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RESEARCH ARTICLE

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Factors influencing purchase intention for recycled products: A comparative analysis of Germany and South Africa

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Abstract

Due to an increasing demand, companies have started producing recycled products. However, little is known about the specific purchase behavior. Hence, this study analyses the factors influencing purchase intention for recycled products including differences related to different types of products and between Germany and South Africa. A quantitative study in Germany ($n = 603$) and South Africa ($n = 692$). shows that purchase intention is significantly higher in South Africa. The influencing factors (individual, product, and context related constructs) are the same in both countries, but they differ regarding their strength. Thus, the factor "attitude/environmental concern" has the strongest influence in South Africa, while it is "value/accessibility" in Germany. Furthermore, purchase intention for mobile phones is generally smaller than for t-shirts and toilet paper. Purchase intention for recycled t-shirts is significantly higher in South Africa than in Germany.

KEYWORDS
developed- and developing countries, influencing factors, product types, purchase intention, recycled products, sustainable development

1 | INTRODUCTION

Since 1950, the global population has more than tripled. Although the population growth has decelerated recently, it is expected that 9.5 billion people will be living on our planet by 2050. (United Nations, 2022) In order to satisfy the needs of these people, natural resources are increasingly being depleted. On the one hand, this depletion has a negative impact on our environment. (United Nations, 2021) On the other hand, many natural resources are in short supply, which is why we are faced with the challenge of securing supplies for future generations by managing and restoring them. (OECD, 2012).

To ultimately protect both our environment and the availability of natural resources, the concept of Sustainable Development was introduced. (United Nations, 1987) In 2015, the United Nations presented "17 sustainable development goals," including various actions such as to stop global poverty and hunger by 2030. Goal number 12 explicitly deals with sustainable consumption and production, where the reduction of humanity's ecological footprint by the maximum conservation of resources and the use of recycling or waste reduction is emphasized (United Nations Development Programme, 2022). One way of moving toward sustainable development is through the concept of the circular economy (CE) (Ellen MacArthur Foundation, 2022), which often refers to the "3Rs" reduce, reuse, and recycle (Ghisellini et al., 2015; Grafström & Aasma, 2021; e.g., Kirchherr et al., 2017). Recycling is the most commonly applied of the 3Rs (Ghisellini et al., 2015). In recent years, renowned companies, such as Apple, H&M, and Adidas, have implemented recycling programs in which they collect used products and ultimately produce products made from recycled materials (Lv et al., 2021; Meng & Leary, 2019).

Due to the negative developments in our environment, an increasing number of people have started to demand sustainable products (Kumar et al., 2021). Within the last 5 years, the intention to buy sustainable products increased globally by 63% (Simon + Kucher & Partners, 2021)

However, in order to manage the transformation to a circular economy, consumers should not only intend to buy such products but also accept them and actually buy them. (Calvo-Porral & Lévy-Mangin, 2020). It is therefore important to discover which factors influence the purchase intention for recycled products to find out what makes consumers buy such products and finally be able to derive appropriate marketing strategies.

2 | RESEARCH GAPS AND OBJECTIVES

Numerous studies have been conducted in recent years to determine which factors influence purchase intentions for sustainable products in general (e.g., Nekmahmud & Fekete-Farkas, 2020; Testa et al., 2021). Although recycled goods can be considered sustainable products (e.g., Biswas, 2016; Mohd Suki, 2015), little is known about the factors that influence purchase intentions regarding these in a narrower sense (Bigliardi et al., 2020; Calvo-Porral & Lévy-Mangin, 2020). This fact is confirmed by the literature research carried out as part of the present study. Only 14 relevant publications could be identified for the period 2010 to 02/2022, which is shown in Table 1. These publications are usually very specific and examine only a few influencing factors. (e.g., Calvo-Porral & Lévy-Mangin, 2020; Queiroz et al., 2021). Furthermore, purchase intentions are often only investigated for specific product types such as apparel. (e.g., Chaturvedi et al., 2020; Chi et al., 2021; Wagner & Heinzel, 2020) Hence, the literature is not only scarce but also fragmented. (Bigliardi et al., 2020). Thus, one objective of this paper is to discover the factors that influence purchase intentions for recycled products in a quantitative study.

Another point to consider are different product types. Previous publications have focused mainly on apparel (e.g., Chaturvedi et al., 2020; Chi et al., 2021; Wagner & Heinzel, 2020), plastic products, or apparel made from recycled plastic (e.g., Luu & Baker, 2021; Meng & Leary, 2019; Nguyen et al., 2018; Queiroz et al., 2021). However, further studies have found that there may be a difference in purchase intentions concerning different product types (Magnier et al., 2019). Hence, another objective of this study is to determine the influence of different product types on purchase intentions for recycled products, namely toilet paper, t-shirt and mobile phone. This aim is underpinned by the fact that past publications have also requested further exploration of this area (e.g., Agostini et al., 2021; Bigliardi et al., 2020; Ta et al., 2022).

Finally, the need to examine country-specific differences should be highlighted (Agostini et al., 2021; Bigliardi et al., 2020; Ta et al., 2022). Existing literature usually refers to single countries such as Brazil (Queiroz et al., 2021), Vietnam (Luu & Baker, 2021; Nguyen et al., 2018), the USA (Bae, 2021; Meng & Leary, 2019), India (Chaturvedi et al., 2020), Spain (Calvo-Porral & Lévy-Mangin, 2020), the Netherlands (Magnier et al., 2019), or Canada (Hamzaoui Essoussi & Linton, 2010). However, Queiroz et al. (2021) suggested that purchase intentions might differ due to various economic, social, and psychosocial factors. Differences could exist with regard to whether countries are developed or developing (Luu & Baker, 2021). Developing countries are generally slower than developed ones in embracing the concept of the circular economy (Ngang et al., 2019). This trend makes the comparison of a developed country like Germany and a developing country like South Africa of particular significance. For this reason, another goal of this study is to ascertain how the results differ between a developing and a developed country.

3 | LITERATURE REVIEW

3.1 | Sustainable development

The concept of sustainability originated in the 1980s. The concept focuses on the development of the environment, but specifically on the consumption of natural resources. Its primary goal is to balance the environment and the economy, based on the assumption that resources cannot be depleted indefinitely (Portney, 2015).

The term is often used to refer to the "3Es" environment, economy, and equity. By this, it is understood that sustainability can only be achieved if the environment is protected, while ensuring economic growth and equity. A balance of all three concepts should be established, knowing there is a trade-off between economic growth, environmental protection, and equity (Portney, 2015).

In this context, reference is made to the concept of sustainable development, first introduced in the 1987 report "our common future," also known as the Brundtland Report (Balderjahn, 2021). In 2015, the United Nations presented the 17 sustainable development goals (SDG). Goal number 12 explicitly pursues the goal of sustainable consumption and production. The reduction of humanity's ecological footprint through the maximum conservation of resources and the use of recycling or waste reduction is particularly emphasized (United Nations Development Programme, 2022). The SDGs and the circular economy are interrelated. Ultimately, the circular economy contributes to the achievement of some of the 17 goals, and it directly helps achieve goal number 12 (Ghosh, 2020).

3.2 | Recycling

As an integral part of circular economy, the topic of recycling has also gained importance again in recent years and is frequently addressed and politically pushed (Schäfer, 2021). The frequency with which both topics have been discussed is displayed in Figure 1, which shows the number of publications.

Nevertheless, the global economy is still a long way from implementing the CE. Recycling is the most common of the 3R approaches (Ghisellini et al., 2015), despite being less environmentally friendly than reducing or reusing (Stahel, 2014). However, recycling is a better alternative than throwing products away (Münger, 2021) since it significantly reduces waste and the demand for natural resources, which in turn leads to a reduction in pollution (EPA, 2021). According to Pearce (2009), recycling is defined as "the process by which a used product is broken down into consistent parts, which are converted into different products or used as raw material." Thus, recycled products are items made from materials that have been recycled and are transformed into new products (Pearce, 2009).

TABLE 1 Literature overview of purchase intentions of recycled products

No.	Author(s)	Sample	Country	Data collection	Product type	Dependet variable(s)	Independent variable(s)
1	Queiroz et al. (2021)	$N = 422$	Brazil	Online Survey	Recycled PET products	• Purchase intention	• Perceived quality • Product image • Sustainability/environmental benefits • Safety
2	Luu and Baker (2021)	$N = 495$	Vietnam	Online Survey	Recycled PET bottle-based apparel	• Purchase intention	• Perceived Quality • Product Image • Sustainability • Safety
3	Bae (2021)	$N = 170$ $N = 100$	US	2 Online Surveys	Recycled products	• Purchase intention	• Implicit Theories • Perceived Product Quality • Reactions to Recycled Products
4	Chi et al. (2021)	$N = 16$	US	Qualitative interviews	Recycled athletic apparel	• Purchase intention	• Functional value • Emotional value • Epistemic value • Conditional value • Social value
5	Chaturvedi et al. (2020)	$N = 497$	India	Online survey	Recycled clothing	• Purchase intention	• Environmental concern • Personal norms • Willingness to pay • Perceived value
6	Calvo-Porral and Lévy-Mangin (2020)	$N = 312$	Spain	Online survey	Recycled goods	• Purchase intention	• Perceived quality • Product image • Sustainability/environmental benefits • Safety
7	Nguyen et al. (2020)	$N = 425$	Vietnam	Online survey	Fashion made of recycled plastic waste	• Purchase intention (Consumption Behavior)	• Price • Environmental awareness • Product quality • Community influence • Consumer identity • Product's versatility • Awareness of brand image
8	Park and Lin (2020)	$N = 217$	Korea	Online survey	Recycled and upcycled fashion products	• Purchase intention • Purchase experience	• Availability risk • Economic risk • Utilitarian value • Self-expressiveness • Interpersonal differentiation • Subjective norms • Perceived consumer effectiveness • Environmental concern
9	Meng and Leary (2019)	$N = 215$	US	Online survey	Fashion made of recycled plastic bottles	• Purchase intention	• Contagion • Contamination • Disgust
10	Magnier et al. (2019)	$N = 258$	Netherlands	Online survey	Products made of ocean plastic	• Purchase intention • Willingess to pay	• Perceived benefits (Environmental benefits, anticipated conscience, recognisability) • Perceived risks (reduced quality and functionality, limited attractiveness, value for money, contamination, perceived safety)
11	Sun et al. (2018)	$N = 215$	Hong Kong	Survey	Recycled products (A4 paper, mobile phones, printers)	• Purchase intention • Purchase behavior	• Risk and uncertainty • Environmental knowledge • Perceived Quality • Attitude toward environmental protection
12	Hamzaoui-Essoussi and Linton (2014)	$N = 359$	Canada	Survey	Recycled/ remanufactured products	• Willingness to pay	• Product category • Perceived risk • Perceived quality • Brand name

(Continues)

TABLE 1 (Continued)

No.	Author(s)	Sample	Country	Data collection	Product type	Dependet variable(s)	Independent variable(s)
13	Hamzaoui Essoussi and Linton (2010)	$N = 49$	Canada	Survey	Recycled products	• Willingness to pay premium prices	• Functional risk
14	Bigliardi et al. (2020)	—	—	Theoretical framework	Recycled products	• Purchase intention	—

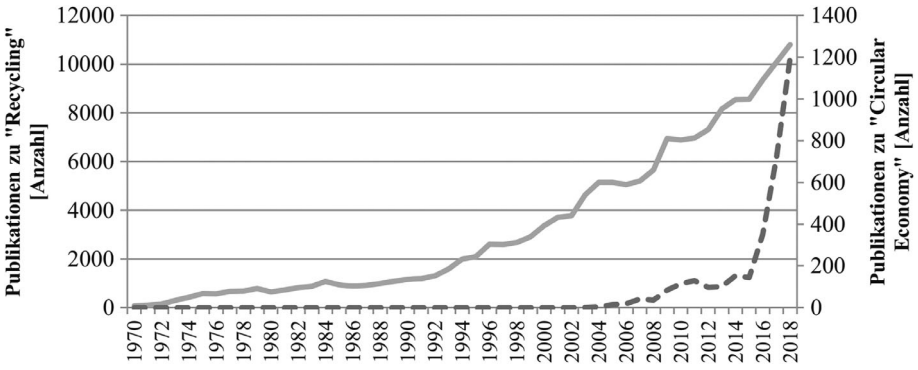

FIGURE 1 Number of publications of recycling (left) and circular economy (right). *Source*: Schäfer (2021)

3.3 | Germany

In Germany, more than 400 million tons of waste were generated in 2020 (Destatis, 2022a). Despite the increasing waste production, which is mainly attributable to the private sector, Germany has a good recycling rate of 70% (Nelles et al., 2020) only exceeded by Belgium and the Netherlands, with around 80% (Deutsche Recycling, 2022). However, regarding the per capita municipal waste, Germany ranks relatively poorly, generating 632 kg of waste per year (more than 100 kg above the EU average) (Destatis, 2022b). New regulations ensure that recycling will have a higher priority in the future (Nelles et al., 2020). For example, the European Union has drawn up a directive concerning CE (European Commission, 2022), officially "Directive 2008/98/EC" (EUR-Lex, 2018) giving priority to recycled products (Urbansky, 2020).

Most consumers in Germany (75%) already pay attention to sustainability when buying new products (McKinsey & Company, 2021). Concern for the environment has led German consumers to change their shopping behavior. The primary factors preventing German consumers from buying sustainable products are a lack of trust in eco-labels and the tendency toward high prices (Statista Global Consumer Survey (GCS), 2021). Although around 30% believe that companies are responsible for tackling climate change, around half of German consumers think their own behavior plays a role (Statista Global Consumer Survey (GCS), 2021).

3.4 | South Africa

In terms of waste management and the introduction of CE, South Africa is said to be two to three decades behind European and other developed countries (Godfrey & Oelofse, 2017) For example, about 90% of South African waste ends up in landfills (Department of Environmental Affairs, 2012). This type of waste disposal seems typical for developing countries (Agamuthun, 2013).

Nevertheless, recycling has been pursued in South Africa for many years (Godfrey & Oelofse, 2017). After the introduction of the White Paper on Integrated Pollution and Waste Management for South Africa in 2000 (Department of Environmental Affairs and Tourism, 2000) and the first National Waste Management Strategy (NWMS), further guidelines and laws followed, the aim being to help South Africa develop into a zero-waste nation. The South African president recently called for the country to follow global developments and participate in the circular transformation (Nahman et al., 2021).

South Africa will face floods and droughts with increasing frequency due to ongoing climate change (BBC, 2022). Increasing environmental degradation is leading to increased consumption of sustainable products. Hence, concern about the environment generally leads to a positive purchase intention, but, in many cases, this does not result in an actual purchase (Koloba, 2020). Furthermore, South Africans do not boycott environmentally unfriendly stores or brands or encourage friends and family to buy sustainable products (Mkhize & Ellis, 2020).

3.5 | Purchase intention for recycled products

In the field of marketing, purchase intention has been considered an important predictor of whether consumers are willing to buy a product in the future (Namias, 1959). The Theory of Planned Behavior (TPB) is particularly relevant to purchase intentions. This theory is a

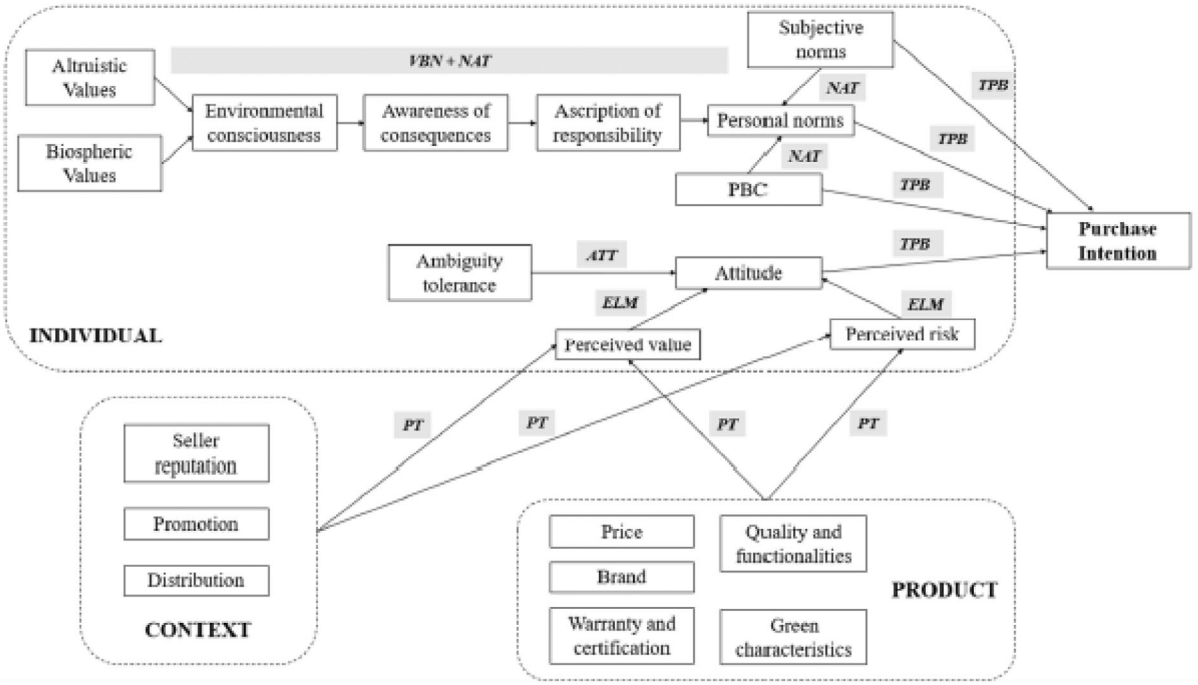

FIGURE 2 Theoretical framework of factors influencing purchase intention for recycled products. *Source*: Bigliardi et al. (2020)

further development of Fishbein and Ajzen's Theory of Reasoned Action (TRA), which was developed in the 1970s. The TRA initially included the variables attitude and subjective norm and was later supplemented with the variable perceived behavioral control, finally giving rise to the TPB (Ajzen, 1991). These three variables influence intention, which in turn is used to predict future behavior (Ajzen, 1991). This older theory originated in the 1970s and is still considered one of the most influential theories for predicting behavior (Zhuang et al., 2021), especially in the field of purchase intentions for green products (Wijekoon & Fazli Sabri, 2021).

When it comes to the definition of purchase intention, reference is made to the TPB where according to Ajzen (1991) the concept of intention is defined as follows: "Intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior. As a general rule, the stronger the intention to engage in a behavior, the more likely should be its performance."

Another problem is that the existing literature on the topic is fragmented, as the publications rely on different theories originating from psychology, sociology, and marketing (Bigliardi et al., 2020). Most publications focusing on recycled products examine the influence of individual factors such as the impact on purchase intention of the quality, image, sustainability, or safety of recycled products (Calvo-Porral & Lévy-Mangin, 2020; Queiroz et al., 2021). Some studies concentrate on the influence of perceived value on purchase intention (Chi et al., 2021), while others use adaptations of behavioral theories such as the TRA (Sun et al., 2018) or the TPB to explain purchase intentions of recycled products. To reduce this complexity, Bigliardi et al. (2020) developed a theoretical framework to provide a holistic picture of the factors influencing purchase intention for recycled products, which is divided into three blocks: individual-related, context-related, and product-related. The individual-related block contains constructs related to individual values, beliefs, norms, and attitudes. The product-related block contains all constructs that can be attributed to the product, and the context-related block is about factors that influence perception about a product (Bigliardi et al., 2020). Figure 2 shows the theoretical framework from Bigliardi et al. (2020). The constructs of the individual-related block were derived from the value belief norm (VBN) and the norm activation theory (NAT), the ambiguity tolerance theory (ATT), the elaboration-likelihood models (ELM) and the theory of planned behavior (TBP). The context-related and product-related blocks were derived from the prospect theory (PT) (Bigliardi et al., 2020).

Other publications providing similar theoretical frameworks relating to green products were found. For example, Zhuang et al. (2021) divided the factors influencing green purchase intentions into three categories: cognitive factors, consumer individual characteristics, and social factors. Wijekoon and Fazli Sabri (2021) published a literature review on the "determinants that influence green product purchase intention and behavior" and assigned the numerous identified constructs to five blocks: individual and non-individual factors, situational factors, product attributes, and demographics. Zhang and Dong (2020) developed a theoretical framework based on various theories. The authors divided their framework into "individual factors, product attributes and marketing, and social factors." Since the theoretical framework developed by Bigliardi et al. (2020) is the only one with a specific focus on recycled products, it was deemed appropriate for

the present research. The framework has already been applied in a study on recycled PET products in Brazil (Queiroz et al., 2021).

Zhang and Dong's (2020) systematic literature review includes 97 papers on purchase behavior and purchase intention of green products (including recycled products). The authors identified more than 40 constructs influencing green purchase behavior (Zhang & Dong, 2020). Zhuang et al. (2021) meta-analysis examined 54 quantitative studies related to green purchase intention (Zhuang et al., 2021). Wijekoon and Fazli Sabri's (2021) systematic literature considered 108 papers published between 2015 and 2021. The review identified 212 constructs that influence purchase intention (Wijekoon & Fazli Sabri, 2021). Constructs mentioned in at least two of three publications are included in the current research. Table 2 shows the development of relevant influencing factors.

Bigliardi et al. framework does not include the construct perceived consumer effectiveness. However, the construct was mentioned as relevant in all three additional publications, which is why it is included in this study (Wijekoon & Fazli Sabri, 2021; Zhang & Dong, 2020; Zhuang et al., 2021).

The following formulation of the hypotheses follows a combination of deduction and induction. In a first step the constructs were identified and derived based on the literature analysis. In a second step the context specific results of the factor analysis for recycled products were taken into consideration. They sometimes show that two originally in another context separated constructs, for example, general attitude and environmental concerns are one construct in the specific context of purchasing recycled products.

3.6 | Individual-related constructs

Zhuang et al. (2021) found that the more risk consumers perceive in relation to buying a green product, the less willing they are to buy it.

Perceived consumer effectiveness means whether a person believes they can contribute to solving environmental problems—for example by buying environmentally friendly products (Kinnear et al., 1974). The relationship between perceived consumer effectiveness and green purchase intention is significant (Sharma & Dayal, 2016). Moreover, Wijekoon et al. (2021) stated that perceived consumer effectiveness is a key factor influencing purchase intentions for green products.

Contamination associated with recycled products negatively impacts purchase intention (Baxter et al., 2017; Magnier et al., 2019). A factor analysis based on the collected data showed that perceived contamination, perceived risk and consumer effectiveness are one construct which is summarized in the following hypothesis:

> **Hypothesis 1.** *Uncertainty has a negative influence on purchase intention for recycled products.*

TABLE 2 Development of relevant influencing factors based on Bigliardi et al., 2020

Block	Constructs/variables	Description	a	b	c
Individual-related	Altruistic values	Values that let us contribute to the welfare of others			x
	Biospheric values	Values that make us feel concerned for the nature and biosphere			x
	Environmental consciousness/concern	Concern for the environment	x	x	x
	Awareness of consequences	Awareness of what consequences our own behavior has			x
	Ascription of responsibility	Not wanting to take responsibility for the consequences of our own behavior			x
	Subjective norm	Influence of other people on our own behavior	x	x	x
	Perceived behavioral control	To what extent a desired behavior can also be implemented	x	x	x
	Ambiguity tolerance	Being tolerant in contradictory situations			
	Attitude	The attitude leads to a certain behavior	x	x	x
	Perceived value	The "trade-off between perceived benefit and perceived sacrifice"	x	x	x
	Perceived risk	Perceived risk toward a product or service	x	x	x
Product-related	Certification[a]	Certificates or eco-labels on a product	x		x
	Brand equity	The value of a brand			x
	Price	The price of a product	x		x
	Quality and functionalities	The quality characteristics of the product	x	x	x
	Green characteristics	Refers to the green characteristics of the seller			
Context-related	Seller reputation	The reputation of the seller			
	Promotion	Advertising and all communication measures	x		x
	Distribution	Access and availability of the products	x		x

[a]Originally: Warranty and Certification. However, Warranty was not included, as the three publications only identified Certification as a factor.

The construct attitude stems from the TPB, for which Ajzen (1991) describes it as "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question." Among other things, people assign attributes to objects they associate with and then evaluate the object as positive or negative, ultimately forming an attitude toward an objective (Ajzen, 1991). Previous studies have discovered that attitude positively influences purchase intention of green or remanufactured products (Chan, 2001; Hazen et al., 2016; Mostafa, 2008). In some studies, however, attitude has been identified as the preeminent factor influencing such purchase intentions (Rausch & Kopplin, 2020; Wang et al., 2013).

Environmental concern is the extent to which people are concerned about the state of the natural environment (Weigel & Weigel, 1978). The more concerned people are, the more likely it is to affect their behavior (Fransson & Gärling, 1999). Environmental concern has been identified as one of the major influencing factors for green purchase intentions (Wijekoon & Fazli Sabri, 2021). Empirical evidence supports the relationship between environmental concern and purchase intention for green products in general (Rausch & Kopplin, 2020) but also particularly for recycled products (Park & Lin, 2020). Originally separated the factor analysis showed attitude and environmental concern belonging to the same construct.

Hypothesis 2. *Attitude/environmental concern has a positive influence on purchase intention for recycled products.*

The construct perceived behavioral control is part of the TPB and is defined as "the perceived ease or difficulty of performing the behavior" (Ajzen, 1991). Perceived behavioral control refers to how difficult or easy it is for consumers to implement a desired behavior (Ajzen, 1991). The greater the perceived behavioral control, the stronger the intention to perform a desired behavior (Ajzen, 1991). This has also been confirmed in studies regarding green products (Wang, Wang, et al., 2018; Xu et al., 2020).

According to past research, perceived value strongly influences purchase intention for recycled products (Chaturvedi et al., 2020). Quality, or perceived quality, is the subjective perception of the quality of a product (Zeithaml, 1988). According to Magnier et al. (2019) customers are more likely to purchase a recycled product if the quality is expected to be the same as that of products made from new/conventional materials. However, research shows that recycled products are judged to be of lower quality, which ultimately reduces purchase intention (Bae, 2021; Luu & Baker, 2021; Queiroz et al., 2021). The factor analysis showed perceived behavioral control, perceived value and perceived quality being one construct.

Hypothesis 3. *Value/accessibility has a positive influence on purchase intention for recycled products.*

The construct subjective norm is also part of TPB and is defined as "the perceived social pressure to perform or not to perform the behavior." It is assumed that the greater the subjective norm, the more likely it is that an intention will result in actual behavior (Ajzen, 1991). Previous research dealing specifically with recycled or remanufactured products has identified subjective norm as positively influencing purchase intention (Khor & Hazen, 2016; Park & Lin, 2020).

Hypothesis 4. *Subjective norm has a positive influence on purchase intention for recycled products.*

3.7 | Product-related constructs

According to Joshi and Rahman (2015) and Nguyen et al. (2018), a high price reduces the willingness to buy green products. Therefore, the following hypothesis is made:

Hypothesis 5. *A price lower than that of new/conventional products has a positive influence on purchase intention for recycled products.*

3.8 | Context-related constructs

Bigliardi et al. (2020) defined the promotion construct as communication activities that ensure potential consumers are made aware of products and ultimately consider buying them. Qu et al. (2018), concluded that advertising influences people's attitudes toward remanufactured heavy-truck engines. Zhuang et al. (2021) recommend that companies promote green products, as this promotion positively affects purchase intention.

Consumers look at certifications or eco-labels when considering recycled products (Harms & Linton, 2015). Zhang and Dong (2020) refer to publications that confirm the importance of eco-labels when buying green products. Riskos et al. (2021) revealed that eco-label credibility positively influences attitude and behavior toward purchasing green products. Since the factor analysis revealed that both constructs load on the same factor, the following hypothesis is made:

Hypothesis 6. *The promotion/certification of recycled products has a positive influence on purchase intention for recycled products.*

The availability of products also positively affects purchase intention for recycled products (Bigliardi et al., 2020). A qualitative study by Connell (2010) investigated the major barriers consumers face when purchasing sustainable apparel. One of the major barriers identified was the lack of availability of such products. Furthermore, Walia et al. (2019) and Nguyen et al. (2018) identified that product availability significantly influences purchase intention of green products.

Hypothesis 7. *Buying effort has a negative influence on purchase intention for recycled products.*

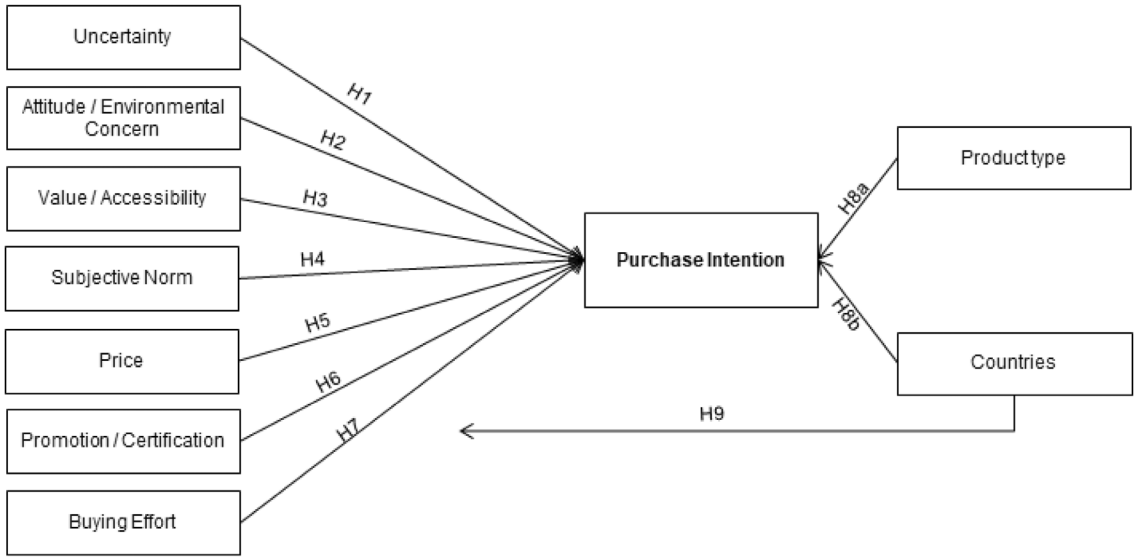

FIGURE 3 Research model, summary of hypotheses

3.9 | Product types

Magnier et al. (2019) investigated consumers' evaluations of recycled ocean-plastic products. The authors mention that past research has revealed a difference in consumers' responses to different types of products, based mainly on the research findings of Hamzaoui Essoussi and Linton (2010). However, Magnier et al. (2019) state that the differences have various causes. They summarize some of these as follows: How often consumers purchase a product, how consumers expect a product to perform, how long consumers expect a product to last, the level of symbolic value a product has for consumers and the degree to which a product is used in public by consumers. Similar research was conducted by Mobley et al. (1995) who examined consumers' reactions to personal hygiene-related recycled products. This leads to the following hypotheses:

> **Hypothesis 8.** *The purchase intention for recycled products varies based on different product types and between Germany and South Africa.*

> **Hypothesis 8a.** *The purchase intention for recycled products varies based on different product types.*

> **Hypothesis 8b.** *The purchase intention for recycled products varies between Germany and South Africa.*

For the current study, the products will be selected following the approach of Magnier et al. (2019) in choosing the product types from the categories textiles, durables and FMCGs. It is essential that the chosen products are widely available to the target groups in Germany and South Africa. The products also need to be made of recycled material. Therefore the product types t-shirt (textiles/apparel), durables (electronics/mobile phone) and FMCGs (paper/toilet paper) are selected.

3.10 | Country-specific differences

Regarding purchase intention for green products, the small number of publications regarding cultural or country-specific differences are often criticized (e.g., Testa et al., 2021; Zhang & Dong, 2020). Most publications concerning green products focus on Asia or Europe (Testa et al., 2021). Zhang and Dong (2020) identified just four cross-cultural studies involving developed and developing countries. One of them compares the differences in green purchase intentions in high context (American) and low context (Indian) cultures (Patel et al., 2020). Another study examines the green purchase behavior of consumers in the US and India (Muralidharan et al., 2016). A third looked at motivations for sustainable consumption in Germany and China (Ali et al., 2019) and another examined consumption values in the UK and China (de Silva et al., 2021).

No existing study could be identified that examines country differences in purchase intentions for recycled products. Various publications have called for an investigation of cultural differences in purchase intentions for recycled products (e.g., Bigliardi et al., 2020; Magnier et al., 2019). However, the subsections above suggest influencing factors vary. This research aims to discover what these factors are.

> **Hypothesis 9.** *The influencing factors of purchase intentions for recycled products differ between Germany and South Africa.*

Figure 3 shows the model by summarizing the nine hypotheses.

TABLE 3 Targeted and achieved quotas for South Africa and Germany

	South Africa ($n = 692$)			Germany ($n = 603$)		
Criteria	**Target in %**	**Reached in %**	***N***	**Target in %**	**Reached in %**	***N***
LSM 7	30.00	28.32	196	–	–	–
LSM 8	23.33	22.54	156	–	–	–
LSM 9	20.00	20.81	144	–	–	–
LSM 10	26.67	28.32	196	–	–	–
Male	–	33.38	231	48.93	50.58	305
Female	–	66.47	460	51.07	49.25	297
Diverse/not specified	–	0.14	1	–	0.17	1
18–24	–	17.05	118	15.36	14.93	90
25–34	–	26.73	185	19.74	20.23	122
35–49	–	32.80	227	23.56	24.05	145
50–64	–	16.33	113	26.71	26.20	158
65+	–	7.08	49	14.63	14.59	88
Less than R 8000/Less than € 1250	–	22.83	159	8.88	8.46	51
R 8001 to 18,000/€ 1250 to 2000	–	39.16	271	15.12	15.09	91
R 18,001 to 37,000/€ 2001 to 3000	–	28.32	196	22.13	21.72	131
R 37,001 to 63,000/€ 3001 to 5000	–	8.38	58	27.55	27.69	167
R 63,000 and more/€ 5001 and more	–	1.30	9	26.32	27.03	163

4 | OPERATIONALISATION

4.1 | Individual-related constructs

To operationalize the construct attitude in the context of green products, Chan (2001), Mostafa (2008), Wang et al. (2013), Hazen et al. (2016), and Rausch and Kopplin (2020) used the scale provided by Taylor and Todd (1995). The same scale is adopted in the present study.

A standard way of measuring subjective norm is to ask how important people (family, friends, partners, etc.) feel about a certain behavior to ascertain the extent to which one's behavior is influenced by them (Ajzen, 1991). Rausch and Kopplin (2020) and Kumar et al. (2016) measured subjective norm by using the scale devised by Vermeir and Verbeke (2007). Xu et al. (2020) took a similar approach based on Han and Kim (2010) and Chen and Tung (2014), using three items only. Finally, Xu et al. (2020) approach was chosen due to the validity and reduced number of items.

The construct perceived behavioral control is measured based on Wang et al. (2013) looking at remanufactured auto parts following the approach of Taylor and Todd (1995) and Bansal and Taylor (2002).

Pretner et al. (2021) measured environmental concern by combining six items from Dermody et al. (2015) and Polonsky et al. (2012). Based on validity and number of items the scales used by Park and Lin (2020) and Rausch and Kopplin (2020) are used. The items they used were originally adopted from Dunlap et al. (2000).

Past research has assigned distinct dimensions to the different risk types and measured them with several items (Featherman & Pavlou, 2003; Kim et al., 2021; Park & Lin, 2020). However, Wang et al. (2013) and Wang and Hazen (2016) considered risk as one dimension, and in their studies, each item consists of one type of risk. The items were based on research by Grewal et al. (1994), McCorkle (1990), Peter and Tarpey (1975), Featherman and Pavlou (2003), and Dodds et al. (1991). This study also considers risk as one dimension and uses a combination of the items from Wang et al. (2013) and Wang and Hazen (2016).

Sweeney and Soutar (2001) developed a scale for measuring perceived value. They identified four dimensions: emotional, social, quality/performance, and price/value for money. In previous research, the various dimensions of perceived value have been measured individually using three or four items each (Kim et al., 2021), or perceived value has been considered as a single dimension (Wang & Hazen, 2016; Wang, Hazen, et al., 2018). The present study considers perceived value as a single dimension and, therefore, uses a combination of three items based on Wang and Hazen (2016) and Wang, Hazen, et al. (2018), Wang, Wang, et al. (2018), based on Monroe & Krishnan (1985), Zeithaml (1988), and Dodds et al. (1991).

Park and Lin (2020) followed the approach of Kim and Choi (2005) and measured the perceived consumer effectiveness similar to the approach of Ellen et al. (1991). Since Ellen et al. (1991) approach is more general than that of Kim and Choi (2005), it is adopted for the current study.

4.2 | Product-related constructs

In previous studies, price has been measured in various ways. For example, Hamzaoui Essoussi and Linton (2010), Guagnano (2001) and

TABLE 4 Factor analysis, rotated component matrix

Rotated component matrix components							
Items	Uncertainty	Attitude/environmental concern	Promotion/ certification	Value/ accessibility	Subjective norm	Price	Buying effort
IR1_AT1	−0.270	0.537	0.232	0.351	0.233	0.208	0.184
IR1_AT2	−0.363	0.543	0.236	0.321	0.192	0.112	0.184
IR1_AT3	−0.322	0.542	0.203	0.384	0.177	0.086	0.187
IR4_SN1	0.033	0.215	0.141	0.295	0.741	0.088	0.033
IR4_SN2	−0.001	0.239	0.190	0.225	0.755	0.120	0.054
IR4_SN3	−0.041	0.307	0.215	0.200	0.713	0.061	0.091
IR7_PBC1	0.048	0.106	0.134	0.703	0.195	0.168	−0.254
IR8_PBC2	0.239	0.010	0.116	0.584	0.161	0.068	−0.170
IR8_PBC3	0.095	0.047	0.170	0.711	0.205	0.112	−0.276
IR9_EC1	−0.120	0.747	0.244	−0.011	0.134	0.093	−0.010
IR10_EC2	−0.054	0.751	0.208	−0.022	0.164	0.115	−0.023
IR11_EC3	−0.151	0.777	0.264	0.041	0.121	0.065	−0.040
IR12_PR1	0.766	−0.028	0.020	−0.150	0.017	−0.178	0.006
IR13_PR2	0.793	−0.001	0.006	−0.100	0.000	−0.178	0.023
IR14_PR3	0.774	−0.161	−0.119	−0.068	−0.056	−0.028	0.043
IR15_PR4	0.739	−0.030	0.075	−0.021	0.052	−0.086	0.042
IR16_PR5	0.708	−0.100	0.027	0.118	0.019	0.046	0.182
IR17_PR6	0.763	−0.210	−0.068	−0.075	0.001	−0.015	−0.003
IR19_PV1	−0.286	0.416	0.201	0.481	0.244	0.125	0.226
IR19_PV2	0.037	0.104	0.342	0.429	0.322	−0.100	0.253
IR19_PV3	−0.243	0.374	0.175	0.430	0.343	0.178	0.235
IR22_PCE1	0.549	−0.045	−0.215	0.263	−0.182	−0.033	0.198
IR22_PCE2	0.514	0.074	−0.091	0.295	−0.291	−0.125	0.174
IR22_PCE3	0.221	−0.558	−0.336	−0.191	−0.236	−0.100	−0.077
PR1_P1	0.219	0.072	0.178	0.277	0.236	0.680	0.021
PR2_P2	−0.298	0.078	−0.113	−0.108	−0.042	0.590	−0.230
PR3_P3	−0.172	0.251	0.183	0.174	0.087	0.621	0.097
PR4_QF1	−0.316	0.277	0.283	0.417	0.174	0.383	0.183
PR5_QF2	−0.283	0.188	0.103	**0.402**	0.131	**0.447**	0.239
PR6_QF3	0.734	−0.217	−0.075	0.099	−0.018	0.012	0.090
PR7_QF4	0.745	−0.274	−0.102	0.066	0.030	0.058	0.113
PR8_C1	−0.099	0.245	0.581	0.240	0.315	0.167	−0.008
PR9_C2	−0.106	0.300	0.558	0.180	0.337	0.279	0.051
PR10_C3	−0.045	0.244	0.533	0.166	0.322	0.261	−0.010
CR1_D1	0.211	0.085	0.186	0.002	0.191	0.161	0.604
CR2_D2	0.386	−0.007	−0.004	−0.222	−0.015	−0.078	0.631
CR3_D3	0.184	0.065	0.229	−0.160	0.011	−0.058	0.674
CR4_P1	−0.113	0.239	0.799	0.085	0.047	−0.012	0.125
CR5_P2	−0.032	0.270	0.770	0.107	0.082	0.048	0.102
CR6_P3	0.015	0.208	0.762	0.110	0.080	−0.007	0.167

Note: The grey shade indicates the allocation of an item e.g., "IR1_AT1" to a factor e.g., "Attitude/environmental concern" to our understanding it is quite a usual way to make the visible very easyly. The bold values, e.g., 0.402 and 0.447 indicated that this allocation is a little bit critical and should lead the attention of the reader to those slightly critical aspects.

TABLE 5 Factor analysis, rotated component matrix (purchase intention)

Rotated component matrix components	
Items	**Purchase intention**
DV3_PI1	0.894
DV4_PI2	0.894
DV5_PI3	0.837

Harms and Linton (2015) measured the dimension "willingness to pay" using open questions such as how much more or less respondents were willing to pay for a recycled product compared to a product made of new/conventional materials. Magnier et al. (2019) used two items to measure willingness to pay, specifically asking if respondents were willing to pay a higher or lower price for products made of recycled materials compared to new/conventional ones. Similarly, Nekmahmud (2020) measured the dimension "green awareness of price." Similar items were used by Nguyen et al. (2018), who was additionally interested in ascertaining whether respondents were willing to purchase green products when they were on sale or promotion, which is, however, not of interest in the present study. Therefore, the scales from Magnier et al. (2019) and Nekmahmud (2020) are adopted.

Queiroz et al. (2021) investigated whether perceived quality influences purchase intention for recycled polyethylene terephthalate (PET) products. Based on the items provided by Sprott and Shimp (2004), Magnier et al. (2019) followed a similar approach to measure perceived quality. However, unlike Queiroz et al. (2021), they also measured whether contamination influences purchase intention. For this purpose, they used three items provided by Argo et al. (2006). For the present study, a combination of Queiroz et al. (2021) and Magnier et al. (2019) is used—two items to measure perceived quality, and two were used to measure the perceived contamination of recycled products.

Concerning the construct certification, reference is made to eco-labels in particular. Riskos et al. (2021) measured both eco-label credibility and the involvement. For each dimension, they used three and four items respectively based on Taufique et al. (2019). Nittala (2014) examined the effect of eco-labels on the willingness to purchase green products. For the current research, three items from Riskos et al. (2021) and Nittala (2014) are used to ascertain whether eco-labels influence purchase intention for recycled products.

4.3 | Context-related constructs

The product availability is measured based on Walia et al. (2019) and Nguyen et al. (2018) using three items to measure whether the (un) availability of green products influences purchase intention.

To measure the impact of environmental advertisements on consumers' purchase behavior, Rahbar and Wahid (2011) used four items similar to those of Qu et al. (2018). The current research uses their scale, which is based on the research by Hammond et al. (1998).

4.4 | Dependent variables

Regarding purchase intention, Han and Kim (2010) developed a scale with three items to measure the intention to revisit a green hotel. The same scale was used by Chen and Tung (2014), who also examined the intention to visit green hotels, and by Xu et al. (2020), who investigated purchase intention for green furniture. Rausch and Kopplin (2020) produced a similar scale. Based on Kumar et al. (2016) and Park and Lin (2020), they developed items to measure purchase intention for sustainable clothes. Wang, Hazen, et al. (2018), Wang, Wang, et al. (2018), Khor and Hazen (2016), and Wang et al. (2013) used similar scales with three or four items to measure purchase intention for remanufactured products in particular. Three items provided by Wang, Hazen, et al. (2018), Wang, Wang, et al. (2018) are adopted for this research.

5 | EMPIRICAL RESULTS

5.1 | Target population and sample

The target population includes individuals aged 18 and above who have access to the internet and are from Germany or South Africa.

In South Africa, the Gini coefficient is 62, suggesting that there is a large disparity in terms of income (OECD Data, 2022); hence, only a small number of people might be able to consider purchasing products with higher prices (Dobbelstein et al., 2021) such as a recycled mobile phone. For this reason, the eligible participants for the South African sample were those with higher living standards/incomes, which is why the South African Living Standards Measure (LSM) groups 7 to 10 were used.

In contrast to South Africa, Germany's Gini coefficient of 29 indicates a much greater income balance (OECD Data, 2022), which is why it can be assumed that a large proportion of the population is in a position to buy recycled products such as mobile phones. For this reason, a quota sample was created for Germany, based on age (18 years and older), gender, and net household income.

Based on a standard deviation of 1.2, a 95% significance and an allowed error of 0.1, a sample size of 554 was set for each country which was increased to 600 to compensate for eventually implausible answers (Heidig & Dobbelstein, 2021). The data was collected online using an online access panel provider and non-probabilistic quota sampling.

After the data were collected ($n = 1306$), they were processed accordingly. This included the coding, cleaning, and transformation of the numerical variable values. This was done with the help of the statistical software IBM SPSS Statistics version 28.0. Inconsistent answers, for example, I would pay more/less for a recycled productand the answer time were checked and 11 questionnaires (0.84%) were removed from the sample. The topic of the survey was not mentioned in the invitation to the online-access panelist. The dropout rate was 0.72% for the South African sample and 0.99% for the German. Both figures as well as the low percentage of invalid answers are strong indicators for the absence of a non-response bias.

Overall, the final, quality checked sample size (*n*) was 1295. An illustration of the planned versus achieved quotas for South Africa and Germany is shown in Table 3.

5.2 | Reliability and validity

Exploratory factor analysis was conducted using principal component analysis as the extraction method, the Varimax rotation was selected (Backhaus et al., 2021) and Cronbach's alpha were calculated (Hornburg & Giering, 1996). Since they refer to two different groups of constructs the dependent and independent variables are analyzed separately.

The factor analysis was performed first for the independent variables. For this purpose, the number of factors to be generated was not preset. Kaiser-Meyer-Olking value (KMO value) is 0.948, which is considered very good and the Bartlett test proved to be highly significant (0.000) (Backhaus et al., 2021).

To determine how the items fit the selected components, the factor loadings were observed (Döring & Bortz, 2016). Due to their factor loadings, the constructs could be clearly assigned to the respective components as is shown in Table 4. Item PR5_QF2 was an exception, as it had a higher factor loading on component 6, but due to its meaning it could be better assigned to component 4.

The factor for the dependent variable analysis had a KMO value of 0.714 and a Bartlett test of (.000). As a result, all three items measuring purchase intention were loaded onto the "purchase intention" factor. Cronbach's alpha shows a good value of .849, which is shown in Table 5.

5.3 | Descriptive statistics

Table 6 provides an overview of the mean values of items and constructs.

5.4 | Factors influencing purchase intentions

The factors were calculated based on the results of the EFA as the mean of the variables included in one factor. Table 7 provides an overview on the key figures of the regression analysis, which analyze the influence of the seven factors regarding the purchase intention of recycled products and shows good results for all criteria.

Table 8 summarizes the results of the three regression analyses.

For the first regression analysis (overall), the factor "attitude/environmental concern" (0.243) generally has the greatest influence on the purchase intention of recycled products, followed by "promotion/certification" (0.217), "value/accessibility" (0.203), "price" (0.178) and "subjective norm" (0.143). "Uncertainty" (−0.131) also influences purchase intention, but the relationship is negative, so greater uncertainty has a negative impact on purchase intention. The factor "buying effort" (0.060) has the least influence on the purchase intention of recycled products.

The second regression analysis for South Africa shows that all factors except "buying effort" (0.047) have a high significance. According to the standardized coefficient beta, the factor "attitude/environment" (0.247) has the greatest influence on the purchase intention of recycled products, followed by "value/accessibility" (0.221), "promotion/certification" (0.213), "price" (0.200), "uncertainty" (−0.117) and "subjective norm" (0.097).

The results of the third regression analysis for Germany show that all factors are highly significant, and the "buying effort" (0.071) factor is just within the significant range. Unlike in South Africa, in Germany the factor "value/accessibility" (0.226) has the greatest influence on purchase intention for recycled products, followed by "price" (0.217), "attitude/environment" (0.200), "subjective norm" (0.188), "uncertainty" (−0.148), "promotion/certification" (0.138), and "buying effort" (0.071).

The influence of the individual factors on the intention to purchase recycled products differs between the two countries. In South Africa, for example, "attitude/environmental concern" (0.247) has the greatest influence on purchase intention for recycled products, while in Germany the most influential factor is "value/accessibility" (0.226). Furthermore, "promotion/certification" has more influence on the purchase intention in South Africa (0.213) than in Germany (0.138), while the factor "uncertainty" has more influence in Germany (−0.148) than in South Africa (−0.117). However, the confidence intervals for all seven factors overlap, which means that the differences between the countries are not significant.

As shown in Table 9, the South African sample with a mean of 5.75 tends to have a higher purchase intention for recycled products than the German sample with a mean of 5.12.

The result is highly significant with a value of <0.001. Hence, the purchase intention for recycled products is significantly higher in South Africa than in Germany.

5.5 | Differences of purchase intention between product types

Generally speaking, there is no significant difference in purchase intentions with regard to t-shirts and toilet paper made from recycled materials. Considering the confidence interval, the significance is only seen for mobile phones. Hence, a difference in purchase intentions for different product types is identified for mobile phones only. Results are shown in Table 10.

Considering the mean value of the South African and German samples, it is clear that people in South Africa tend to have greater purchase intentions for all three product types than people in Germany. However, a highly significant difference between the two countries could only be identified for t-shirts. Results are shown in Table 11.

5.6 | Country-specific differences in influencing factors

Concerning the factor "uncertainty," the mean value in South Africa is 3.02 and in 3.15 in Germany. Although Germany tends to be more risk-averse than South Africa (Hofstede Insights, 2022), the

TABLE 6 Mean values of all Items

Factor	Construct	Item	Country	Mean	*SD*	Total mean
Uncertainty	Perceived risk	I am afraid that the quality of recycled products is not as good as that of products with new/conventional materials.	SA	3.55	1.850	3.52
			GER	3.48	1.726	
		I am afraid that recycled products might not function as well as products with new/conventional materials.	SA	3.41	1.776	3.41
			GER	3.41	1.684	
		I am afraid that buying recycled products is not a good investment.	SA	2.80	1.643	2.96
			GER	3.12	1.707	
		I am afraid that I will have to return recycled products more frequently than products with new/conventional materials.	SA	3.68	1.775	3.61
			GER	3.53	1.652	
		I am afraid that people I value disapprove of me when buying recycled products.	SA	2.74	1.801	2.66
			GER	2.58	1.703	
		It makes me feel uncomfortable when I think of buying recycled products.	SA	2.49	1.657	2.65
			GER	2.81	1.780	
	Perceived consumer effectiveness	There is not a lot that an individual can do to help solve environmental problems.	SA	3.38	2.115	3.56
			GER	3.74	1.971	
		One person's efforts are meaningless as long as other people refuse to contribute to solving environmental problems.	SA	4.18	2.063	4.04
			GER	3.89	1.917	
		I feel that I can help solving environmental problems when buying recycled products.	SA	6.10	1.085	5.76
			GER	5.42	1.385	
	Quality and functionalities (Contamination)	I think products made of recycled materials are contaminated.	SA	2.84	1.794	2.93
			GER	3.02	1.615	
		In my opinion, products made of recycled materials are disgusting.	SA	2.28	1.697	2.40
			GER	2.52	1.615	
Attitude/ environmental concern	Attitude	I like the idea of buying recycled products.	SA	6.04	1.053	5.80
			GER	5.56	1.294	
		I think it's a good idea to buy recycled products.	SA	6.21	1.024	5.97
			GER	5.72	1.277	
		I have a positive attitude toward recycled products.	SA	6.16	1.084	5.93
			GER	5.70	1.283	
	Environmental concern	I am concerned about the current environmental changes.	SA	6.19	1.131	5.96
			GER	5.73	1.416	
		I am concerned about the long-term consequences of unsustainable behavior.	SA	6.00	1.261	5.79
			GER	5.57	1.415	
		I am concerned about the lasting damage that humans are inflicting on the environment.	SA	6.29	1.063	6.06
			GER	5.82	1.417	
Promotion/ certification	Certification	I trust eco-labels since they are a sign that the product is environmentally friendly.	SA	5.79	1.195	5.35
			GER	4.91	1.479	
		An eco-label on a recycled product encourages me in buying the product.	SA	5.72	1.195	5.37
			GER	5.01	1.500	
		An eco-label on a recycled product increases the credibility of the product.	SA	5.51	1.338	5.29
			GER	5.06	1.448	
	Promotion	Promotion can help me to find out more about recycled products.	SA	6.03	1.084	5.52
			GER	5.00	1.560	
		Promotion can help me learn about the environmental impact caused by buying products with new/conventional materials.	SA	6.02	1.057	5.44
			GER	4.86	1.527	
		The stronger the promotion, the higher my attention to recycled products.	SA	5.82	1.246	5.19
			GER	4.55	1.629	

(Continues)

TABLE 6 (Continued)

Factor	Construct	Item	Country	Mean	*SD*	Total mean
Value/accessibility	Perceived value	I consider recycled products to be of good value.	SA	5.90	1.111	5.66
			GER	5.41	1.286	
		Compared to products with new/conventional materials, recycled products have a better price-performance ratio.	SA	5.20	1.336	4.80
			GER	4.39	1.433	
		Recycled products will satisfy my wants and needs.	SA	5.56	1.215	5.37
			GER	5.17	1.312	
	Perceived behavioral control	I know where to buy recycled products.	SA	5.05	1.623	4.99
			GER	4.93	1.465	
		Recycled products are easy to identify.	SA	4.59	1.714	4.51
			GER	4.42	1.438	
		I find recycled products to be easily accessible.	SA	5.03	1.626	4.92
			GER	4.80	1.375	
	Quality and functionalities	Recycled products are of good quality.	SA	5.59	1.163	5.43
			GER	5.27	1.237	
		Recycled products have a quality similar to that of products made of new/conventional materials.	SA	5.26	1.446	5.26
			GER	5.26	1.290	
Subjective norm	Subjective norm	People I care about think I should buy recycled products.	SA	5.17	1.481	4.93
			GER	4.68	1.500	
		People I care about would want me to buy recycled products.	SA	5.34	1.369	5.03
			GER	4.72	1.543	
		People whose opinions I value would appreciate me buying recycled products.	SA	5.57	1.323	5.22
			GER	4.86	1.422	
Price	Price	I would pay more for a recycled product than for a product made of new/conventional materials.	SA	4.22	1.721	4.13
			GER	4.04	1.614	
		I would pay less for a recycled product than for a product made of new/conventional materials.	SA	4.56	1.727	4.33
			GER	4.09	1.534	
		If the price of a recycled product was the same as the price of a product made of new/conventional materials, I would choose the recycled product.	SA	5.33	1.581	5.32
			GER	5.31	1.516	
Buying effort	Availability	The lack of availability of recycled products affects my purchase intention.	SA	4.68	1.587	4.45
			GER	4.22	1.433	
		Recycled products are not sold in any stores close to where I live.	SA	3.91	1.851	3.88
			GER	3.84	1.571	
		In order to locate recycled products I have to research.	SA	5.13	1.529	4.75
			GER	4.37	1.512	
Dependent variables	Purchase behavior	In the past, how often have you bought a t-shirt made of recycled materials instead of new/conventional materials? (1 = all the time/7 = never)	SA	4.34	1.762	4.48
			GER	4.62	1.732	
		In the past, how often have you bought a mobile phone made of recycled materials instead of new/conventional materials? (1 = all the time/7 = never)	SA	5.27	1.897	5.37
			GER	5.47	1.879	
		In the past, how often have you bought toilet paper made of recycled materials instead of new/conventional materials? (1 = all the time/7 = never)	SA	3.81	2.138	3.56
			GER	3.30	1.856	
		How often have you bought any other products made of recycled materials in the past? (1 = all the time/7 = never)	SA	4.24	1.387	4.04
			GER	3.84	1.344	

TABLE 6 (Continued)

Factor	Construct	Item	Country	Mean	*SD*	Total mean
	Purchase intention	I am considering buying recycled products in the near future.	SA	5.97	1.054	5.62
			GER	5.26	1.332	
		I will encourage my family and friends to buy recycled products.	SA	5.99	1.114	5.52
			GER	5.05	1.446	
		When I have to choose between a recycled and a product made of new/conventional materials, I will typically choose the recycled version.	SA	5.30	1.368	5.18
			GER	5.05	1.409	
	Purchase intention (Product types)	I would consider buying a t-shirt made of recycled materials in the near future.	SA	5.90	1.178	5.37
			GER	4.84	1.427	
		I would consider buying a mobile phone made of recycled materials at my next purchase.	SA	5.08	1.623	4.96
			GER	4.36	1.580	
		I would consider buying toilet paper made of recycled materials in the near future.	SA	5.65	1.552	5.54
			GER	5.43	1.622	

TABLE 7 Key figures of regression analysis

	Overall	South Africa	Germany
Adjust r Square	0.688	0.606	0.716
Durban Watson	2.002	2.070	1.947
Significance	<0.001	<0.001	<0.001
Tolerance	>0.2	>0.2	>0.2
heteroscedasticity (plots res. ag. perd.)	min. heterosc.	min. heterosc.	no heterosc.
norm. distr. errors (pp plot)	fulfilled	fulfilled	fulfilled

differences in this factor are not significant. However, in the factor "attitude/environmental concern," there is a significant difference between the countries. The mean value in South Africa is 6.15, while it is 5.68 in Germany. Thus, attitude and concern for the environment is higher in South Africa. The mean value for the factor "promotion/certification" is also higher in South Africa (5.82) than in Germany (4.90). This is a significant difference, indicating that South Africans are more likely than Germans to rate promotion and certification as important. Although the mean for the "value/accessibility" factor is slightly higher in South Africa (5.27) than in Germany (4.96), the differences are not significant. There is a significant difference in the factor "subjective norm," with the mean value 5.36 in South Africa and 4.75 in Germany. Regarding price, the mean is 4.32 in South Africa and 4.42 in Germany. The differences are not significant. The difference in the "buying effort" factor is not significant with regard to the countries. The mean is 4.57 in South Africa and 4.14 in Germany. The results are shown in Table 12.

Table 13 summarizes the results of the test of hypotheses.

6 | DISCUSSION

6.1 | Influencing factors

Concerning the purchase intention of recycled products, the study results show that "uncertainty" has a negative but small influence compared to the other factors (Hypothesis 1). Thus, uncertainty factors such as fear of lower quality, functionality or contamination appear to influence purchase intention for recycled products, but this influence is not strong compared to other factors. This result is in line with past studies where it was confirmed that the perceived lower quality of recycled products (Queiroz et al., 2021) and the fear of contamination (Magnier et al., 2019) have a negative influence on purchase intention for recycled productsNo significant difference was observed between South Africa and Germany for the "uncertainty" factor. Both countries show a below-average risk in buying products made from recycled materials. This is a noteworthy observation, as German culture is more likely to avoid uncertainty than South Africa (Hofstede Insights, 2022).

As for the influence on purchase intention for recycled products, it can generally be said that "attitude/environmental concern" has the greatest influence (Hypothesis 2). This result is in line with past studies, which have found that attitude has the greatest influence on purchase intention (Rausch & Kopplin, 2020; Wang et al., 2013). However, regarding differences between the countries, no significant difference was found, although the factor has a slightly greater influence in South Africa (greatest influence) than in Germany (third greatest influence). Regarding the value of the factor "attitude/environmental concern," a significant difference was found between South Africa and Germany. In South Africa, people tend to be more concerned about the environment and have a more positive attitude

TABLE 8 Summary of all regression analyses (overall, South Africa, Germany)

	Overall			South Africa			Germany		
Factors	Coeff. beta	Conf. lower bd.	Conf. upper bd.	Coeff. beta	Conf. lower bd.	Conf. upper bd.	Coeff. beta	Conf. lower bd.	Conf. upper bd.
Uncertainty	−0.131**	−0.161	−0.088	−0.117**	−0.147	−0.051	−0.148**	−0.203	−0.090
Attitude/ environmental concern	0.243**	0.231	0.348	0.247**	0.231	0.406	0.200**	0.139	0.307
Value/accessibility	0.203**	0.196	0.308	0.221**	0.167	0.311	0.226**	0.212	0.394
Subjective norm	0.143**	0.091	0.166	0.097**	0.031	0.133	0.188**	0.120	0.231
Price	0.178**	0.143	0.213	0.200**	0.124	0.213	0.217**	0.180	0.298
Promotion/ certification	0.217**	0.179	0.272	0.213**	0.174	0.334	0.138**	0.078	0.208
Buying effort	0.060**	0.024	0.089	0.047	−0.004	0.080	0.071*	0.023	0.125

Note: This is to show which BETA values are significant "*" and which are highly significant "**".

TABLE 9 Independent *t*-test, differences in purchase intention

Country	*N*	Mean	*SD*
South Africa	692	5.7543	0.99896
Germany	603	5.1216	1.24942

toward recycled products than Germans. This fact is noteworthy, as it could be assumed that German consumers are more exposed than South Africans to issues such as sustainable development, circular economy, and recycling due to political initiatives. In addition, research has shown that the majority of German consumers already value sustainability aspects when buying new products and even boycott stores that do not have sustainable environmental policies, which is not the case in South Africa (Mkhize & Ellis, 2020; Statista Global Consumer Survey (GCS), 2021). However, South Africa has to deal with more natural disasters than Germany (Bündnis Entwicklung Hilft, 2022). For example, shortly before the present study's survey was conducted, the country was hit by a devastating flood that claimed 400 lives (BBC, 2022). This could be why the "attitude/environmental concern" factor is stronger in South Africa than in Germany. So the marketing recommendations do apply even stronger to South Africa than to Germany.

Generally speaking, the "promotion/certification" factor has the second largest influence on purchase intention for recycled products. (Hypothesis 6) This result is consistent with previous studies confirming that certificates in the form of eco-labels (Harms & Linton, 2015) and promotion (Qu et al., 2018) positively influence purchase intentions. However, no significant difference of the influence was found between the two countries, although the influence is greater in South Africa than in Germany. The value of the "promotion/certification" factor was found to show a significant difference between the two countries. For example, in South Africa, it is more important for recycled products to be labeled with eco-labels and advertised accordingly than in Germany. With regard to certificates, the difference could also be due to the fact that people in Germany are skeptical about eco-labels (Statista Global Consumer Survey (GCS), 2021). In contrast, South African consumers often have difficulties identifying sustainable products (Struwig & Adendorff, 2018), which is why it can generally be assumed that an eco-label on the product or advertising with sustainable product characteristics supports the identification of sustainable products such as recycled products.

The factor "value/accessibility" appears to be equally important in Germany and South Africa. Generally speaking, the factor has the third greatest influence on purchase intention for recycled products (Hypothesis 3), and in Germany it has the greatest influence and thus appears to be even more important than the factor "attitude/environmental concern". This result means that in Germany, the ease of purchasing recycled products (accessibility) and value/quality aspects have the greatest influence on purchase intentions. This finding is supported by previous studies confirming that perceived behavioral control (Wang, Hazen, et al., 2018, Wang, Wang, et al., 2018; Xu et al., 2020) and perceived value (Chaturvedi et al., 2020) influence purchase intention for green products.

Another significant difference between the two countries was found with regard to the factor "subjective norm". In South Africa, society's views of one's behavior tend to be more important than in Germany. In general, the results of the present study show that the factor influences purchase intention for recycled products, which does not differ significantly between the two countries. (Hypothesis 4) Generally speaking, the factor significantly influences purchase intention for recycled products; hence, the result is in line with past studies (Khor & Hazen, 2016; Park & Lin, 2020).

No significant difference was found between the two countries with regard to the factor "price". This result suggests that both countries are likely to be unwilling to pay more for recycled products than for conventional products. (Hypothesis 5) This result is in line with past studies, where Joshi and Rahman (2015) and Nguyen et al. (2018) found that the high price of green products reduces purchase intention. Thus, this factor influences purchase intention for recycled products, but this does not differ significantly between the countries.

TABLE 10 Independent *t*-test, differences in product types

Product type	Mean difference	Conf. lower bd.	Conf. upper bd.
T-shirt	5.408	5.33	5.48
Mobile phone	4.749	4.66	4.84
Toilet paper	5.547	5.46	5.63

TABLE 11 Independent *t*-test, differences in product types (and countries)

Product type	Country	Mean	Significant difference	Mean difference	Conf. lower bd.	Conf. upper bd.
T-shirt	SA	5.90	Yes (<0.001)	1.058	0.914	1.202
	GER	4.84		1.058	0.914	1.202
Mobile phone	SA	5.08	No (0.217)	0.719	0.544	0.894
	GER	4.36		0.719	0.544	0.894
Toilet paper	SA	5.65	No (0.170)	0.211	0.038	0.385
	GER	5.43		0.211	0.038	0.385

TABLE 12 Independent *t*-test of the individual factors

Factor	Country	Mean	Sig.
Uncertainty	SA	3.02	n.s.
	GER	3.15	
Attitude/environmental concern	SA	6.15	<0.001
	GER	5.68	
Value/accessibility	SA	5.27	n.s.
	GER	4.96	
Subjective norm	SA	5.36	<0.001
	GER	4.75	
Price	SA	4.33	n.s.
	GER	4.42	
Promotion/certification	SA	5.81	<0.001
	GER	4.90	
Buying effort	SA	4.57	n.s.
	GER	4.14	

For the value of factor "buying effort", no significant difference was identified between the two countries. The factor has the least influence on purchase intention for recycled products in general. In South Africa, the factor is not significant, and in Germany it is moderately significant. (Hypothesis 6). In general, this finding means that the buying effort of recycled products has a minimal influence on purchase intention. This result differs from previous studies, which have found that the lack of availability of green products is a major reason for not buying them or negatively affects purchase intentions (Connell, 2010; Nguyen et al., 2018; Walia et al., 2019).

6.2 | Product types

The results confirm that there is a difference in purchase intention with regard to different products, particularly true for mobile phones, for which the purchase intention is significantly lower than for t-shirts and toilet paper. A difference was also found between the two countries. For example, the purchase intention for t-shirts is significantly greater in South Africa than in Germany. (Hypothesis 8).

The results of the present study show a general difference in purchase intention for different product types, but this only applies to mobile phones (durables), where purchase intention is lowest. There may be several reasons for this. For example, mobile phones differ from the other two products in that they have a comparatively higher price and are not as readily available as t-shirts or toilet paper. For this reason, it could be that the barrier to trying something new is greater than for the other two products.

Looking at the two countries separately, the purchase intention for all three product types tended to be greater in South Africa than in Germany. However, a significant difference could only be found for t-shirts (textiles). This finding means that South Africans are more likely to purchase textiles made from recycled materials than Germans. In fact, concerning all three product types, purchase intention was highest for the textiles product group in South Africa, despite past studies showing that these can be perceived as unhygienic when they touch the skin (Meng & Leary, 2019).

A study from 2000 showed that consumers prefer to buy conventional toilet paper because it looks more visually appealing than recycled toilet paper (Hanyu et al., 2000). However, the present study found a large purchase intention for toilet paper (FMCG) was found. This result could be because recycled toilet paper has now been available for a long time and people are more willing to purchase it because of its low price.

7 | PRACTICAL IMPLICATIONS

For marketing in Germany, greater attention should be paid to highlighting quality features. For example, consumers can be informed that there is no loss of quality when buying a recycled product and

TABLE 13 Summary of hypotheses

H#	Description	Country	Supported
1	Uncertainty has a negative influence on purchase intention for recycled products.	Overall	yes
		South Africa	yes
		Germany	yes
2	Attitude/environmental concern has a positive influence on purchase intention for recycled products.	Overall	yes
		South Africa	yes
		Germany	yes
3	Value/accessibility has a positive influence on purchase intention for recycled products.	Overall	yes
		South Africa	yes
		Germany	yes
4	Subjective norm has a positive influence on purchase intention for recycled products.	Overall	yes
		South Africa	yes
		Germany	yes
5	A price lower than that of new/conventional products has a positive influence on purchase intention for recycled products.	Overall	yes
		South Africa	yes
		Germany	yes
6	Promotion/certification has a positive influence on purchase intention for recycled products.	Overall	yes
		South Africa	yes
		Germany	yes
7	Buying effort has a negative influence on purchase intention for recycled products.	Overall	yes
		South Africa	no
		Germany	yes
8	The purchase intention for recycled products varies based on different product types and be-tween Germany and South Africa.	Overall	yes
		South Africa	yes
		Germany	yes
9	The values of the influencing constructs of purchase intentions for recycled products differ between Germany and South Africa.	no (only for selected constructs)	

that its longevity is equal to the conventional variety's. Regarding eco-labels, it is vital in Germany that these are trustworthy and perceived as such by consumers, as German shoppers are particularly skeptical of them. Furthermore, it is recommended that the price does not exceed that of corresponding items. It is necessary to apply more aggressive marketing to reach the majority with a weaker purchase intention. Accordingly, it is recommended that the quality and environmental aspects should be actively communicated at all touchpoints. The communication efforts should integrate educational aspects.

In South Africa, it is recommended to increasingly advertise the product's environmental friendliness. Consumers should be made aware that they are doing something good for the environment with their purchases. Furthermore, eco-labels play a major role in the purchase intention and should thus be attached to the product. It is also important that the price does not exceed that of corresponding conventional items. Promotion is a very important point in South Africa, which should primarily serve to educate people about the product. Furthermore, appropriate communication should be available at the point of sale so that consumers can easily recognize that the product is sustainable.

For marketers in both countries it can be recommended to especially target consumers who already show high environmental concerns, for example, by creating messages that emphasize the high positive impact of buying recycled products on the environment or by specifically promoting recycled products in associations joined by this target group. Marketers may think about how the purchase or use of recycled products can be communicated in a consumers peer group, for example, by social media marketing or by attaching easily visible product characteristics to the products.

8 | LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

The study only includes Germany and South Africa. In South Africa only LSM groups 7 to 10 were included. For future studies, it would be insightful to consider LSM groups 5 and 6, especially since these are gradually approaching the standards of LSM group 7, and this may also impact purchasing behavior (Dobbelstein et al., 2020).

Important constructs may not have been included and different constructs could be analyzed more differentiated, for example, by asking how much people are willing to pay for a recycled product.

As far as product categories are concerned, future research could follow the approach of Frank and Brock (2018) and investigate high-involvement as well as low-involvement products.

Another limitation relates to the lack of investigation of cultural aspects. Future research could investigate whether cultural differences affect purchase intention for recycled products.

As a final limitation it has been mentioned that the intention-behavior-gap was not analyzed.

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