores where I shop*” (4.24) and of PBC3 “*I have resources, time and opportunity to purchase recycled plastic products*” (4.70) were quiet low. Finally, for the Environmental Knowledge variable, the overwhelming majority of the respondents consider themselves knowledgeable on plastic pollution (mean 4.88), plastic overproduction (4.88) and very knowledgeable on the impacts of plastic on marine life (5.40). Table 5.2 summarizes the descriptive statistics of the main constructs under analysis.

**Table 5.2. Descriptive Statistics of the Main Constructs.**

<b>Construct</b>	<b>Mean (Std. Deviation)</b>
<b>ATT</b> - Attitude towards the purchase	<b>5.82 (1.92)</b>
<b>SN</b> - Subjective Norm	<b>4.68 (0.85)</b>
<b>PBC</b> - Perceived control over the purchase	<b>4.99 (1.48)</b>
<b>BI</b> - Purchase intention of recycled plastic products	<b>6.06 (1.25)</b>
<b>EK</b> - Environmental knowledge related to impacts of plastic	<b>5.05 (1.44)</b>

Note: all the mean values range from 1 to 7.



### 5.3 Data Analysis

Following Ajzen's (1991) indication, before proceeding to the statistical analysis, the beliefs-based measures of ATT, SN, and PBC were calculated. Thus:

- i) Each behavioral belief (BB) was multiplied by its outcome evaluation (OE). The results of  $BB_1 \times OE_1$ ,  $BB_2 \times OE_2$ ,  $BB_3 \times OE_3$ ,  $BB_4 \times OE_4$ ,  $BB_5 \times OE_5$  were then summed over to obtain  $BB_i \times OE_i$ ;
- ii) Each normative belief (NB) was multiplied by its motivation to comply (MC). The results  $NB_1 \times MC_1$ ,  $NB_2 \times MC_2$  and  $NB_3 \times MC_3$  were then summed over to obtain  $NB_j \times MC_j$ .
- iii) Finally, each control belief (CB) was multiplied by the perceived power (PP) that individuals feel over that beliefs. The results  $CB_1 \times PP_1$ ,  $CB_2 \times PP_2$  and  $CB_3 \times PP_3$  were then summed over to obtain  $CB_k \times PP_k$ .

Once the new measures were obtained, Harman's one-factor test was used to examine the possibility of common method bias, given that this study relied on self-reported data. For this purpose, an exploratory factor analysis (EFA) was conducted. The results of the EFA with all observed variables in the model loaded on a single factor, using an unrotated factor, indicated that the variance explained by the single factor is 23.89%, which is below the 50% cut-off point (Podsakoff et al., 2003). Therefore, no issue of common method bias was detected in the study.

Then, in order to empirically test the proposed conceptual model - and to examine the determinants of the purchase intention of recycled plastic products - a Structural Equation Modelling technique was employed (Hair et al., 2014), using AMOS 26. Structural equation modelling (SEM) is one of the most widely used methodologies in quantitative social sciences. Indeed, many of the previous studies that applied the Theory of Planned Behavior relied on this methodology to conduct their analysis (Han et al., 2009; Han et al., 2010; Han et al., 2011; Han and Kim, 2010). SEM has two main goals: i) to understand the patterns of correlation among a set of variables and ii) to explain as much of their variance as possible with a chosen model. SEM is widely used as a confirmatory technique to test the reliability and validity of a model chosen *a priori*. Given that one of the study's objectives was to test the applicability of the Theory of Planned Behavior (the *a priori* model) to understand consumers' intention to buy recycled plastic products, SEM appeared to be the most suitable technique.

In particular, the study followed Anderson and Gerbing's (1988) two-step SEM approach. The two-step approach involves first the assessment of the measurement model by employing

a confirmatory factor analysis (CFA) and, secondly, a full structural analysis. The purpose of the preliminary CFA is to make sure that all the proposed measurement items are representatives of the constructs they are supposed to define. Once the CFA results indicate ideal representativeness of the measurement items, then the full structural analysis is performed to assess the fit of the full model and to test the proposed hypothesis.

### 5.3.1 Analysis of Measurement Model

The first step involves the assessment of the measurement model by employing a confirmatory factor analysis. The assumptions required to perform a CFA include multivariate normality, a sufficient sample size ( $n > 200$ ) and that no missing values should be present (Hair et al., 2014). First, the data were cleaned: the process included finding and checking error in the data file, identifying and removing missing values and detecting and removing outliers. After cleaning the data, the sample size under analysis counted 346 responses, indicating a sufficient sample size.

Multivariate Normality was tested in AMOS and the results showed a Critical Ratio (c.r) between -1.962 and + 1.962 as per the requirements of Mardia (1974), thus indicating normal distribution for our data and meeting the assumption of Multivariate Normality. Since the required conditions to perform a CFA were met, the CFA was performed. In order to decide if it was reasonable to proceed with a full structural analysis, various conditions had to be met (Hair et al., 2014):

- I) The model needed to show an acceptable fit to the data, assessed through Chi-square statistic, comparative-of-fit index (CFI), Tucker–Lewis index (TLI), normed fit index (NFI), and root-mean-square error of approximation (RMSEA) (Bagozzi and Yi, 2012);
- II) All **factors loading** had to be statistically significantly high ( $>0.60$  with  $p < .05$  level), as this would suggest that the factors extract sufficient variance from the observed variables;
- III) **Construct validity** (convergent validity & discriminant validity) had to be assessed since we wanted to make sure that each construct measured exactly what it was supposed to measure;

- IV) Finally, since we wanted to make sure that the various items measuring the same general construct produced similar scores, **internal consistency**, a measure based on the correlations between different items on the same construct, had to be achieved.

The results from the initial analysis indicated that items BB1xOE1, BB2xOE2, CB1xOE2 and PBC1 did not reach the threshold of 0,60 factor loading strength and, in addition, they failed to achieve construct validity as well as internal consistency (Hair et al, 2012). For these reasons, these four items were removed and the model was run again. The results of the new confirmatory factor analysis shows that the measurement model fits the data well, as reported by the following indices of model fit:  $\chi^2 = 373.849$ ,  $df = 202$ ,  $\chi^2/df = 1.769$ ,  $p < 0.001$ , normed fit index (NFI) = 0.928, comparative fit index (CFI) = 0.967, Tucker–Lewis index (TLI) = 0.959, root mean square error of approximation (RMSEA) = 0.047. Indeed, the ratio of goodness of fit to degrees of freedom is lower than recommended threshold of 3 ( $X^2 / df = 1.769$ ); the NFI (0.928), CFI (0.967) and TLI (0.959) are above the prescribed cut-off value of 0.9 (Bagozzi and Yi, 1988); and the RMSEA is lower than .06 (0.047) (Hu and Bentler, 1999). The second assumption involved factor loadings: in our analysis, all of the factor loadings were significant at  $p < 0.001$  and equal to or greater than 0.607 as seen in Table 5.3, indicating a satisfactory correlation between observed variables and latent common factors.

**Table 5.3. Confirmatory Factor Analysis: Items and loadings.**

<b>Construct and Scale Item</b>	<b>Standardized Loading a</b>	<b>SCR</b>	<b>AVE</b>
<b>Behavioral beliefs (BB) * Outcome evaluations (OE)</b>		0.816	0.603
BBiOEi3	0.607		
BBiOEi4	0.764		
BBiOEi5	0.926		

<b>Normative beliefs (NB) *</b>			
<b>Motivation to comply (MC)</b>		0.853	0.663
NBjMCj1	0.692		
NBjMCj2	0.929		
NBjMCj3	0.804		
<b>Control beliefs (CB) *</b>			
<b>Perceived power (PP)</b>		0.756	0.612
CBkPPk2	0.726		
CBkPPk3	0.817		
<b>Attitude toward a behavior (ATT)</b>			
		0.954	0.873
ATT1	0.915		
ATT2	0.956		
ATT3	0.932		
<b>Subjective norm (SN)</b>			
		0.798	0.665
SN1	0.877		
SN2	0.75		
<b>Perceived behavioral control (PBC)</b>			
		0.833	0.558
PBC2	0.648		
PBC3	0.683		
PBC4	0.775		
PBC5	0.864		
<b>Purchase intentions (BI)</b>			
		0.905	0.761
BI1	0.843		
BI2	0.968		
BI3	0.797		
<b>Environmental Knowledge (EK)</b>			
		0.916	0.784
EK1	0.888		

EK2	0.918		
EK3	0.849		

Note 1: All factors loadings are significant at  $p < 0.001$ ;

Note 2: goodness of fit statistics:  $\chi^2 = 373.849$ ,  $df = 202$ ,  $\chi^2/df = 1.769$ ,  $p < 0.001$ , normed fit index (NFI) = 0.928, comparative fit index (CFI) = 0.967, Tucker–Lewis index (TLI) = 0.959, root mean square error of approximation (RMSEA) = 0.047.

Finally, construct validity and internal consistency were tested. Construct validity is achieved through convergent validity and discriminant validity. Convergent Validity is present when all the AVE are 0.5 or more and Discriminant validity is achieved when the square root of AVE is higher than the latent variables' correlation (Fornell & Larcker, 1981). Internal consistency was measured through composite reliability (CR) and it is achieved when the value of CR is 0.7 or higher (Fornell & Larcker, 1981). Table 5.4 shows how convergent validity and internal consistency were statistically confirmed. As far as Discriminant Validity, the measure was tested using Heterotrait-Monotrait ratio (HTMT) which is regarded as a significant measure for testing discriminant validity (Henseler et al., 2015). Table 5.5 indicates that all values conform with the thresholds (0.850 for strict and 0.900 for liberal discriminant validity) thus, the discriminant validity has also been established. To sum up, the results indicated reasonable representativeness of all the measurement items and that the various items defining the same general construct produced alike results.

**Table 1.4. Correlation Matrix**

	<b>C R</b>	<b>AV E</b>	<b>MS V</b>	<b>MaxR( H)</b>	<b>BB</b>	<b>NB</b>	<b>CB</b>	<b>AT T</b>	<b>SN</b>	<b>PB C</b>	<b>PI</b>	<b>E K</b>
<b>BB</b>	0.816	0.603	0.058	0.871	<b>0.776</b>							
<b>NB</b>	0.853	0.663	0.533	0.900	0.005	<b>0.814</b>						

<b>CB</b>	0.75 6	0.612	0.091	0.803	0.092	0.045	<b>0.782</b>					
<b>AT T</b>	0.95 4	0.873	0.156	0.957	0.112 †	0.150 *	0.059	<b>0.93 4</b>				
<b>SN</b>	0.79 8	0.665	0.533	0.821	0.104	0.730 ***	0.030	0.20 2 **	<b>0.816</b>			
<b>PB C</b>	0.83 3	0.558	0.169	0.859	0.088	0.208 **	0.301 ***	0.18 1 **	0.313 ***	<b>0.747</b>		
<b>PI</b>	0.90 5	0.761	0.169	0.951	0.229 ***	0.240 ***	0.163 *	0.39 5 ***	0.403 ***	0.411 ***	<b>0.87 3</b>	
<b>EK</b>	0.91 6	0.784	0.058	0.921	0.241 ***	0.025	0.024	0.03 3	0.133 *	0.139 *	0.20 0 ***	<b>0.88 6</b>

**Table 5.5. HTMT Analysis**

	<b>BB</b>	<b>NB</b>	<b>CB</b>	<b>ATT</b>	<b>SN</b>	<b>PBC</b>	<b>PI</b>	<b>EK</b>
<b>BB</b>								
<b>NB</b>	0.047							
<b>CB</b>	0.085	0.021						
<b>AT T</b>	0.121	0.156	0.055					

<b>SN</b>	0.139	0.754	0.038	0.230				
<b>PBC</b>	0.103	0.208	0.326	0.175	0.342			
<b>PI</b>	0.277	0.293	0.175	0.391	0.473	0.443		
<b>EK</b>	0.273	0.016	0.030	0.035	0.138	0.167	0.226	

Notes from the analysis: There are no warnings for this HTMT analysis.

Thresholds are 0.850 for strict and 0.900 for liberal discriminant validity (Henseler et al., 2015).

### 5.3.2 Results of the Structural Equation Model (SEM)

Given the satisfactory fit to the data from the confirmatory factor analysis, SEM was performed to look at the relationships between the measured concepts and test the proposed hypotheses. The proposed structural model had an adequate fit to the data ( $\chi^2 = 435.991$ ,  $df = 223$ ,  $\chi^2/df = 1.955$ ,  $p < 0.001$ ,  $NFI = 0.913$ ,  $CFI = 0.955$ ,  $TLI = 0.949$ ,  $RMSEA = 0.053$ ) (Hair et al., 2014).

The results indicate that the beliefs-based measures of Attitude, Subjective Norm and Perceived Behavioral Control positively correlated with their global measures. The belief-based measure of Att (BBiOEi) positively correlate with the direct measure of Att ( $\beta=0.112$ ,  $p < 0.10$ ), therefore supporting H1 that behavioral beliefs are positively related to Attitude. The belief-based measure of Subjective Norm (NBjMCj) positively correlated with the direct measure of SN, ( $\beta=0.722$ ,  $p \leq .001$ ), therefore supporting H2 that normative beliefs are positively related to Subjective Norm. And finally, the belief-based measure of Perceived Behavioral Control (CBkPPk) positively correlates with the direct measure of PBC, ( $\beta=0.31$ ,  $p \leq .001$ ), therefore supporting H3 that control beliefs are positively related to Perceived Behavioral Control.

The results also show that attitude has the strongest positive influence on consumers' purchase intention of recycled plastic products ( $\beta=0.324$ ;  $p < 0.001$ ) therefore supporting H4 and confirming the key role that Attitude play to influence consumers' intention to purchase. At the same time, the results underline the positive role that subjective norm play on consumers' purchase intention of recycled plastic products ( $\beta=0.241$ ;  $p < 0.001$ ) supporting H5, and they underline that perceived behavioral control also positively influences the purchase intention of recycled plastic products ( $\beta=0.298$ ;  $p < 0.001$ ), supporting H6. Finally, the newly added construct of Environmental Knowledge was found to have a significant effect on Purchase

Intention ( $\beta=0.141$ ;  $p < 0.05$ ), therefore supporting H7 that Environmental Knowledge positively influences purchase intention. Table 5.6 summarizes the results of hypotheses testing. Overall, the proposed framework of the Theory of Planned Behavior was able to explain 27.2% of the variance of purchase intention. Thus, based on the results obtained, we conclude that TPB is reasonably competent in explaining purchasing intention for recycled plastic products. The results from the structural model were satisfactory and can be seen in Figure 5.

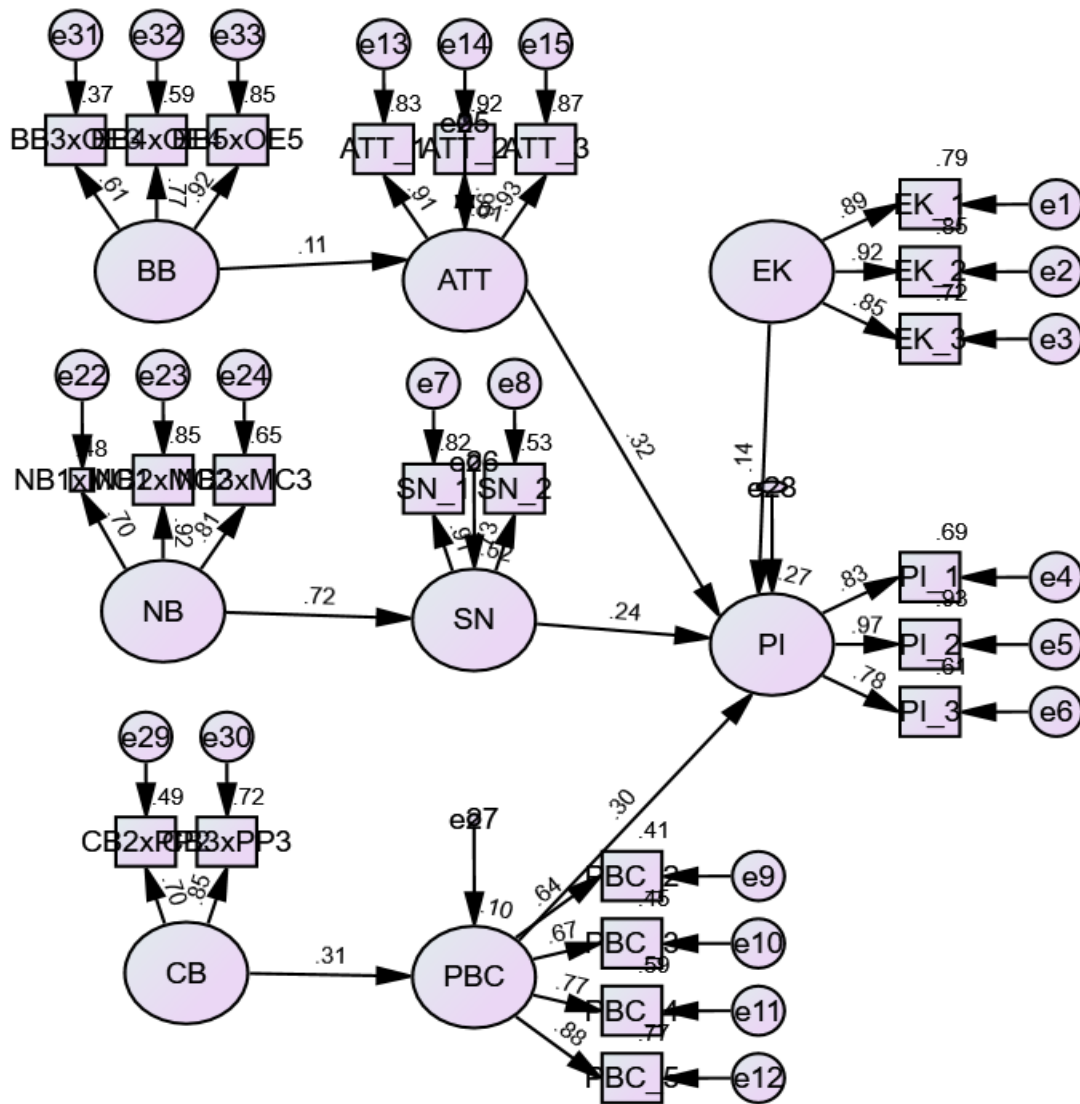
**Table 5.6. Results of Hypotheses Testing**

		<i>Standardized Estimate</i>	<b>p-value</b>	<b>Hypothesis</b>
H1 BBiOEi	→ Attitude toward the behavior	0.112	0.057*	Supported
H2 NBjMCj	→ Subjective norm	0.722	***	Supported
H3 CBkPPk	→ Perceived behavioral control	0.31	***	Supported
H4 Attitude toward a behaviour	→ Behavioral intention	0.324	***	Supported
H5 Subjective norm	→ Behavioral intention	0.241	***	Supported
H6 Perceived behavioral control	→ Behavioral intention	0.298	***	Supported
H7 Environmental Knowledge	→ Behavioral intention	0.141	0.006**	Supported

Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$



Figure 5. Results of Structural Equation Modelling



Note 1: Fit Indices: = 435.99 (df = 223;  $\chi^2/df = 1.955$ ;  $p < 0.001$ ); RMSEA = 0.053; NFI = 0.913; CFI = 0.955

Variance of purchase intention explained = 27.2%;

Note 2: BB = Behavioral Beliefs (BBiOEi), CB = Control Beliefs (NBiMCi), CB = Control Beliefs (CBiPpi), ATT = Attitude toward the behaviour, SN = Subjective Norm, PBC = Perceived Behavioral Control, PI = Purchase Intention and EK = Environmental Knowledge.

## 6. Discussion

### 6.1 Main Findings

The study aimed at understanding consumers' purchase intention of recycled plastic products. With the advent of environmental issues like resource scarcity, plastic pollution, and the waste crisis, together with the appearance of innovative circular business models, the idea of recycling and reusing resources is gaining momentum (Kirchherr, Reike, & Hekkert, 2017). In particular, with the plastic waste crisis spiraling out of control, companies are on the move to collect and reuse discarded plastic. Consequently, many of the fast-moving consumer goods giant corporations have been setting increasingly high targets for recycled plastic content in their products, hoping to reverse the negative trend of plastic pollution (Snowden, 2021; Malviya, 2021).

Notwithstanding, the realm of consumers' behavior regarding recycled products has received surprisingly little attention in the past, as very few studies have focused on the interaction between consumers and recycled products. Furthermore, many of the previous research papers around the topic of recycled products date back to the late 1990s / early 2000s (e.g.: Mobley et al. 1995, Guagnano 2001 and Hamzaoui, Essoussi & Linton 2010) and, therefore, cannot be considered up to date or necessarily applicable to the current time. Thus, the aim was to fill this gap by expanding the literature on consumers' attitudes and intentions toward recycled products and identifying the main drivers for the purchase intention of recycled plastic products. To do so, the author tested the applicability of the Theory of Planned Behavior (Ajzen, 2002) - one of the most popular theories to explain human behavior – to identify the biggest influencer for the purchase of recycled plastic products.

All of the main constructs of the theory – Attitude, Subjective Norm and Perceived Behavioral Control – were maintained; and an additional variable - Environmental Knowledge - was added following Ajzen's (2002) suggestion that supplementary variables may be included in the model if they can provide further explanation of the behavior under analysis. Furthermore, to obtain more detailed results, Ajzen's (1991) recommendation to calculate both direct and indirect measures of attitude, subjective norm and perceived behavioral control was followed. First, the measures were calculated 'directly' by asking respondents to summarise their overall i) evaluative reaction to the purchase intention of products made with recycled plastic (attitudes), ii) perceptions of whether important others would approve of them purchasing recycled plastic products (subjective norms) and iii) perception of having, or not having control over the purchase intention of recycled plastic products (PBC). Second, the

measures were calculated ‘indirectly’, by asking respondents about their specific beliefs associated with the purchase of recycled plastic products. These indirect measures correlated positively with the more direct measures and were based on beliefs around recycled products extracted from the literature. Thus, the general beliefs regarding recycled products were included in the questionnaire to check if such beliefs were "confirmed" or not by the respondents under analysis.

Respondents’ overall attitude towards recycled plastic products was favorable and the majority of them declared they would be willing to purchase them (>80%). Such findings are in line with the results of Magnier et al. (2019) who found that consumers’ evaluations of products made of ocean plastic were generally positive. Attitude - the overall evaluation of the behavior by the individual - was found to be the biggest predictor of Purchase Intention, followed by Perceived Behavioral Control and Subjective Norm. Being attitude the strongest predictor, we conclude that consumers who display a more positive attitude towards recycled plastic products are more likely to engage in the purchase.

Perceived Behavioral Control was the second strongest predictor of the intention to purchase recycled plastic products. As expected, a direct positive relationship between Perceived Behavioral Control and intention to purchase was established. This means that as consumers increase their resources and confidence in their ability to carry out the purchase, so does their intention to purchase increase. In other words, fewer barriers to the purchase and more opportunities for the consumer translate into higher chances for the purchase to happen.

Finally, Subjective Norms was also found to positively influence Purchase Intention, but in a lower level. Previous research had already identified Subjective Norm as the weakest link in the framework (Ajzen, 1991), and some authors did not find it to be a significant predictor at all (Paul, Modi & Patel, 2016). It appears that respondents did not feel a strong influence from their “significant others” for the decision to buy recycled plastic products. This result can be explained in two ways: the first hypothesis is that friends, family members and peer group failed to provide positive pressure for purchasing recycled plastic products to consumers because they did not feel the necessity. The second potential explanation is that consumers' might sometimes be more individualistic in their purchase decision and therefore choose what to purchase without considering peer pressure.

A novelty in this study was the introduction of the variable Environmental Knowledge. While this variable had been included in prior studies before (Paul, Modi & Patel, 2016), in this

context it was adapted to indicate knowledge of issues around plastic pollution in particular. The variable was found to have a statistically positive influence on Purchase Intention, thus confirming the findings of Mostafa (2009), which showed that environmental knowledge to be an important variable affecting the purchase of green products, and those of Schwepker and Cornwell (1991), that suggested that knowledge about an environmental issue influences how consumers react to products designed to tackle that same issue.

Regarding consumers' beliefs, contrary to previous research (Hamzaoui, Essoussi and Linton, 2010), in the current study consumers did not appear to be concerned about the safety, performance and quality of recycled products. Additionally, respondents rejected the idea that recycled materials are perceived as inferior to virgin materials (Kashmanian et al. 1990). Indeed, the findings showed that consumers did not identify issues of poor quality, low performance or safety in their evaluation of recycled plastic products. Although contrary to early research on this topic, such findings are consistent with more recent work by Magnier et al. (2019) who also found that perceived risks in terms of expected quality and functionality and contamination of recycled ocean plastic products were low. And with those of Porral and Mangin (2020) whose research did not support the influence of perceived quality on consumers' acceptance of recycled products. This suggests a change in consumer perceptions, with consumers becoming less worried about the use of recycled materials and more prone to consider recycled products in their purchase decision. Such shift can be justified by the increased interest of consumers for eco-products or products with lower environmental impacts than traditional ones. Indeed, the study's results also show that the majority of respondents consider that purchasing recycled products can help alleviate environmental problems and help save natural resources; results that are in line with Chan and Lau's (2002) finding that consumers' attitude toward green purchases is strongly affected by the belief that green products can help save our planets' resources.

To conclude, the findings indicate a good overall fit of the theory for the explanation of consumers' purchase intention of recycled plastic products. Thus, this research adds to the list of studies that successfully applied the Theory of Planned Behaviour in the context of consumers' behavior and *green* behavior in particular like Han et al. (2009), Han and Kim (2010) and Paul, Modi & Patel (2016). In particular, all the three main constructs of the Theory of Planned Behavior were found to be statistically significant predictors confirming that if a consumer holds positive attitudes, a high level of perceived behavioral control, a strong

subjective norms, as well as a high environmental knowledge, she or he will be more likely to have purchase intentions for recycled plastic products.

## **6.2 Implications for Practice**

The results have practical implications for both managers facing the decision of including recycled plastic products among their product lines and marketers trying to promote them. The study's fundamental finding is that consumers are willing to accept products made of recycled plastic and there are no concerns regarding their negative perception. Indeed, the overall attitude towards these products was positive and the respondents showed little concern regarding the low quality, performance, and safety of recycled plastic products. This suggests that, at a broad level, if a company was to invest in the development or marketing of such products this would not represent a risk.

Given that Attitude was found to be the biggest behavioral predictor of intention to purchase recycled plastic products, we conclude that it is of paramount importance for brands to create and reinforce a positive, favorable attitude around recycled plastic products to further increase their acceptance. In particular, marketing efforts should be concentrated on communicating and underlining the environmental benefits of such products, such as the savings in natural resources, the use of less raw materials, and their positive contributions to our planet's health.

Consumers' purchase intention was also strongly influenced by their perceived behavioral control or, in other words, the various factors that may inhibit or facilitate their purchase behavior. Overall, respondents perceived a slightly above average control over the behavior, indicating the presence of barriers to the purchase. In particular, respondents believed that recycled plastic products are somewhat hard to find and that they take more time and effort than conventional products to be found. Brands and marketers could help mitigate these predicaments by employing special tags or visual indicators to make recycled products more visible and recognizable, to facilitate their identification and purchase. Indeed, such techniques have been proved to increase the willingness to pay for green products (Berger, 2019). Thus, the overall suggestion would be to design recycled plastic products in a recognizable, impactful way while at the same time communicating their green and environmental benefits. At the same time, information campaigns to promote recycled products should keep stressing the quality of these products to positively influence consumers' intention to purchase.

Finally, Environmental Knowledge also appears to exert a significant influence on the intention to purchase recycled plastic products. Individuals that are more knowledgeable about the impacts of plastic pollution and overproduction appear more likely to purchase products made of recycled plastic. Here, a key practical suggestion would be to create tailored marketing campaigns for individuals with high awareness of the issue and, at the same time, educate consumers on the impacts of plastic pollution and present recycled products as a solution and as a more sustainable alternative than traditional products.

## **7. Conclusion, Limitations & Future Research Suggestions**

Recently, some companies have started using recycled plastic as a manufacturing material for their consumers' products but, as of today, little is known about consumers' perception of recycled plastic. At the same time, mystery remains into whether or not consumers will accept goods manufactured with such material. To answer these doubts, this study investigated consumers' relationship with products made with recycled plastic and identified the main predictors driving the purchase intention of such products. To do so, the author applied the Theory of Planned Behavior. Previously, the Theory of Planned Behavior had been successfully used to explain green consumers' behavior. Here, however, the theory was applied with in a new purpose: to explain consumers' purchase intention of products made with recycled plastic, which represents a novelty in the area.

Respondent's overall attitude towards recycled plastic products was generally favorable. Based on the results, respondents did not seem to be worried about the safety and quality of products made with recycled plastic in line with Magnier, Mugge & Schoormans (2019) who discovered that consumers were not worried about the safety or contamination risks of ocean plastic products.

Attitude was found to be the biggest and most powerful predictor of purchase intention for recycled plastic products, just like in Han et al., 2009, Han et al., 2010, Han et al., 2011 and Han and Kim, 2010. Holding a positive Attitude about recycled plastic products is, therefore, crucial for consumers to engage in their purchase. Similar conclusions were reached by Porral and Mangin (2020) that found that the positive image of recycled goods is the most important driver of consumers' acceptance. After attitude, Perceived Behavioral Control was found to be the biggest predictors of purchase intention thus concluding that as consumers feel more control

in terms of resources, time, and opportunity to buy recycled plastic products, the likelihood of the purchase increases. In conclusion, the study expanded the literature around recycled products and contributed to the existing literature around green consumers' behavior by providing clarity behind the relationship between consumers' and recycled products. In addition, the study also benefited marketers and businesses in practical terms by giving them precious insights regarding the main indicators that drive consumers' purchase intention of products made with recycled plastic.

While the results obtained indicate that the Theory of Planned Behavior was successful in the explanation of purchase intention of recycled plastic products, some limitations are worth pointing out. The first limitation is that the study was conducted without a focus on a specific product's category. Indeed, consumers were not asked to evaluate a specific product made with recycled plastic (e.g., a t-shirt), but were rather asked general questions regarding all products made with recycled plastic. The limitation lies in the fact that consumers may feel differently when purchasing a high involvement product like a laptop made with recycled plastic than they would feel if purchasing a low-involvement one, like a shampoo, with packaging is made with recycled plastic. Given the lack of research around products made with recycled plastic, the author decided to conduct a general study without focusing on specific product lines. Nonetheless, considering that the level of involvement can directly influence buying decisions (Dholakia, 2001), future research could focus on analyzing consumers' point of view on recycled plastic products of various categories, and even comparing them (e.g. durables, FMGC, electronics, and so on).

Moreover, it is worth pointing out that the study was conducted in Italy, a developed European Union country which generally scores high on environmental awareness (“Awareness about environmental issues in Italy 2017 | Statista”, 2021). This is also confirmed by the high score of the respondents on the ‘Environmental Knowledge’ variable. Since a relation between cultural factors and green and sustainable behaviors has long been established (Nguyen, Lobo & Greenland, 2017), further research could replicate the study in other countries and with different samples. In addition, the study analyzed consumers' purchase intention of recycled plastic products and not the actual purchase. This is partly because measuring an actual behavior is a challenging task. Nonetheless, future researchers could conduct experiments with real-life purchase situations to try to determine if consumers' purchase intentions are reflected in their actual purchase behavior. Finally, while there is no arguing that the Theory of Planned Behavior is appropriate to study consumer's behavior, various scholars have integrated it with other

theories like the Norm Activation theory to explain *green* behavior (Bigliardi et al., 2020). As such, using a different theory as the underlying model could be beneficial as it might result in new findings and could provide additional insights.



## 8. Bibliography

- Albino, V., Balice, A., & Dangelico, R. (2009). Environmental strategies and green product development: an overview on sustainability-driven companies. *Business Strategy And The Environment*, 18(2), 83-96. <https://doi.org/10.1002/bse.638>
- 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](https://doi.org/10.1016/0749-5978(91)90020-t)
- Ajzen, I., & Fishbein, M. (2000). Attitudes and the Attitude-Behavior Relation: Reasoned and Automatic Processes. *European Review Of Social Psychology*, 11(1), 1-33. doi: 10.1080/14792779943000116
- Awareness about environmental issues in Italy 2017 | Statista. (2021). Retrieved 12 July 2021, from <https://www.statista.com/statistics/863200/awareness-about-environmental-issues-in-italy/>
- Antonides, G. (2017). Sustainable Consumer Behavior: A Collection of Empirical Studies. *Sustainability*, 9(10), 1686. <https://doi.org/10.3390/su9101686>
- Balch, O. (2019). Good company: the capitalists putting purpose ahead of profit. *the Guardian*. Retrieved 14 December 2020, from <https://www.theguardian.com/world/2019/nov/24/b-corps-capitalism-for-an-environmentally-endangered-age>.
- Bagozzi, R.P., Yi, Y. On the evaluation of structural equation models. *JAMS* 16, 74–94 (1988). <https://doi.org/10.1007/BF02723327>
- Bagozzi, R.P., Yi, Y. Specification, evaluation, and interpretation of structural equation models. *J. of the Acad. Mark. Sci.* 40, 8–34 (2012). <https://doi.org/10.1007/s11747-011-0278-x>
- Baxter, W., Aurisicchio, M., & Childs, P. (2017). Contaminated Interaction: Another Barrier to Circular Material Flows. *Journal Of Industrial Ecology*, 21(3), 507-516. <https://doi.org/10.1111/jiec.12612>
- Berger, J. (2019). Signaling can increase consumers' willingness to pay for green products. Theoretical model and experimental evidence. *Journal Of Consumer Behaviour*, 18(3), 233-246. doi: 10.1002/cb.1760

- Bhamra, T., Lilley, D., & Tang, T. (2011). Design for Sustainable Behavior: Using Products to Change Consumer Behavior. *The Design Journal*, 14(4), 427-445. <https://doi.org/10.2752/175630611x13091688930453>
- Bigliardi, B., Campisi, D., Ferraro, G., Filippelli, S., Galati, F., & Petroni, A. (2020). The Intention to Purchase Recycled Products: Towards an Integrative Theoretical Framework. *Sustainability*, 12(22), 9739. doi: 10.3390/su12229739
- Bray, J., Johns, N., & Kilburn, D. (2010). An Exploratory Study into the Factors Impeding Ethical Consumption. *Journal Of Business Ethics*, 98(4), 597-608. <https://doi.org/10.1007/s10551-010-0640-9>
- Brock, A., & Williams, I. (2020). Life Cycle Assessment of Beverage Packaging. *Detritus*, (13), 47-61. doi: 10.31025/2611-4135/2020.14025
- Calvo-Porrá, C., & Lévy-Mangin, J. (2020). The Circular Economy Business Model: Examining Consumers' Acceptance of Recycled Goods. *Administrative Sciences*, 10(2), 28. <https://doi.org/10.3390/admsci10020028>
- Carrington, M., Black, I., & Newholm, T. (2012). Transformative Ethical/Sustainable Consumption Research. *Journal Of Nonprofit & Public Sector Marketing*, 24(4), 239-246. <https://doi.org/10.1080/10495142.2012.733637>
- Carrington, M., Neville, B., & Whitwell, G. (2014). Lost in translation: Exploring the ethical consumer intention–behavior gap. *Journal Of Business Research*, 67(1), 2759-2767. doi: 10.1016/j.jbusres.2012.09.022
- Chan, R., & Lau, L. (2002). Explaining Green Purchasing Behavior. *Journal Of International Consumer Marketing*, 14(2-3), 9-40. [https://doi.org/10.1300/j046v14n02\\_02](https://doi.org/10.1300/j046v14n02_02)
- Chen, S., & Hung, C. (2016). Elucidating the factors influencing the acceptance of green products: An extension of theory of planned behavior. *Technological Forecasting And Social Change*, 112, 155-163. <https://doi.org/10.1016/j.techfore.2016.08.022>
- Circular Business Models - Sustainability Guide. Sustainability Guide. (2020). Retrieved 13 December 2020, from <https://sustainabilityguide.eu/methods/circular-business-models/#:~:text=A%20circular%20business%20model%20articulates,minimising%20ecological%20and%20social%20costs.>

- Dangelico, R., & Pontrandolfo, P. (2013). Being 'Green and Competitive': The Impact of Environmental Actions and Collaborations on Firm Performance. *Business Strategy And The Environment*, 24(6), 413-430. <https://doi.org/10.1002/bse.1828>
- Developing focused strategies for managing and curbing plastic usage, disposal, and recycling.*  
IHS Markit. (2018). Retrieved 3 November 2020, from <https://ihsmarkit.com/research-analysis/strategies-for-managing-and-curbing-plastic.html>.
- Dholakia, U. (2001). A motivational process model of product involvement and consumer risk perception. *European Journal Of Marketing*, 35(11/12), 1340-1362. doi: 10.1108/eum0000000006479
- Di Maio, F. & Rem, P., (2015). A Robust Indicator for Promoting Circular Economy through Recycling. *Journal of Environmental Protection*, 06(10), pp.1095-1104.
- Ellen Macarthur Foundation (EMAF), (2013). Towards a Circular Economy. Business Rationale for an Accelerated Transition.
- Emmott, S. (2013). *Humans – the real threat to life on Earth*. the Guardian. Retrieved 28 October 2020, from <https://www.theguardian.com/environment/2013/jun/30/stephen-emmott-ten-billion>.
- EPA. (2016). *Recycling Economic Information Report*.
- European Commission. (2014). *Waste management in the EU*.
- Eriksen, M., Lebreton, L., Carson, H., Thiel, M., Moore, C., & Borerro, J. et al. (2014). *Plastic Pollution in the World's Oceans: More than 5 Trillion Plastic Pieces Weighing over 250,000 Tons Afloat at Sea*. *Plos ONE*, 9(12), e111913. <https://doi.org/10.1371/journal.pone.0111913>
- Fornell, Claes, and David F. Larcker. "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error." *Journal of Marketing Research*, vol. 18, no. 1, American Marketing Association, 1981, pp. 39–50, <https://doi.org/10.2307/3151312>.
- Fryxell, G.E., Lo, C.W.H. The Influence of Environmental Knowledge and Values on Managerial Behaviours on Behalf of the Environment: An Empirical Examination of

- Managers in China. *Journal of Business Ethics* 46, 45–69 (2003).  
<https://doi.org/10.1023/A:1024773012398>
- Gallaud, D., & Laperche, B. (2016). *Circular Economy, industrial ecology and short supply chain*. Wiley Online Library.
- Geyer, R., Jambeck, J., & Law, K. (2017). Production, use, and fate of all plastics ever made. *Science Advances*, 3(7), e1700782. <https://doi.org/10.1126/sciadv.1700782>
- GESAMP (2015). “Sources, fate and effects of microplastics in the marine environment: a global assessment” (Kershaw, P. J., ed.). (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP/UNDP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection). Rep. Stud. GESAMP No. 90, 96 p.
- Global Consumers Seek Companies That Care About Environmental Issues. Nielsen. (2018). Retrieved 10 December 2020, from <https://www.nielsen.com/eu/en/insights/article/2018/global-consumers-look-for-companies-that-care-about-environmental-issues/>.
- Gilg, A., Barr, S., & Ford, N. (2005). Green consumption or sustainable lifestyles? Identifying the sustainable consumer. *Futures*, 37(6), 481-504. <https://doi.org/10.1016/j.futures.2004.10.016>
- Guagnano, G. (2001). Altruism and Market-Like Behavior: An Analysis of Willingness to Pay for Recycled Paper Products. *Population And Environment*, 22(4), 425-438. <https://doi.org/10.1023/a:1006753823611>
- F. Hair Jr, J., Sarstedt, M., Hopkins, L. and G. Kuppelwieser, V. (2014), "Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research", *European Business Review*, Vol. 26 No. 2, pp. 106-121. <https://doi.org/10.1108/EBR-10-2013-0128>
- 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. doi: 10.1080/08961530.2016.1251870
- Hamzaoui Essoussi, L., & Linton, J. (2010). New or recycled products: how much are consumers willing to pay?. *Journal Of Consumer Marketing*, 27(5), 458-468. <https://doi.org/10.1108/07363761011063358>

- Henseler, J., Ringle, C.M. & Sarstedt, M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. *J. of the Acad. Mark. Sci.* 43, 115–135 (2015). <https://doi.org/10.1007/s11747-014-0403-8>
- Hobson, K. (2006). Environmental psychology and the geographies of ethical and sustainable consumption: aligning, triangulating, challenging?. *Area*, 38(3), 292-300. <https://doi.org/10.1111/j.1475-4762.2006.00669.x>
- Jackson, T. (2014). Sustainable consumption. *Handbook Of Sustainable Development*, 279-290. <https://doi.org/10.4337/9781782544708.00029>
- Jambeck, J., Geyer, R., Wilcox, C., Siegler, T., Perryman, M., & Andrady, A. et al. (2015). Plastic waste inputs from land into the ocean. *Science*, 347(6223), 768-771. <https://doi.org/10.1126/science.1260352>
- Joshi, Y., & Rahman, Z. (2015). Factors Affecting Green Purchase Behavior and Future Research Directions. *International Strategic Management Review*, 3(1-2), 128-143. <https://doi.org/10.1016/j.ism.2015.04.001>
- Kabir, Syed Muhammad. (2016). *METHODS OF DATA COLLECTION*.
- Kolstad, I. (2007). Why Firms Should Not Always Maximize Profits. *Journal Of Business Ethics*, 76(2), 137-145. <https://doi.org/10.1007/s10551-006-9262-7>
- Kotchen, M., & Reiling, S. (2000). Environmental attitudes, motivations, and contingent valuation of nonuse values: a case study involving endangered species. *Ecological Economics*, 32(1), 93-107. doi: 10.1016/s0921-8009(99)00069-5
- Kotler, P. & Lane Keller, K., (2011). *Marketing Management*. 14th ed. Prentice Hall.
- Kirchherr, J., Reike, D., & Hekkert, M. (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>.
- Komolprasert, V., & Bailey, A. (2008). Recycled plastics for food applications: improving safety and quality. *Environmentally Compatible Food Packaging*, 326-350. <https://doi.org/10.1533/9781845694784.2.326>
- Korhonen, J., Nuur, C., Feldmann, A. and Birkie, S., (2018). Circular Economy as an essentially contested concept. *Journal of Cleaner Production*, 175, pp.544-552.

Laville, S. (2018). *Retailers likely to face backlash for failing to curb plastic use, survey finds*. the Guardian. Retrieved 26 October 2020, from <https://www.theguardian.com/environment/2018/aug/01/retailers-likely-to-face-backlash-for-failing-to-curb-plastic-use-survey-finds>.

*Learning from consumers: How shifting demands are shaping companies' circular economy transition – A circular economy survey*. ING Direct & Longitude. (2020).

Li-tze Hu & Peter M. Bentler (1999) Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives, *Structural Equation Modeling: A Multidisciplinary Journal*, 6:1, 1-55, DOI: 10.1080/10705519909540118

Lieder, M., & Rashid, A. (2016). Towards Circular Economy implementation: a comprehensive review in context of manufacturing industry. *Journal Of Cleaner Production*, 115, 36-51. <https://doi.org/10.1016/j.jclepro.2015.12.042>

Lien-Ti Bei & Eithel M. Simpson (1995) ,“The Determinants of Consumers' Purchase Decisions For Recycled Products: an Application of Acquisition-Transaction Utility Theory”, in *NA - Advances in Consumer Research Volume 22*, eds. Frank R. Kardes and Mita Sujan, Provo, UT : Association for Consumer Research, Pages: 257-261.

Lin, Y., & Chang, C. (2012). Double Standard: The Role of Environmental Consciousness in Green Product Usage. *Journal Of Marketing*, 76(5), 125-134. <https://doi.org/10.1509/jm.11.0264>

Magnier, L., Mugge, R., & Schoormans, J. (2019). Turning ocean garbage into products – Consumers' evaluations of products made of recycled ocean plastic. *Journal Of Cleaner Production*, 215, 84-98. doi: 10.1016/j.jclepro.2018.12.246

Malviya, S. (2021). Mondelez India, TrashCon tie up to make furniture from recycled plastic. Retrieved 13 July 2021, from <https://economictimes.indiatimes.com/tech/startups/mondelez-india-trashcon-tie-up-to-make-furniture-from-recycled-plastic/articleshow/83841855.cms>

Michaud, J. C., Farrant, L., Jan, O., Kjær, B. & Bakas, I. (2010). Environmental benefits of recycling, Waste & Resources Action Programme - WRAP, Oxon

- Michaud, C., & Llerena, D. (2010). Green consumer behavior: an experimental analysis of willingness to pay for remanufactured products. *Business Strategy And The Environment*, n/a-n/a. <https://doi.org/10.1002/bse.703>
- Mobley, A., Painter, T., Untch, E., & Rao Unnava, H. (1995). Consumer evaluation of recycled products. *Psychology And Marketing*, 12(3), 165-176. <https://doi.org/10.1002/mar.4220120302>
- Moisander, J. (2007). Motivational complexity of green consumerism. *International Journal Of Consumer Studies*, 31(4), 404-409. <https://doi.org/10.1111/j.1470-6431.2007.00586.x>
- Mostafa, M. (2007). A hierarchical analysis of the green consciousness of the Egyptian consumer. *Psychology And Marketing*, 24(5), 445-473. doi: 10.1002/mar.20168
- Murray, A., Skene, K., & Haynes, K. (2015). The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context. *Journal Of Business Ethics*, 140(3), 369-380. <https://doi.org/10.1007/s10551-015-2693-2>
- Nguyen, T., Lobo, A., & Greenland, S. (2017). The influence of cultural values on green purchase behavior. *Marketing Intelligence & Planning*, 35(3), 377-396. <https://doi.org/10.1108/mip-08-2016-0131>
- Nußholz, J. (2017). Circular Business Models: Defining a Concept and Framing an Emerging Research Field. *Sustainability*, 9(10), 1810. <https://doi.org/10.3390/su9101810>
- Oskamp, S., Cameron, C., Lipsey, M.W., Mindick, B., & Weissbach, T. 1991. Factors influencing household recycling behavior. *Environment and Behavior*. 23: 494-519
- Parker, L. (2020). *We made plastic. We depend on it. Now we're drowning in it.* National Geographic. Retrieved 26 October 2020, from <https://www.nationalgeographic.com/magazine/2018/06/plastic-planet-waste-pollution-trash-crisis/>.
- Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal Of Retailing And Consumer Services*, 29, 123-134. doi: 10.1016/j.jretconser.2015.11.006
- Peattie, K. (2010). Green Consumption: Behavior and Norms. *Annual Review Of Environment And Resources*, 35(1), 195-228. doi: 10.1146/annurev-environ-032609-094328

- Podsakoff, P., MacKenzie, S., Lee, J., & Podsakoff, N. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal Of Applied Psychology*, 88(5), 879-903. doi: 10.1037/0021-9010.88.5.879
- Recycled Plastics Market by Source, Type, End-Use Industry & Geography | COVID-19 Impact Analysis | MarketsandMarkets*. Marketsandmarkets.com. (2018). Retrieved 2 November 2020, from <https://www.marketsandmarkets.com/Market-Reports/recycled-plastic-market115486722.html#:~:text=%5B144%20Pages%20Report%5D%20The%20global,6.4%25%20during%20the%20forecast%20period.>
- Rethinking plastic packaging | Unilever. (2021). Retrieved 13 July 2021, from <https://www.unilever.com/planet-and-society/waste-free-world/rethinking-plastic-packaging/>
- Rizos, V., Tuokko, K., & Behrens, A. (2017) The Circular Economy: A review of definitions, processes and impacts. *Circular Impacts*.
- Sammer, K., & Wüstenhagen, R. (2006). The influence of eco-labelling on consumer behavior results of a discrete choice analysis for washing machines. *Business Strategy And The Environment*, 15(3), 185-199. <https://doi.org/10.1002/bse.522>
- Savut, I. (2020). Circular Economy Policies Touch 26 Markets Globally. Bloomberg.com. Retrieved 13 December 2020, from <https://www.bloomberg.com/news/articles/2020-07-16/circular-economy-policies-touch-26-markets-globally-bnef-chart>.
- Schweper, C., & Cornwell, T. (1991). An Examination of Ecologically Concerned Consumers and Their Intention to Purchase Ecologically Packaged Products. *Journal Of Public Policy & Marketing*, 10(2), 77-101. doi: 10.1177/074391569101000205
- Sniehotta, F., Presseau, J., & Araújo-Soares, V. (2014). Time to retire the theory of planned behaviour. *Health Psychology Review*, 8(1), 1-7. doi: 10.1080/17437199.2013.869710
- Snowden, S. (2021). Coca-Cola Transitions To 100% Recycled Plastic In Netherlands And Norway. Retrieved 13 July 2021, from <https://www.forbes.com/sites/scottsnowden/2020/09/11/coca-cola-transitions-to-recycled-plastic/?sh=14efb1bc6ed8>
- Strydom, W. (2018). Applying the Theory of Planned Behavior to Recycling Behavior in South Africa. *Recycling*, 3(3), 43. doi: 10.3390/recycling3030043



- Symposium on Sustainable Consumption (1994 : Oslo, Norway) & Ofstad, Sylvi & Norway. Miljøverndepartementet (1994). Symposium : sustainable consumption, 19-20 January 1994, Oslo, Norway. Ministry of Environment, Oslo
- Su, B., Heshmati, A., Geng, Y., & Yu, X. (2013). A review of the circular economy in China: moving from rhetoric to implementation. *Journal Of Cleaner Production*, *42*, 215-227. <https://doi.org/10.1016/j.jclepro.2012.11.020>
- Taylor, J. (1974). The Role of Risk in Consumer Behavior. *Journal Of Marketing*, *38*(2), 54-60. <https://doi.org/10.1177/002224297403800211>
- Taylor, M. (2017). *\$180bn investment in plastic factories feeds global packaging binge*. the Guardian. Retrieved 26 October 2020, from <https://www.theguardian.com/environment/2017/dec/26/180bn-investment-in-plastic-factories-feeds-global-packaging-binge>.
- Taylor, C. (2019). Meet Tetra Pak, the most maddening piece of packaging in your kitchen. Retrieved 30 June 2021, from <https://mashable.com/article/tetra-pak-recycle>
- Taylor, S., & Todd, P. (1995). An Integrated Model of Waste Management Behavior. *Environment And Behavior*, *27*(5), 603-630. doi: 10.1177/0013916595275001
- Thompson, R., Swan, S., Moore, C., & vom Saal, F. (2009). Our plastic age. *Philosophical Transactions Of The Royal Society B: Biological Sciences*, *364*(1526), 1973-1976. <https://doi.org/10.1098/rstb.2009.0054>
- Urban, M. (2015). Accelerating extinction risk from climate change. *Science*, *348*(6234), 571-573. <https://doi.org/10.1126/science.aaa4984>
- Vegter, A., Barletta, M., Beck, C., Borrero, J., Burton, H., & Campbell, M. et al. (2014). Global research priorities to mitigate plastic pollution impacts on marine wildlife. *Endangered Species Research*, *25*(3), 225-247. doi: 10.3354/esr00623
- Walker, C. (2017). *The Economics of Recycling*. Chemical-materials.elsevier.com. Retrieved 26 October 2020, from <https://chemical-materials.elsevier.com/chemical-manufacturing-excellence/economics-recycling/>.

Yadav, R., & Pathak, G. (2016). Young consumers' intention towards buying green products in a developing nation: Extending the theory of planned behavior. *Journal Of Cleaner Production*, 135, 732-739. doi: 10.1016/j.jclepro.2016.06.120

Yang, Q., Zhou, J., & Xu, K. (2014). A 3R Implementation Framework to Enable Circular Consumption in Community. *International Journal Of Environmental Science And Development*, 217-222. <https://doi.org/10.7763/ijesd.2014.v5.481>

Yildirim, S. (2020). The Consumer Role for Sustainable Development. *Advances In Marketing, Customer Relationship Management, And E-Services*, 325-341. <https://doi.org/10.4018/978-1-7998-3115-0.ch018>

## 9. Attachments

### Attachment 1 – Questionnaire in English

**Indicate your opinion regarding the following statements, using a scale from 1 (strongly disagree) to 7 (completely agree):**

	Strongly disagree 1	2	3	4	5	6	Completely agree 7
Purchasing a product made with recycled plastic can alleviate environmental problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Purchasing a product made with recycled plastic can help save natural resources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Products made with recycled plastic have lower quality compared to those made with virgin plastic.

Products made with recycled plastic have lower performances compared to those made with virgin plastic.

Products made or packed with recycled plastic are unsafe (for example in terms of health risk).

Products made with recycled plastic are more expensive than virgin plastic products.

Products made with recycled plastic are hard to find.

Products made with recycled plastic take more time and effort to find than conventional products.

The price of a product made with recycled plastic would affect my decision to purchase.

The availability of a product made with recycled plastic would affect my decision to purchase.

Whether I can easily find products made with recycled plastic would affect my decision to purchase.

**Indicate, on a scale from 1 (Not at all important) to 7 (Extremely important), how important the following statements are for you:**

Not at all important							Extremely Important
1	2	3	4	5	6	7	

To me, helping to protect the environment is	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To me, saving natural resources is:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To me, purchasing quality products is:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To me, purchasing safe products is:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To me, purchasing high-performance products is	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Indicate your opinion regarding the following statements, using a scale from 1 (strongly disagree) to 7 (completely agree):**

	<b>Strongly disagree</b>						<b>Completely Agree</b>
	1	2	3	4	5	6	7
My family thinks I should purchase recycled plastic products in place of conventional non-recycled products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My friends think I should purchase recycled plastic products in place of conventional non-recycled products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My colleagues think I should purchase recycled plastic products in place of conventional non-recycled products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most people who are important to me would want me to purchase recycled plastic products.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



How likely are you to do what your friends suggest you to do?

How likely are you to do what your colleagues suggest you to do?

**Indicate your opinion regarding the following statements, using a scale from 1 (strongly disagree) to 7 (completely agree):**

	Extremely bad 1	2	3	4	5	6	Extremely good 7
To me, purchasing recycled plastic products would be:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Extremely useless 1	2	3	4	5	6	Extremely useful 7
To me, purchasing recycled plastic products would be:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Extremely unnecessary 1	2	3	4	5	6	Extremely necessary 7
To me, purchasing recycled plastic products would be:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Indicate, on a scale from 1 (strongly disagree) to 7 (completely agree), how much you agree with the following statements:**

	Strongly disagree 1	2	3	4	5	6	Strongly agree 7
I am willing to buy products made with recycled plastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In the future, I intend to buy products made with recycled plastic

Over the next few months, I will make an effort to buy products made with recycled plastic rather than products made with virgin plastic.

**Indicate, on a scale from 1 (not at all knowledgeable) to 7 (extremely knowledgeable), how knowledgeable do you consider yourself to be about the following topics:**

Not at all knowledgeable  
1      2      3      4      5      6      7  
Extremely knowledgeable

How knowledgeable do you consider yourself to be about the environmental issues related to plastic pollution?

How knowledgeable do you consider yourself to be about the problems that the overproduction of plastic causes?

How knowledgeable do you consider yourself to be about the impact that plastic has on marine life?

## General information

1. Gender:

Male

Female

Prefer not to say

2. Age: \_\_\_\_\_

3. Education level:

Primary School

Middle school

High school

University

PhD

4. Annual income:

No income

0 € to 10.000 €

10.000€ to 20.000 €

20.000€ to 30.000 €

30.000€ to 40.000€

more than 50.000€