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Willingness to pay more for green products: A critical challenge for Gen Z

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ABSTRACT

Digital natives, with a sense of equality, social justice and environmental awareness, young people from Generation Z value money more than previous generations and, as such, are conscientious in their consumption choices. The consumption of greener products can contribute to achieving the sustainability goals imposed on societies. The study explores the determinants of Generation Z youth's demand for green products and how they influence their willingness to pay more. A quantitative analysis was carried out through a questionnaire in which 927 Portuguese Generation Z consumers of green products participated. First, a descriptive statistical analysis was carried out. Then the Partial Least Square method was applied to explore the relationship between the determinants of demand for green products and the willingness to pay more for them. The results showed that environmental concerns, green future estimation and green perceived quality are potential determinants of Generation Z's consumption of green products and positively influence willingness to pay more for green products. Green perceived benefits have the effect put. This study presents the first evidence of how environmental concerns, future green vision, green perceived quality and green benefits by young Portuguese Generation Z consumers can influence the willingness to pay more for green products. It also demonstrates how green products can be used as signals.

1. Introduction

Sustainability is an increasing concern for consumers, which has led to the proliferation of actions with a strong green marketing component and the growing appearance of environmentally friendly products, also called green products (Squires, 2019). This is an emerging challenge for companies (Jabbour et al., 2015; Tsalis et al., 2020). There is a theoretical and practical interest in realizing if generations have a greater propensity for these realities and what factors can generate a willingness to pay more for green products (Sheth, 2021).

Exploiting generational cohorts will allow us to understand that each cohort shares political, cultural, and economic issues and values (Kotler, 2006; Reisenwitz and Iyer, 2009). Generally, each generation shares common characteristics, different from one generation to another. Z Generation, in particular, is considered in the literature as the one with more environmental concerns and is green-friendly, willing to pay more for eco-friendly products (Casalegno et al., 2022; Ham et al., 2022). From a marketing viewpoint, more studies are needed to understand the Z Generation's environmental concerns better so that marketers can have a deeper knowledge to determine in which generation(s) to invest their marketing resources and helps the development of specific products for specifics generations (Abdelkader and Attallah, 2021; Ottman, 2017).

Generation Z (sometimes referred to as iGen or Centennials) refers to the generation born between 1997 and 2012, after millennials. Gen Z was raised in a digital world with the internet and social media (Kardaras, 2016). They spend their time on their phones and are considered an open-minded generation (Kaplan, 2020). This generation embraces diversity and inclusion. They are tech-savvy and mobile-first—and have high standards for how they want to spend their time online. According to Firstinsight (2020), most Gen Z shoppers prefer to buy sustainable brands and are willing to spend more (an average of 10 per cent more). The report also found that Gen Z is the most receptive and likely to purchase based on hedonic (personal, social and environmental) principles and values. Z generation also expects retailers and brands to become more sustainable.

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Generation Z is the generation that wants to achieve success faster and gives more value to money (Chillakuri, 2020) and represents about 20% of the population in Portugal in 2021 (Pordata, 2021). Despite the representativeness of generation Z in Portugal and around the world (32% of the total population in 2019) (World Bank, 2021), there are still few studies that address the environmental concerns exclusively of this generation (Dabija et al., 2019, 2020; Hill and Lee, 2012; Lakatos et al., 2018) and how these concerns translate into practical implications such as the consumption of more green products and the willingness to pay more for this type of products (Biswas and Roy, 2016; Testa et al., 2021; Wei et al., 2018). So, to what extent are they willing to pay more for green products? Which determinants most affected your willingness to pay? In this context, the aim of this study is to explore the determinants of the demand of Gen Z youth for green products and to assess their influence on their willingness to pay more for green products.

This study will contribute to the body of green marketing literature because it aims to develop an exploratory analysis of the determinants (environmental concerns, green future estimation, green perceived benefits and green perceived quality) that affect the willingness to pay more for green products by generation Z. By doing so, this study expects to extend the existing literature of green marketing research based on an innovative perspective: the signalling theory and its integration with green and trendings issues such as environmental concerns, green future estimation, green perceived benefits and green perceived quality in a unique new framework applied to Z Generation.

2. Literature review

2.1. Signaling Theory

Signalling Theory is considered a social cognitive theory (Connelly et al., 2011)and was initially developed in two different contexts: 1) biology by Zahavi (1975); and 2) economics by Spence (1973). This theory is based on information asymmetry, where an individual emits information to convince another that he/she possesses desired qualities, but this characteristic is not directly perceived or observable. Thus, according to this theory, a signal must be reliable because if it is not, the receiver of the information will ignore and refuse to make an exchange with the individual who issued the signal. For the signal to be reliable, individuals who hold the desired quality are willing to incur more costs (Berger, 2019). Recently, some studies have linked the consumption behaviour of green products to the willingness to pay more through the Signaling Theory (Ki and Kim, 2022; Rahman and Reynolds, 2019). This theory was first applied to luxury goods consumption, which signifies wealth and high social status, distinguishing luxury consumers from the rest (Chung and Kalnins, 2001). However, several authors have argued that costly signalling is not restricted to this type of consumption. Thus, an individual consuming a green product may signal that he or she is willing to pay more for the green premium (Berger, 2019; Costa et al., 2014; Elliott, 2013). Thus, according to the Signaling Theory, what matters is not the total cost of the product but the additional premium that the individual is willing to pay (Przepiorka and Berger, 2017). Thus, in green consumption, the premium of paying more for green products may not be a signal merely of social status but may signal pro-social and cooperative values, demonstrating that individuals who consume green products care about the environment based on their environmental concerns and green future vision and, as such, the global environment (Berger, 2019; Kohlova and Urban, 2018; Whitfield, 2011). However, there are other reasons for consuming green products other than social signals to benefit the environment or to signal quality. The fact that green products are perceived to be healthier, of better quality and are associated with higher perceived benefits (especially in the case of edible products), makes the purchase of green products motivated by self-interest (Lockie et al., 2002; Michaelidou and Hassan, 2008; Pickett-Baker and Ozaki, 2008). These self-interests are signalled through willingness to pay more (additional premium) for green products.

2.2. Environmental concerns

Environmental concern refers to consumers' general attitude toward preserving the environment (Ellen et al., 1991). It is the degree of consumers' awareness of environmental problems and willingness to contribute to solving them (Dunlap and Jones, 2002; Kim and Choi, 2005; Wei et al., 2018). A pro-environmental attitude can manifest itself in various ways, from specific beliefs to specific behaviours, such as recycling and consumption of green products (Choi and Johnson, 2019). The effects of consumers' environmental concerns have been studied, although the results of these behaviours are still inconsistent. Kim and Choi (2005), In their study on higher education students, concluded that there is a direct and significant relationship between environmental concerns and green purchasing behaviour. Also, Maichum et al. (2016) demonstrated a positive association between environmental concerns and young consumers' purchase of green products in Thailand. Lee et al. (2014) also found a positive relationship between environmental concerns and intention to purchase green products stabilized through pro-environmental behaviour, such as Irawan and Darmayanti (2012), who focused on students in Indonesia. However, there has also been evidence that environmental concerns are the least effective variable to explain green purchasing behaviour when evaluated with other variables and may not have a direct effect (Bamberg, 2003; Joshi and Rahman, 2017). One barrier to environmentally responsible behaviours is the lack of environmental concern (Cheah and Phau, 2011). When individuals exhibit low environmental concern or negative attitudes towards preserving the environment, they are less likely to engage in pro-environmental behaviours (Paul et al., 2016). Consequently, a lack of environmental concern is negatively related to the willingness to pay more for green products. (Ellen et al., 1991; Wei et al., 2018). Maichum et al. (2016) showed that young consumers' environmental concerns (18–30 years old) positively influence environmental attitudes towards green products. Consequently, young consumers' environmental concern positively influence young consumers' purchase intentions towards green products as concluded by Albayrak et al. (2013) and Aman et al. (2012). Thus, pro-environmental attitude and higher environmental awareness positively influence willingness to pay more for green products in young consumers (Hao et al., 2019; Kaufmann et al., 2012; Khoiriyah and Toro, 2018; Leszczyńska, 2014). Thus, the following hypothesis was formulated:

H1. Environmental concerns positively influence the willingness to pay more for green products for young people of generation Z.

2.3. Green future estimation

The future estimation for green products depends on the current consumer demand for green products or services (Nekmahmud and Fekete-Farkas, 2020). If the demand for green products is positive, this demand will increase. The demand for green products to be positive depends on whether the products are environmentally friendly and whether there are benefits for consumers, namely in terms of health and satisfaction. Thus, the previous purchase experience results from the consumer's affective, cognitive and emotional responses (McColl-Kennedy et al., 2015; Meyer and Schwager, 2007). This contact can occur before, during and after purchase (Lemon and Verhoef, 2016; Penz and Hogg, 2011). According to Parkinson et al. (2018), the results of previous experience can be considered a personal source of information that serves as a basis for future decisions. Even if the consumer is aware of sustainable issues, engagement with sustainability only occurs with actual sustainable consumption to internalise green purchasing elements (McColl-Kennedy et al., 2015; Tanner and Wölfing Kast, 2003). Green marketing is key in stimulating future demand for green products and will be most effective for consumers with lower or middle incomes (Nekmahmud and Fekete-Farkas, 2020). Price plays an important role in the decision to buy green products in the future (Lin et al., 2020) and is

considered a barrier that changes behaviour toward sustainable consumption (Ferreira and Coelho, 2017), especially among younger consumers who have more limited budgets (Chaudhary, 2018). Consumers, in general, with a positive experience of consuming green products are willing to pay more for green products in the future (Boronat-Navarro and Pérez-Aranda, 2020; Namkung and Jang, 2017; Tezer and Bodur, 2019; Xu et al., 2012). Also, for young consumers, several studies have shown that previous experience of consuming green products influences future purchase intention, and if it is positive, it affects the willingness to pay more for green products (Chaudhary, 2018; Cronin et al., 2011; Yadav and Pathak, 2016). Thus, we formulate the following hypothesis:

H2. Green future estimation of a product has a significant positive influence on the willingness to pay more for green products by generation Z.

2.4. Green perceived benefits

Perceived benefits are positive beliefs that are related to behaviours in the face of risks. According to Chandon et al. (2000), perceived benefits encompass six elements: 1) convenience; 2) value; 3) quality; 4) expression; 5) monetary savings; and 6) entertainment. The benefits consumers perceive concerning green products, namely a good perception of health, taste and flavour, generate purchase intention and higher satisfaction (Islam and Zabin, 2013; Martínez et al., 2020; Silva et al., 2021). Young consumers recognise the perceived benefits of consuming green products and are willing to pay more the higher the perceived benefits (Kovacs and Keresztes, 2022; Yazdanpanah et al., 2015). In this context, the following hypothesis was formulated:

H3. Green Perceived Benefits positively influence the willingness to pay more for green products by generation Z youth.

2.5. Green perceived quality

Perceived quality is defined as a consumer's reputation for superiority or excellence, of superiority or excellence (Zeithaml, 1988). The consumer's pre-existing impression can influence the perceived quality, the difference in quality perception between the consumer and the supplier, and consumers' information asymmetry because they cannot obtain global information about product quality based on the selected information (Zeithaml, 1988). Measures of the perceived quality of a product can be determined by five dimensions: 1) functionality; 2) ease of use; 3) performance; 4) reputation; and 5) serviceability (Brucks et al., 2000). When consumers have no previous experience consuming the goods, purchase intention cannot be influenced by experience. But the perceived quality of a product or brand can influence purchase intention (Chen et al., 2015). So, perceived quality is one of the most significant determinants of purchase intention (Wang et al., 2020). The quality of green products is reflected by their composition, characteristics and environmental benefits (Ali et al., 2011). In this way, perceived quality is understood as consumers' decisions about the overall environment (Chen and Chang, 2013). Most consumers have confidence in the quality of green products because they have higher quality standards and a cost-benefit balance (Ferguson et al., 2009; Mahesh, 2013). Thus, consumers' purchase decisions are influenced by the perceived quality of green products (Suki, 2013, 2016) and may be an antecedent of green consumer satisfaction and loyalty (Gelderman et al., 2021). Previous studies have shown that consumers are willing to pay more for green products, the higher the perceived quality (D'Souza et al., 2007; Shen et al., 2020), although there is no evidence yet for young consumers. In this context, the following hypothesis was formulated:

H4. Green perceived quality positively influences the willingness to pay for green products by generation Z youth.

The hypotheses formulated can be represented through the structural model shown in Fig. 1.

3. Methods

3.1. Sample and measures

Data were collected through an online questionnaire between October and December 2021 and made available to young Generation Z Portuguese through social networks (Facebook, Instagram and LinkedIn). Participation was voluntary and anonymous, and participants were informed about the purpose of the study, having obtained informed consent. A pre-test was also performed to assess whether participants understood the questions.

The sample collected contains responses from 1255 participants, 927 of whom habitually buy green products. Of these participants who habitually buy green products, 708 are young people of generation Z, the target audience of this study.

The questionnaire applied was adapted from Nekmahmud and Fekete-Farkas (2020). Before the pre-test, the questionnaire was translated from English into Portuguese. The questionnaire comprises five groups of questions in addition to questions regarding the socio-demographic characterization of the participants. The first group of questions assessed willingness to pay more for green products. The second group of questions is related to "environmental concern", in which four questions were evaluated regarding the preservation of nature and wildlife, the pleasure of buying green products, the consideration of the potential impact on the environment of the purchases made, and individual environmental responsibility. The third group with two questions is related to "green perceived benefits", having evaluated the benefits of green products in terms of health, taste and aroma. The fourth group with three questions is related to "green perceived quality", having evaluated the standard of quality, durability and trust in green

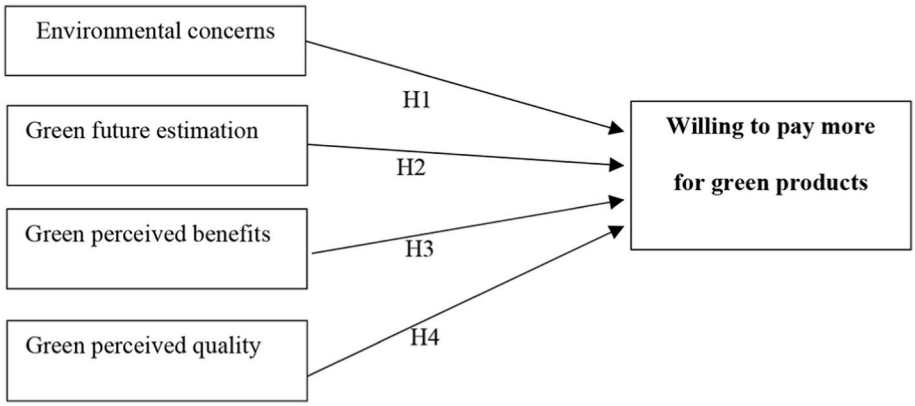


Fig. 1. Structural model explaining willingness to pay more for green products by Generation Z.

products. In the last group, the perspective of a green future was evaluated through two questions, assessing the popularity and future acceptance of green products. The questions were measured on a 5-point scale, from 1 - Strongly Disagree to 5 - Strongly Agree.

3.2. Data analysis

Statistical analysis of the variables used in this study was conducted in SPSSv.25. The hypotheses formulated were tested using the Partial Least Squares (PLS) method in Smart PLS 3.0. (Ringle et al., 2015). The PLS method is suitable for samples collected through questionnaires since it does not require data normality and allows for optimizing the relationships between the items collected and the latent variables constituted and between latent variables (Ringle et al., 2020). According to Hair et al. (2019), the construct reliability and validity must be assessed by three measures: Cronbach's Alpha (Cα > 0.70), Composite Reliability (CR > 0.70), and Average Variance Extracted (AVE >0.50). The discriminant validity must be tested by the Fornell-Larcker criterion and the predictive prediction through the R2 values of the endogenous latent variables.

4. Results

4.1. Descriptive analysis

The initial sample included 928 valid responses from young people of generation Z, but only 708 of the participants usually buy green products. The sample was filtered by participants who habitually consume green products. 63.4% are female, and 36.4% are male. There is a negative statistical association between gender and willingness to pay more for green products (β = −0.053; p-value = 0.052), showing that men are the ones who are willing to pay more for green products (Table 1). The average age of generation Z respondents is 20.51 years, with the minimum age being 16 years and the maximum age being 27 years. The older generation Z youth are willing to pay more for green products (β = 0.029; p-value = 0.059). 56.7% of respondents have completed 12th grade or less, and 36.6% have a university degree. There is a negative statistical association between schooling and willingness to pay more for green products (β = −0.060; p-value = 0.093), demonstrating that generation Z youth with lower schooling are more willing to pay more for green products.

Regarding professional occupations, 69.6% are students, 14.1% are working students, and 13.4% are employees. The professional occupation variable was not statistically significant to explain the willingness to pay more for green products. Most of the respondents (67.3%) have a net monthly income of up to 665 €. A positive statistical association was found between net monthly income and willingness to pay more for green products (β = −0.011; p-value = 0.085), with a higher willingness to pay among the youngsters of generation Z with higher income.

About the variables used in the model shown in Fig. 1, Table 2 presents the means and standard deviation. On average, respondents agree to pay more for green products since the mean (M) of responses is above 2.50. The questions that compose the independent variables present means higher than 4.00, meaning that, on average, the respondents agree with the evaluated items. As regards the environmental concerns variable, the item which generated, on average, the highest agreement was the belief in the preservation of nature and wildlife (M = 4.50); in the green future estimation variable, the item concerning the future acceptance by consumers of green products (M = 4.29); in the green perceived benefits variable, the perception that good products are good for health (M = 4.47); in the green perceived quality variable, the item concerning the acceptable standard of quality (M = 4.25).

Table 2
Mean and standard deviation of variables.

Variables	Mean	Standard Deviation
Willing to pay	3.540	1.085
Environmental concerns	4.2401	0.8205
I believe in the preservation of nature and wildlife	4.530	0.712
I am pleased to purchase green products	4.320	0.831
I consider that my purchase may have an environmental impact	4.113	0.913
I am an environmentally responsible person	4.003	0.826
Green Future Estimation	4.1503	0.8675
Green products will be popular in our country	4.008	0.950
The consumer will accept the future the green products	4.291	0.754
Green Perceived Benefits	4.216	0.8437
Green products are good for health.	4.467	0.735
Green products have well to test and flavour	3.939	1.011
Green Perceived Quality	4.0701	0.8580
Green products appear to have an acceptable quality standard.	4.252	0.761
The green products appear to be durable	3.888	0.955
Green products appear to be reliable	4.242	0.785

3.3. Evaluation of reflective measurement model

The PLS model estimated in SmartPLS3.0 requires validation in terms of reliability, convergence and discriminant validity (Hair et al., 2019). The results of these measures are shown in Table 3. The results show that the model is reliable and have factor convergence because Cα and CR > 0.70 (reference value according to Hair et al. (2019). The Fornell-Larcker criterion was used to measure discriminant validity, and the results are shown in Table 3. The results demonstrated that there is discriminant validity between the latent variables and the way they are measured.

4.3. Explanatory analysis

The R^2 of the endogenous variable WPM and the predictive relevance (Stone-Geisser Q^2) based on the cross-validated redundancy approach were also evaluated. These measures are presented in Table 4. As Q^2 is greater than zero ($Q^2 = 0.251$), the model is relevant for predicting the dependent variable WPM. The independent variables CE, GFE, GPB and GPQ explain 25.9% of the dependent variable ($R^2 = 0.259$), having, therefore, a "substantial effect" according to Cohen (1988). Finally, the quality of model fit was validated by Chi-Square (p = 0.098), Goodness-of-Fit (0.957), the Comparative Fit Index (0.8876), and Standard Root Mean Square Residual (0.089), demonstrating that the model has a good fit.

Environmental concerns, future green estimates and green perceived quality positively influence generation Z's willingness to pay more for green products (β = 0.289; β = 0.163; β = 0.165, respectively), confirming hypotheses H1, H2 and H4. The green perceived benefits negatively influence generation Z's willingness to pay more for green products (β = −0.026), rejecting hypothesis 3. We may also conclude that environmental concerns are the ones that most influence generation

Table 1
Statistical association of sociodemographic variables with the dependent variable.

Variables	Gender		Age		Schooling		Professional situation		Net Monthly Income	
	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value
Willing to pay more for green products	−0.053	0.052	0.029	0.059	−0.060	0.093	0.015	0.714	0.011	0.085

Table 3
Reliability, convergence and discriminant of the PLS Model.

	Ca	CR	AVE	EC	GFE	GPB	GPQ	WPM
Environmental Concern (EC)	0.798	0.867	0.620	0.788				
Green Future Estimation (GFE)	0.794	0.864	0.762	0.548	0.873			
Green Perceived Benefits (GPB)	0.723	0.774	0.632	0.488	0.425	0.795		
Green Perceived Quality (GPQ)	0.798	0.882	0.713	0.598	0.536	0.556	0.844	
Willing to Pay More (WPM)	1.000	1.000	1.000	0.464	0.398	0.276	0.409	1.000

Note: AVE Square Root in bold.

Table 4
Direct effects on dependence variable (WPM).

Effects on Endogenous Variable	Path (β)	*t* Value (Bootstrap)	Confidence Interval	Support
Willing to Pay More (WPM) Adj R2 = 0.259/ Q2 = 0.251)				
H1: Environmental Concerns (EC)	0.289	6.388*	Sig (0.209; 0.378)	Yes
H2: Green Future Estimation (GFE)	0.163	4.020*	Sig (0.088; 0.238)	Yes
H3: Green Perceived Benefits (GPB)	−0.026	0.616**	Sig (−0.102; 0.059)	On
H4: Green Perceived Quality (GPQ)	0.165	3.884*	Sig (0.070; 0.237)	Yes

Z's willingness to pay more for green products, followed by green perceived quality and green future estimations.

5. Discussion of results

This study considered determinants that affect the willingness to pay more for green products, environmental concerns, the green future estimation, the green perceived benefits, and the green perceived quality.

It was found that environmental concerns positively influence the willingness to pay more for green products by consumers of generation Z. Therefore, it can be affirmed that Z generation consumers are increasingly aware of the importance of conserving the environment and are willing to contribute to the resolution of environmental problems (Wei et al., 2018). According to Arısal and Atalar (2016) and Kim and Choi (2005), environmental concerns influence green purchasing behaviour. Moreover, their attitudes' social and environmental benefits positively impact their sustainable purchasing behaviour (Nekmahmud and Fekete-Farkas, 2020).

Green future estimation of a product was also found to positively influence generation Z consumers' willingness to pay a higher value for green products. Thus, the results suggest that the current consumption trend of green products may cause generation Z consumers to pay more or less for them. Thus, generation Z consumers may be strongly influenced by green marketing, and this fickleness may be because generation Z consumers generally have less disposable income (Chaudhary, 2018). Therefore, Gen Z consumers are highly price-sensitive (Lin et al., 2020), and green products are generally more expensive than non-green products (Shen et al., 2020). However, if generation Z consumers have a positive experience with green products, they will be willing to pay more for them in the future (Boronat-Navarro and Pérez-Aranda, 2020; Tezer and Bodur, 2019; Yadav and Pathak, 2016).

It was also found that perceived green benefits negatively influence young generation Z's willingness to pay more for green products. This result is disruptive, as the results point to the unwillingness of young Portuguese generation Z to pay more for green products, even though they perceive their added value. According to Yazdanpanah et al. (2015) and Kovacs and Keresztes (2022), younger consumers identify the perceived benefits of green products and are willing to pay more the higher the perceived benefits are. Nowadays, there is great pressure from policymakers and society on issues related to sustainability (Lopes et al., 2022; Nogueira et al., 2022). Therefore, consumers may feel pressured to purchase greener products, changing their consumption habits. As far as green foods are concerned, policymakers and companies have in the last years raised awareness that these products are good for the environment, good for health, prevent diseases and are palatable (Islam and Zabin, 2013; Nekmahmud and Fekete-Farkas, 2020; Silva et al., 2021).

Finally, the perceived green quality can positively influence the willingness to pay more for green products in the young Portuguese generation Z. Green products generally tend to have higher quality than non-green ones (Shen et al., 2019). Thus, we may state that generation Z consumers behave similarly to consumers concerning green perceived quality. According to Ferguson et al. (2009) and Mahesh (2013), consumers have confidence in the quality of green products, associating more quality with them, also considering that there is a cost-benefit balance of these products. Thus, green perceived quality significantly impacts the purchase decision-making and satisfaction of generation Z consumers, a result that is in line with that indicated by Wang et al. (2020) and Gelderman et al. (2021).

5.1. Theoretical implications

This study contributes to the development of knowledge about signalling theory and green products in generation Z. First, this study complements the results of previous studies (Berger, 2019; Liao et al., 2020) in which green products may have a signalling benefit when analyzing the attitude of customers regarding the purchase of green products. This infers that green purchase intention increases when a signage benefit is added, with consumers agreeing to pay more for this type of product, as already concluded by Berger (2019) and Liao et al. (2020). Also, Liao et al. (2020) concluded that attitudes and the value attributed by the customer to green products positively affect their purchase intention and willingness to pay more for these products. The second theoretical implication is that, for Gen Z consumers, the purchase of green products is related to trust in these kinds of products. Reliability is related to quality and perceived benefits. Berger (2019), in his study, conceived green consumption as a sign of reliability rather than status since status can reduce the perceived reliability of the consumption of green products. Thus, cheaper signals translated by the consumption of green products can be produced, rather than necessarily through luxury products, and can also be reliable, changing the signalling theory assumptions that the monetary costs of signalling are only high (Berger, 2017). The signage advantage is a stimulus for green customers to pay a (more expensive) premium for ecological products, which can eliminate the disadvantage of green products being generally more expensive (Liao et al., 2020). As a third contribution, green consumption is also identified as a sign of pro-sociality through future green estimation. According to Berger (2019), green consumers purchase products to be treated more favourably in their social interactions. However, status signals can reduce the perceived pro-sociality of green product consumption (Berger, 2017). In addition, the consumption of green or organic food products is motivated by hedonic concerns and physical well-being and not by reasons of pro-sociability, and their signaling should be carried out according to the motivations of consumers.

Rahman and Reynolds (2019) also concluded that personal benefits, social-altruistic perspective and environmental concern influence the purchase of green products. Finally, this study adds to the literature that environmental concerns, green future estimation and green perceived quality can be considered determinants for generation Z to pay more for green products, based on the signaling explanations of green consumption that are proven.

5.2. Practical implications

This paper has several valuable practical implications for businesses. It defines potential determinants of green purchasing (environmental concerns, green future estimation and green perceived quality), which can assist marketers in designing more assertive strategies for generation Z consumers, thereby promoting sustainable consumption. These determinants will influence the willingness to pay more for green products by generation Z, demonstrating that the previous sustainable behaviour of Generation Z green consumers is important and can influence future purchases. Therefore, marketers can contribute to developing more sustainable purchasing behaviour in the future (Joshi and Rahman, 2017). Although Generation Z consumers are willing to pay more for green products, the signalling benefit may not pay off if the price of the green product is much higher than a similar non-green product (Berger, 2019). Thus, companies should avoid very high prices for green products or develop such products only for niche targeting high-income consumers. The trend should be to normalise the price of green products vis-à-vis non-green products. To this end, companies can invest in finding new processes that lower the production price, making them lower than their non-green counterparts. Companies can also develop new strategies to clearly signal green products, and for consumers to clearly identify them, for example by obtaining green certificates.

For food products, companies have to change their strategy to highlight the health benefits to consumers and their hedonic aspects rather than only flagging them as green products. Another strategy to promote the consumption of green food products could be for restaurants or canteens to identify meals made only from green products with the colour green on their menus (Berger, 2019; Nekmahmud and Fekete-Farkas, 2020)

Policymakers and industries need to work together to develop sustainable activities that include consumers, generating engagement and the intention to buy in the future. The use of gamified and co-creation strategies can contribute to fostering these activities, as well as the development of offers that have discounts for the green consumer in the next purchase if they return a product after use, thus applying reverse logistics (Nuss et al., 2015; Yuan et al., 2016). Companies can also seek new business segments through the resale of used products, which is considered highly profitable (Guide et al., 2010; Joshi and Rahman, 2017). E-commerce platforms are a good option for selling used products (Ghose et al., 2006).

However, businesses and government, through simpler initiatives such as encouraging the use of using public transport, reusing used goods, or recycling, can encourage sustainable habits. Recycling by all actors (consumers-businesses-government) decreases waste and can create marketing opportunities (Cronin et al., 2011; Ghose et al., 2006). This waste can be a new business opportunity, as it can be used to develop new green products with high market value (Oliveira et al., 2022). Policymakers can also develop events and programmes in universities and schools to make students aware of environmental problems and publicise measures to protect the environment. Along the same line of thought, other sustainable activities can be developed (e.g. experiencing the beauty of nature through rock tours, tree planting, and music festivals) that increase companies' social and corporate social responsibility (Bieak Kreidler and Joseph-Mathews, 2009; Richardson, 2018).

5.3. Limitations of the study and future lines of research

All studies have limitations, and this one is no exception. The data for this study was only collected in Portugal, and, as such, the results cannot be generalized to other contexts unless this study is replicated in other contexts. The paper focuses on Portuguese green consumers from generation Z. Still, it would be interesting to analyse the willingness to pay more for green products with other generations, such as generation X or Y. The respondents' sociodemographic characteristics were not used as mediating variables between the determinants of buying green products and willingness to pay more for green products. It would be interesting in future studies to evaluate the mediating influence of gender, age, income and education. This study addresses green products in general and does not particularize anyone specifically. Thus, new studies can be conducted with the same questionnaire but apply it to specific products such as food, clothes, houses, and cars. We also leave a research question for future studies: How many times more is the consumer willing to pay for green products compared to "non-green" ones?

6. Conclusion

The pressure to consume green products is increasingly a reality in our daily lives. Generation Z is marked by digital transformation, greater environmental awareness, a sense of equality and justice, and ethical diversity, valuing sustainability in the most diverse dimensions. However, generation Z is marked by the effects of the various financial crises and the pandemic, giving more value to money. In this context, this paper evaluates the willingness to pay more for green products by generation Z from the perspective of Signaling Theory, which is a social cognitive theory. Environmental concerns, green future estimation and green perceived quality are potential determinants of Generation Z's consumption of green products and positively influence willingness to pay more for green products. Green perceived benefits have the effect put. We cannot neglect that all the pressures lead us more and more to the consumption of green products and that Generation Z, due to its representativeness, has an essential contribution to reaching this milestone. The willingness to pay extra for green products has to be justified and motivated so that Generation Z is more permeable to changes in their consumption behaviour. Politicians and marketers can play a key role in this respect.

CRediT authorship contribution statement

Sofia Gomes: Conceptualization, Methodology, Software, Formal analysis, Investigation, Resources, Writing – original draft, Writing – review & editing, Visualization. **João M. Lopes:** Conceptualization, Investigation, Resources, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition. **Sónia Nogueira:** Conceptualization, Investigation, Resources, Writing – original draft, Writing – review & editing, Visualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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