



Enhancing consumer purchase intentions for sustainable packaging products: An in-depth analysis of key determinants and strategic insights

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ABSTRACT

Environmental concerns drive corporate and consumer focus on sustainable packaging. Research explores key factors influencing consumer intent, emphasizing the importance of strategic integration for enhanced purchase intentions and environmental goals. A comprehensive literature review identifies factors such as perceived value, willingness to pay, environmental concern, and attitude toward sustainable packaging. Empirical validation using survey data demonstrates the statistical significance of these factors on consumer purchase intentions, with the willingness to pay to emerge as the most influential determinant. Stakeholders are urged to incorporate these findings into strategies for sustainable packaging, fostering positive environmental impact, and informing academic and managerial discussions.

1. Introduction

In the 21st century, the pervasive issue of pollution, particularly the escalating challenge posed by plastic waste, emerged as a paramount environmental concern [1]. Projections foretell a disturbing future, with predictions suggesting that by 2050, our seas and oceans may harbour more plastic than fish [2]. Notably, a substantial fraction of this plastic is attributed to packaging, with each European generating an average of 150 kg of discarded packaging annually, contributing significantly to one-fifth of all waste [3]. Packaging waste's environmental repercussions and substantial yearly production require immediate attention to mitigate the adverse impacts [4]. Innovations have arisen to tackle this challenge and promote sustainable packaging solutions that cater to consumer demands.

Beyond its practical roles of safeguarding products and facilitating transportation, packaging is pivotal in providing information and preserving products [5]. A holistic approach to sustainable packaging is imperative, encompassing considerations of raw materials, production processes, and waste management [6]. Key considerations include using recycled materials, prioritizing production efficiency, and ensuring recyclability. In an era of heightened environmental awareness,

consumer behaviour and sustainability intersection have become a focal point for businesses seeking to align with evolving societal values [2,7]. One pivotal aspect of this dynamic relationship is the growing emphasis on sustainable packaging solutions. As concerns about environmental degradation and the ecological footprint of human activities intensify, consumers increasingly scrutinize the packaging choices associated with the products they purchase. However, this awareness only sometimes translates into tangible actions due to factors such as cost [8]. The analysis of the process of packaging sustainability perceptions and its impact on consumers' choices is paramount for companies and society, therefore requiring thorough evaluation.

Current society exhibits two distinct characteristics relevant to packaging use and sustainability. On the one hand, it embodies a consumerist culture, marked by increased buying, consumption, and disposal of products and packages, partly due to the increase of e-commerce. On the other hand, there is a growing awareness of the high use of natural resources and the ecological consequences. The latter has garnered attention due to the detrimental effects of unsustainable consumption patterns on the environment. For many years, the responsibility for sustainability primarily rested with producers, with little consideration given to consumers. However, the contemporary focus has

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expanded to encompass consumer behaviour analysis, recognizing that individual consumption patterns play a pivotal role in sustainable development [9,10]. In this context, it is both relevant and pertinent to investigate the impact of sustainable packaging on consumers' purchasing intentions and to understand how various factors can influence this behaviour. Consumers must be able to differentiate between conventional and sustainable packaging and weigh the latter's advantages when making purchasing decisions.

As sustainability transcends being a mere trend and transforms into a guiding principle for many individuals, the significance of sustainable packaging cannot be overstated. From reducing plastic pollution to minimizing carbon footprints, consumers' choices regarding packaging contribute substantially to broader environmental goals. However, the decision-making process behind these choices is intricate, influenced by many factors that shape consumer attitudes and behaviours [11,12].

The current study addresses the gap regarding the comprehensive assessment of consumers' evaluation of packaging sustainability and the impact on purchase intention. This research delves into the complex landscape of consumer purchase intentions concerning sustainable packaging products. Focused on understanding the key determinants that direct consumers towards or away from opting for eco-friendly packaging, our research aims to unravel the multifaceted factors that influence these critical decisions.

By exploring the latest research findings and analyzing key variables, we seek to provide businesses, policymakers, and researchers with valuable insights into the intricate interplay of elements that define consumer attitudes toward sustainable packaging. By identifying and understanding these determinants, stakeholders can develop targeted strategies to promote sustainable choices, fostering a harmonious balance between consumer preferences and environmental responsibility.

This study seeks to unravel the underlying motivations and considerations that direct consumers toward embracing sustainable packaging options. Through a comprehensive examination of environmental concerns, perceived product quality, price sensitivity, and attitude toward sustainable packaging, we aim to contribute a nuanced perspective to the ongoing discourse on sustainable consumption.

This study is organized into five chapters following the introduction. The first chapter conducts a literature review, delving into the subject under research and elucidating the essential concepts to enhance our comprehension of consumer purchasing behaviour concerning sustainable packaging. Subsequently, after establishing the theoretical framework and hypotheses, the conceptual model is outlined. The subsequent chapter illustrates the research methodology, outlining the instruments and scales used to measure the constructs, and then presents the primary findings. These results are further discussed and compared with existing literature in the subsequent chapter. The final chapter provides the research's conclusions, highlighting the key findings, discussing implications and limitations, and offering suggestions for future research.

2. Literature review and model proposal

2.1. The importance of sustainable packaging

In recent years, environmental conservation has gained increased attention, prompting businesses and consumers to consider environmental factors a significant criterion in their decision-making process [2, 7]. Despite heightened awareness of the importance of products with sustainable packaging, this concern is only sometimes fully translated into actual consumption. Cost is an influential factor, as products with sustainable packaging are generally more expensive than their conventional counterparts [8]. This cost differential may explain some consumer resistance when making purchasing decisions. Packaging waste poses substantial environmental challenges, and the increasing recognition of environmental responsibility among consumers has led to a higher demand for products with sustainable packaging. However, the success of sustainable packaging largely hinges on its acceptance by

consumers [13]. Despite packaging being a societal and political concern, there is limited research on consumer perceptions of sustainable packaging [14]. Therefore, it is crucial to comprehend and expand our knowledge of the factors influencing consumers' intentions to purchase products with sustainable packaging.

2.1.1. Purchase intention and its drivers

Intention represents an individual's plan or inclination toward a specific behaviour, including purchasing a product or service [15]. Rashid et al. [16] defines sustainable purchase intention as an individual's likelihood and willingness to select products with sustainable attributes over conventional ones at the time of purchase. Similarly, Chen and Chang [17] describes sustainable purchase intention as the probability of a consumer choosing a particular product due to environmental concerns.

Consumer decisions to purchase products with sustainable packaging are influenced by various individual factors, which can vary based on the consumer's characteristics. Lan et al. [18] identifies key factors influencing the intention to purchase environmentally friendly packaging, encompassing social influence, consumers' perception of effectiveness, and the quality and price of such packaging. Social influence significantly shapes consumers' attitudes and purchasing behaviour, particularly the ones from reference groups. This is particularly true in environmental sustainability, where social norms and values can be critical in shaping attitudes towards sustainable products. The perceived effectiveness of environmentally friendly packaging and concerns about its protective function also impact purchase intention. Consumers are more likely to be drawn to environmentally friendly packaging if they believe it effectively protects the product without compromising quality. Moreover, the study underscores the crucial role of the quality and price of environmentally friendly packaging in influencing consumer behaviour, suggesting that appropriate pricing strategies can enhance purchase intention and that packaging quality significantly affects purchasing decisions.

Similarly, Macht et al. [19] delves into how perceived quality cues, including packaging type, influence purchase intention. The study highlights the mediating role of perceived eco-friendliness and convenience and the moderating influence of green consumption values in shaping consumers' intentions to choose bio-based food packaging over recyclable plastic across various product categories. This highlights the need to raise consumer awareness about sustainable packaging options' environmental benefits and convenience. Additionally, Shimul and Cheah [20] draws attention to a positive correlation between consumers' environmental knowledge and responsibilities and their intention to purchase eco-friendly packaged products. This supports the idea that consumers' ethical imperatives, cultivated through awareness and obligations, influence their support for environmentally friendly initiatives.

Analyzing intrinsic factors such as perceived value, willingness to pay, environmental concern, and attitudes toward sustainable packaging is key to understanding the consumer profile that prefers sustainable packaging. These elements are crucial in forming a comprehensive picture of the consumer decision-making process regarding sustainable packaging.

In synthesizing these findings, it becomes apparent that enhancing sustainable purchase intentions among consumers involves a multi-dimensional strategy. This includes fostering environmental awareness and knowledge and addressing practical considerations such as price, quality, and convenience of sustainable packaging options. Furthermore, leveraging social influences and aligning marketing strategies with consumers' ethical values and environmental responsibilities can significantly impact the inclination towards sustainable packaging.

2.1.2. Perceived value of sustainable packaging

The concept of perceived value regarding sustainable packaging is rooted in the theory of Consumer Perceived Value, which primarily

encompasses two dimensions: functional value (encompassing quality, service, price, and convenience values) and symbolic value (encompassing aesthetic, emotional, social, and reputational values) [21]. In this context, Oliver and DeSarbo [22] defines this theory as based on the theory of equity proposed by Adams [23], which posits that consumers assess the merits and drawbacks of a given product to determine their purchase decisions.

Consumers can enhance a product's perceived value through its purchase, consumption, or feedback gathered from others. Through these interactions, they can recognize a particular product's advantages and distinguish it from alternatives or substitutes [24]. These benefits can relate to the product's quality and utility [25], the brand [26], the product's design and aesthetics [27], and the environmental impact of its packaging [28].

Rizzo et al. [29] emphasize that consumers prioritizing sustainability and ethical production practices perceive value in the production stage of organic food and throughout the entire supply chain, including the packaging phase. Macht et al. [19] underscore the pivotal role of perceived eco-friendliness in shaping consumers' intentions to purchase bio-based food packaging alternatives. Giannoutsos et al. [30] suggest that packaging sustainability leads to a higher prevalence of positive emotions and increased satisfaction, thereby amplifying the perceived value of food products. Furthermore, the study underscores the significance of considering the sensory perception of food in conjunction with sustainable packaging, highlighting the potential for sustainable packaging to complement the overall consumer experience and enhance the perceived value of the products.

Zhuang et al. [31] argue that perceived value is a crucial variable in long-term relationships between companies and consumers and plays a pivotal role in influencing purchase intention. Tan and Goh [32] contend that the higher the perceived value of products with sustainable packaging, the more robust the consumer's purchase intention. Therefore, it is proposed that:

H1. Perceived value positively influences the intention to purchase products with sustainable packaging.

2.1.3. *Willingness to pay*

Among the various ways to contribute to environmental preservation, opting for products with sustainable packaging has emerged as a viable and preferable choice for environmentally conscious consumers. However, not all consumers are motivated to pay a premium for such products [33].

Anderson [34] defined willingness to pay as the maximum price a consumer is prepared to pay to acquire or enjoy a specific product or service. It is crucial to comprehend the factors that lead some consumers to be willing to pay more for products with sustainable packaging and what influences the choices of those who are not willing to pay extra for such products.

In this context, Lan et al. [18] highlights that the price of products with environmentally friendly packaging plays a pivotal role in influencing consumer purchase intention. Adopting appropriate pricing strategies can enhance consumers' intention to purchase such products, emphasizing the importance of comprehending consumers' willingness to pay for sustainable packaging and devising pricing strategies that align with consumer preferences and environmental sustainability goals. Giannoutsos et al. [30] also, consumers with heightened environmental awareness and sensitivity to sustainability issues may be more willing to pay for products with sustainable packaging. According to Roozen and Pelsmacker [35], consumers willing to pay more for sustainable packaging are often motivated by their environmental concerns and perception that these products are of higher quality. Conversely, as suggested by Bazoche et al. [36], there needs to be more information about the benefits of sustainable packaging, which is one of the reasons why some consumers hesitate to pay extra for such products. In the realm of sustainability, as emphasized by Prakash and Pathak [37], willingness to pay is a valuable attribute to study in the context of

consumers' purchase intentions. Thus, it is proposed that:

H2. Willingness to pay positively influences the intention to purchase products with sustainable packaging.

2.1.4. *Environmental concern*

Environmental concern has become a significant motivation for sustainable behaviour [38]. Bickart and Ruth [39] define environmental concern as people's sensitivity to environmental issues. Paul et al. [40] researched environmental studies and found that a high level of environmental concern among consumers strongly influences their purchase intentions. Straughan and Roberts [41] established a positive correlation between environmental concern and sustainable behaviour. Regarding sustainable packaging, Lavelle et al. [42] affirms that consumers' environmental concern positively influences their intentions to purchase products with sustainable packaging. Lan et al. [18] underscore the substantial impact of consumers' environmental concerns on their attitudes toward purchasing eco-friendly products. Additionally, the research emphasizes the necessity to enhance consumers' awareness and knowledge of eco-friendly products, suggesting that addressing environmental concerns through education and awareness-building initiatives can positively influence their purchasing behaviour. Macht et al. [19] highlight the significance of environmental concern as a crucial determinant influencing consumers' purchase intentions for bio-based food packaging alternatives. The study explores the moderating impact of green consumption values, suggesting that individuals with heightened environmental concerns and values are more likely to exhibit a stronger intention to purchase eco-friendly packaging. Macht et al. [19] acknowledge the escalating global environmental awareness and sensitivity among consumers. This implies that consumers' environmental concern is a notable factor likely to influence their views and preferences regarding sustainable packaging and its impact on food products. Finally, Shimul and Cheah [20] explores the connection between consumers' environmental responsibility and knowledge and their intention to purchase eco-friendly packaged products, suggesting that environmental awareness and concern significantly influence the intention to opt for environmentally friendly packaging. Moreover, the research proposes that consumers' environmental concern can naturally drive their purchasing choices toward environmentally friendly alternatives.

Therefore, the following hypothesis is proposed:

H3. Environmental concern positively influences the intention to purchase products with sustainable packaging.

2.1.5. *attitude toward sustainable packaging*

Ajzen and Fishbein [43] propose that the relationship between attitude and behaviour is influenced by three main factors: (1) the strength of the attitude, (2) the accessibility of the attitude, and (3) the presence of social and environmental influences. The strength of the attitude refers to the intensity of the belief or feeling concerning the object of the attitude. The stronger the attitude, the more likely it is to impact behaviour. The accessibility of the attitude relates to how readily the attitude comes to mind when a person contemplates performing the behaviour. If the attitude is easily recalled and relevant to the situation, it is more likely to affect behaviour. Situational influences like social norms or environmental restrictions can moderate the relationship between attitude and behaviour.

The attitude is regarded as an antecedent of an individual's purchase intention in the context of sustainable practices [41]. According to Limbu et al. [44], while individuals' attitudes play a pivotal role in their intention to purchase products with sustainable packaging, these attitudes can vary from person to person. They may be positive, negative, or mixed. Studies by Tikka et al. [45] reveal significant differences between men and women in their attitudes toward products with sustainable packaging. Men tend to exhibit negative attitudes toward such products, while women, as indicated by Mainieri et al. [46], tend to believe that buying products with sustainable packaging contributes to

environmental conservation.

Lan et al. [18] suggest a positive relationship between consumers' attitudes toward purchasing products with environmentally friendly packaging and their purchase intention. Macht et al. [19] a favourable attitude toward sustainable packaging will likely enhance consumers' purchase intention for bio-based food package alternatives compared to recyclable plastic packaging. Giannoutsos et al. [30] suggest that consumers generally behave favourably toward sustainable packaging, mainly when sustainability features are explicitly communicated. Shimul and Cheah [20] explores the pivotal role of consumers' attitudes in influencing their purchase intention for eco-friendly packaging. The study highlights attitude as a critical mediator between consumers' environmental responsibility and knowledge and their inclination toward adopting sustainable packaging. Consequently, we posit that:

H4. Attitude towards sustainable packaging positively influences the intention to purchase products with sustainable packaging.

2.2. Conceptual model

Building upon the research conducted in this chapter, Fig. 1 illustrates a proposed analysis model that will underpin the empirical aspect of this study. Fig. 1 outlines the variables constituting the analytical elements of this research, aimed at assessing and comprehending their impact on the intention to purchase products with sustainable packaging. These variables have been derived from the theoretical framework to explore how perceived value, willingness to pay, environmental concern, and attitude towards sustainable packaging (independent variables) influence purchase intention (the dependent variable).

The hypotheses introduced in the preceding chapter serve as a roadmap for the research, facilitating our understanding and discussion of the results and subsequent conclusions. These hypotheses represent the assumptions made by the researcher to elucidate the relationships being tested between the independent and dependent variables [47]. To address the central research question, the following conceptual model will be examined:

3. Methodology

The selection of a quantitative approach stems from the need to comprehend and elucidate the relationships between variables. This study is conducted systematically, employing questionnaires, which offer the researcher control over the variables under investigation and the research questions. To achieve this, hypotheses are developed, involving the initial formulation of predictions regarding the outcomes of relationships between the variables the researcher intends to explore. One distinctive feature of this study is its potential for replication, which entails reproducing prior research to verify whether the original findings can be replicated and if the conclusions align with those of the initial study [48]. Consequently, quantitative research was chosen. Qualitative studies, on the other hand, are typically employed when the goal is to conduct an in-depth exploration of a problem, emphasizing the social

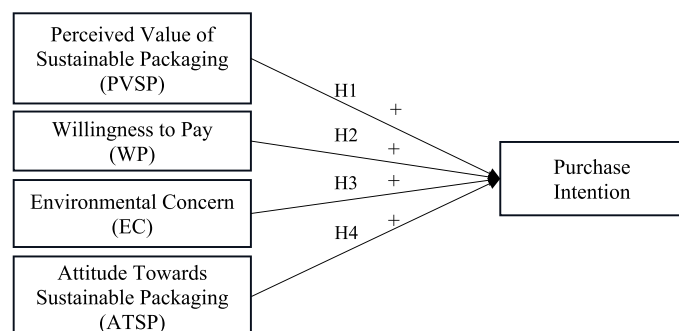


Fig. 1. Proposed conceptual model.

aspects of the research. Qualitative studies are exploratory, as they aim to gain insights into perspectives and behaviours related to a specific topic [49], in contrast to the predominantly confirmatory nature of quantitative studies.

3.1. Pre-test, data collection, and survey structure

For the current study, we opted to collect and analyze primary data. We obtained primary data by administering an online questionnaire to various individuals, enabling the acquisition of information to comprehend the role of sustainable packaging in influencing consumers' purchasing intentions. The questionnaire was designed to align with the study objectives.

A non-probabilistic convenience sample was then selected, allowing for the fast collection of readily accessible and suitable responses. Convenience sampling is a type of non-probability sampling wherein individuals are included from the population based on practical criteria, such as ease of accessibility, geographic proximity, availability at a given time, or willingness to participate in the study [50]. Thus, the initial step involved sharing the survey link with family, friends, and colleagues who represented fitting respondents and were easily reachable. Subsequently, these initial respondents extended invitations to new participants from their network of friends and acquaintances, employing a snowball sampling method [51].

Before publishing the survey, pre-testing was conducted among individuals with characteristics resembling the intended sample's characteristics. The purpose of this pre-test was to identify any flaws in the questionnaire. Five individuals were asked to review the questionnaire and note any concerns or questions, which were subsequently communicated to the researcher. This process allowed for the identification and correction of spelling and grammar errors. Once the necessary corrections were made, the survey link was disseminated via social media using a snowballing data collection technique. The survey was self-administered, with respondents completing it independently [52]. A total of 161 valid responses were collected.

The questionnaire survey was designed to elicit consumer feedback on the specified variables: perceived value, willingness to pay, environmental concern, and attitude toward sustainable packaging. These variables were assessed using scales available in the literature (Table 1).

The questionnaire survey, provided in Appendix A, is organized into nine sections. These include a section for the Survey Header, six sections designed to assess various variables, a section for Sociodemographic Characterization, and a concluding section expressing gratitude to the participants.

3.2. Sample characterization

The sample comprises 161 respondents, mostly women ($n = 108$; 67.1 %). The predominant age group is 51–61, accounting for 39.8 % of respondents ($n = 64$), followed by the 18–28 age group at 26.7 % ($n = 43$) and the 40–50 age group at 18.6 % ($n = 30$). The age groups with the lowest representation are those over 61 (9.9 %; $n = 16$) and those between 29 and 39 (5 %; $n = 8$). Regarding education, the prevalent categories are bachelor's degrees (39.1 %; $n = 26$) and master's degrees (19.3 %; $n = 31$). Notably, over 80 % of the sample holds qualifications beyond high school. Regarding professional status, more than half (67.1 %; $n = 108$) are employed. Regarding household composition, 32.3 % ($n = 52$) correspond to 4-person households. Regarding the presence of children in the household, 68.9 % ($n = 111$) have no children. Regarding the household net monthly income, approximately half of the sample (52.2 %) state having less than 3600€. Finally, 70.2 % of respondents ($n = 113$) are responsible for household shopping.

4. Results

The descriptive statistics of the variables are shown in Table 2.

Table 1
Construct measurement scales.

Perceived value of sustainable packaging (PVSP)	
Kong et al. [53]	<ol style="list-style-type: none"> 1. The intended performance of the product with sustainable packaging meets my expectations. 2. The environmental function of products with sustainable packaging creates value for me. 3. I buy products with sustainable packaging because they have more environmental benefits than products with conventional packaging. 4. I buy products with sustainable packaging because they show more environmental concern than products with conventional packaging. 5. I buy products with sustainable packaging because they are sustainable.
Items: 5-item scale. Likert scale: 5 (1 - strongly disagree; 5 - strongly agree)	
Willingness to pay (WP)	
Jang et al. [54]	<ol style="list-style-type: none"> 1. I agree to pay more for products with sustainable packaging. 2. I am proud to have products with sustainable packaging in my home, even though they are more expensive than products with conventional packaging. 3. I would be willing to pay more to buy products with packaging that is less harmful to the environment.
Items: 3-item scale. Likert scale: 5 (1 - strongly disagree; 5 - strongly agree)	
Environmental concern (EC)	
Jaiswal and Singh [55]	<ol style="list-style-type: none"> 1. The environment is my biggest concern. 2. I am concerned about the deterioration in the quality of the environment. 3. I am emotionally involved in environmental protection issues. 4. I often think about how environmental quality can be improved.
Items: 4-item scale. Likert scale: 5 (1 - strongly disagree; 5 - strongly agree)	
Attitude towards sustainable packaging (ATSP)	
Irfan et al. [56]	<ol style="list-style-type: none"> 1. I have a favourable attitude towards sustainable packaging. 2. I use sustainable packaging because it is good for the environment. 3. In my house, it is considered sensible to use sustainable packaging. 4. It would be nice to use sustainable packaging in my home. 5. I believe that sustainable packaging is just as safe as conventional packaging.
Items: Scale with 7 items. 2 items were excluded from the original scale. Likert scale: 5 (1 - strongly disagree; 5 - strongly agree)	
Purchase Intention (PI)	
Paul et al. [40]	<ol style="list-style-type: none"> 1. For sustainability, I will consider switching to brands that sell their products with sustainable packaging. 2. In the future, I hope to buy products with sustainable packaging for their positive environmental contribution. 3. I will consider buying products with sustainable packaging because they are less polluting. 4. I want to spend more money on products with sustainable packaging than those with conventional packaging. 5. In the near future, I want to buy sustainable packaging products.
Items: 5-item scale. Likert scale: 5 (1 - strongly disagree; 5 - strongly agree)	

Table 2
Descriptive statistics.

Variable	N	Mean	Std deviation
Perceived value of sustainable packaging (PVSP)	161	3.698	0.926
Willingness to pay (WP)	161	3.149	1.029
Environmental concern (EC)	161	3.505	0.884
Attitude towards sustainable packaging (ATSP)	161	3.998	0.836
Purchase Intention (PI)	161	3.778	0.861

4.1. Model analysis

The data collected were processed using the SPSS 28 software. The initial analysis involved checking for missing values. Missing values can

arise due to various factors, including respondents not answering questionnaire questions, errors in manual data entry, measurement inaccuracies, or censored and anonymized data [57]. An analysis of the 22 items on the scale and the eight sociodemographic characterization variables revealed no issues with missing values. We proceed by analyzing outliers. Outliers can result from participant response errors and data entry mistakes. In a variable distribution, extreme values are those considerably distant from most data points, often due to their unusual or abnormal nature. Extreme values within the sample data can bias statistical estimates [58]. As none of the outliers were deemed extreme, it was decided to include all responses in the analysis, partly due to the sample size ($N = 161$).

The next step was analyzing the quality of the measures. Reliability, validity, and standard method bias tests were performed to ensure the measurement model's quality. The results are presented in Table 3.

According to the results in Table 3, the measures present adequate reliability ($\alpha > 0.7$) and convergent validity ($AVE > 0.5$), and no collinearity issues are reported ($VIF < 3.3$) (Kock, 2015).

Discriminant validity was assessed using the Fornell and Larcker criterion and the Heterotrait-monotrait ratio (HTMT) (Table 4). The results show that the measurement model has discriminant validity.

Since the values in each line of the lower triangular matrix are inferior to the principal diagonal value (the square root of the AVE, in bold) and all the values in the upper triangular matrix (the HTMT Ratio, in italics) are lower than 0.85, the discriminant validity is confirmed.

After, the mean, mode, and standard deviation of the variables were examined. As mentioned earlier, the Likert scale was used in the survey, where respondents rated their level of agreement with statements on a scale from 1 to 5. The average score for each item was calculated, with the highest being 4.19 (standard deviation = 0.88) of the EC construct item "I am concerned about the degradation of the quality of the environment" and the lowest being 2.96 (standard deviation = 1.12) for the WP variable item "I agree to pay more for products with sustainable packaging." Furthermore, the 22 items were aggregated into five constructed variables, and their mean scores were analyzed. In descending order, the most highly valued dimensions in the sample are as follows: 1st ATSP ($M = 4.00$; $SD = 0.84$), 2nd PI ($M = 3.78$; $SD = 0.86$), 3rd PVSP ($M = 3.70$; $SD = 0.93$), 4th EC ($M = 3.50$; $SD = 0.88$), and 5th WP ($M = 3.15$; $SD = 1.08$). It is worth noting that, in descriptive terms only, although ATSP is prominent in this sample, WP is the least prominent and consequential variable.

The Harman single-factor test method was used to assess the common method variance (CMV). Harman's One-Factor Test results indicate problematic CMV if an exploratory factor analysis (EFA) with all study variables produces eigenvalues, suggesting the first factor accounts for more than 50 % of the variance among variables. In the current study, the EFA resulted in five factors, with the first one accounting for less than 50 % (48.643 %); therefore, CMV does not seem to bias the results.

4.2. Hypothesis testing

4.2.1. Correlation analysis

After the descriptive assessment of the variables, the proposed hypotheses were tested. In this study, PI (purchase intention) represents the dependent variable to be predicted. In contrast, the variables PVSP

Table 3
Reliability, convergent validity, and common bias testing results.

	Cronbach's alpha (α)	Composite reliability (rho_c)	Average variance extracted (AVE)	Variance inflation factor (VIF)
PVSP	0.893	0.921	0.701	2.165
WP	0.867	0.868	0.790	1.797
EC	0.867	0.910	0.716	2.027
ATSP	0.869	0.906	0.660	2.104
PI	0.906	0.930	0.728	

Table 4
Discriminant validity - Fornell and Larcker criterion and Heterotrait-monotrait ratio (HTMT).

	ATSP	WP	PI	EC	PVSP
ATSP	0,812	0.593	0.798	0.714	0.745
WP	0.514	0,889	0.770	0.688	0.667
PI	0.710	0.681	0,853	0.726	0.738
EC	0.623	0.596	0.644	0,846	0.667
PVSP	0.664	0.588	0.672	0.592	0,838

(perceived value of sustainable packaging), WP (willingness to pay), EC (environmental concern), and ATSP (attitude towards sustainable packaging) serve as the independent (predictor) variables. These variables must meet the prerequisite of demonstrating a statistically significant correlation. If any independent variables do not meet this assumption, they cannot be used to predict the dependent variable.

Correlations can be of two types: parametric (when the sample follows a normal distribution) and non-parametric (when the sample deviates from normality and symmetry). The Kolmogorov-Smirnov test was conducted to assess the normality of the sample, and it did not confirm normality. Therefore, non-parametric correlations between the different constructs were examined using the Spearman correlation. The Spearman test categorizes correlations as low ($r < 0.300$), moderate (r between 0.301 and 0.500), or high ($r > 0.500$) [59]. Table 5 reveals that each construct positively correlates with all the others. The analysis of individual correlations indicates a high correlation ($r \geq 0.500$). Using the values in Table 5, it is possible to calculate the shared variance among the different constructs, as this data reveals the degree of overlap between them. The highest correlation is between PI and SD ($r = 0.663$), and the calculation of shared variance is determined by squaring the value of the correlation coefficient and multiplying it by 100, resulting in a shared variance of 40.06 % between these two constructs ($0.663 \times 0.663 \times 100$). In contrast, the lowest correlation between ATSP and PD ($r = 0.456$) results in a shared variance of 20.79 %.

4.2.2. Multiple linear regression model analysis

Since the prerequisites for independent (predictor) variables were met, a multiple linear regression model (MLR) was employed to assess the hypotheses. The MLR, the stepwise regression method, was selected, characterized by maximizing the number of interactions between all the constructs [60].

Furthermore, the choice was due to the ability to provide information on each factor's individual contribution and the variation on the R-squared. As shown in Table 6, all models are statistically significant at a 0.001 level.

As indicated in Table 6, this method produced analysis for four models:

1. ATSP predicting PI ($R^2 = 0.491$);
2. ATSP and WP predicting PI ($R^2 = 0.638$);
3. ATSP, WP, and PVSP predicting PI ($R^2 = 0.654$);
4. WP, ATSP, PVSP, and EC predicting PI ($R^2 = 0.663$).

The fourth model, where PI is predicted by WP, ATSP, PVSP, and EC together, presents the highest R^2 , indicating that these four variables can predict 66.3 % of the variance in the PI variable.

Table 5
Spearman correlation.

	PVSP	WP	EC	ATSP	PI
PVSP		0.587	0.585	0.626	0.638
WP	0.587		0.589	0.456	0.663
EC	0.585	0.589		0.580	0.616
ATSP	0.626	0.456	0.580		0.645
PI	0.638	0.663	0.616	0.645	

Table 6
Models generated with RLM - stepwise method.

Model	R	R square	Adjusted R-squared	St. error of estimate	Durbin-Watson
1	0.700 ^a	0.491	0.487	0.61651	
2	0.799 ^b	0.638	0.633	0.52158	
3	0.809 ^c	0.654	0.647	0.51133	
4	0.814 ^d	0.663	0.655	0.50611	1.425

- ^a Predictor: (Constant), ATSP.
- ^b Predictors: (Constant), ATSP, WP.
- ^c Predictors: (Constant), ATSP, WP, PVSP.
- ^d Predictors: (Constant), ATSP, WP, PVSP, EC.
- ^e Dependent Variable: PI.

The Durbin-Watson value was used to evaluate autocorrelation in the regression model. The calculated Durbin-Watson value of 1.425 (Table 6) indicated some degree of positive autocorrelation; however, above the critical value of one suggests the model results are acceptable [61].

The ANOVA test was used to conclude whether these models have predictive capacity (Table 7). Although the results show differences between the models, they all have predictive capacity ($p < =0.001$).

4.2.3. Multicollinearity assessment

One of the assumptions for Stepwise Multiple Regression (SMR) is that the variables are correlated. However, strong correlations between variables can potentially render the analyses conducted in SMR unfeasible, as excessively high correlations can compromise the robustness of the models. Two indicators, Tolerance and Variance Inflation Factor (VIF), can be utilized to identify multicollinearity. Tolerance values range between 0 and 1, with results closer to 0 indicating a higher likelihood of multicollinearity problems. VIF, on the other hand, generally suggests an absence of multicollinearity issues when it exhibits values less than 3 [62].

Table 8 displays the Tolerance and VIF values for Model 4. Upon analysis, it can be inferred that these values do not indicate multicollinearity problems in the data since Tolerance values differ from zero and all VIF values are below 3.

Table 8 shows that Model 4 is the one that best explains the purchase intention (PI). Within the context of these four variables, the WP construct makes the most substantial contribution to the model ($\beta = 0.342$), followed by ATSP ($\beta = 0.336$), PVSP ($\beta = 0.159$), and EC ($\beta = 0.136$) as the weakest predictor. In all cases, these predictor variables positively forecast PI, with two variables exhibiting low magnitude (PVSP and EC, <0.30) and the remaining two demonstrating moderate

Table 7
ANOVA test.

Model	Sum of squares	Degrees of freedom	Mean square	F	Sig.
1	58.205	1	58.205	153.136	<0.001 ^b
	60.434	159	0.380		
	118.640	160			
2	75.655	2	37.828	139.047	<0.001 ^c
	42.984	158	0.272		
	118.640	160			
3	77.590	3	25.863	98.920	<0.001 ^d
	41.049	157	0.261		
	118.640	160			
4	78.681	4	19.670	76.794	<0.001 ^e
	39.958	156	0.256		
	118.640	160			

- ^a Dependent Variable: PI.
- ^b Predictor: (Constant), ATSP.
- ^c Predictors: (Constant), ATSP, WP.
- ^d Predictors: (Constant), ATSP, WP, PVSP.
- ^e Predictors: (Constant), ATSP, WP, PVSP, EC.

Table 8
Models Coefficients and Multicollinearity Indices.

Model		Standardized Coefficients		Collinearity statistics	
		Beta (β)	Sig.	Tolerance	VIF
1	ATSP	0.700	0.000	1.000	1.000
2	ATSP	0.468	0.000	0.732	1.365
	WP	0.448	0.000	0.732	1.365
3	ATSP	0.382	0.000	0.549	1.820
	WP	0.386	0.000	0.625	1.600
	PVSP	0.182	0.007	0.493	2.027
4	ATSP	0.336	0.000	0.486	2.057
	WP	0.342	0.000	0.552	1.811
	PVSP	0.159	0.019	0.480	2.082
	EC	0.135	0.041	0.497	2.011

poser (0.301–0.500).

Table 9 presents the supported hypotheses, further graphically presented in Fig. 2.

As can be seen, all four hypotheses are supported by the current sample data.

5. Discussion

The outcomes of our investigation align with recent research in consumer behaviour and sustainable packaging, reinforcing patterns documented by Lan et al. [18], Shimul and Cheah [20], and Macht et al. [19]. However, it is crucial to note the contemporaneity of these studies, emphasizing the ongoing need for additional evidence to strengthen the foundation for analyzing consumer preferences in sustainable packaging. Our meticulous assessment of the measurement model’s reliability and convergent validity, adhering to Kock [63] standards, and discriminant validity, evaluated against specific criteria, affirm our methodology’s robustness. The descriptive analysis of variables supports existing literature on consumer preferences, emphasizing the significance of willingness to pay (WP) and the relatively lower emphasis on environmental concern (EC). Spearman correlation analysis confirms strong associations among all variables in the conceptual model. Regarding hypotheses testing, our results align with prior research, indicating positive and statistically significant relationships between perceived value, willingness to pay, environmental concern, attitude, and purchase intention of sustainable packaging. The stepwise multiple regression analysis helps to show that the impact of the Perceived Value of Sustainable Packaging (PVSP) and Environmental Concern (EC) is small when consumers have a positive attitude towards sustainable packaging and have financial means that allow them to be willing to pay extra for products with sustainable packages.

The results indicate a positive relationship between the perceived value of sustainable packaging and purchase intention, aligning with the findings of Tan and Goh [32], who demonstrated that a higher perceived value of sustainable packaging corresponds to increased consumer purchase intention. Despite these findings and the positive relationship, it is worth noting that the perceived value of sustainable packaging is the second weakest predictor of purchase intention. This may be attributed to sustainable packaging not being widely recognized for its functional

Table 9
Hypotheses supported.

Hypotheses	Supported
H1. Perceived value positively influences the intention to purchase products with sustainable packaging.	Yes
H2. Willingness to pay positively influences the intention to buy products with sustainable packaging.	Yes
H3. Environmental concern positively influences the intention to buy products with sustainable packaging.	Yes
H4. Attitude towards sustainable packaging positively influences the intention to purchase products with sustainable packaging.	Yes

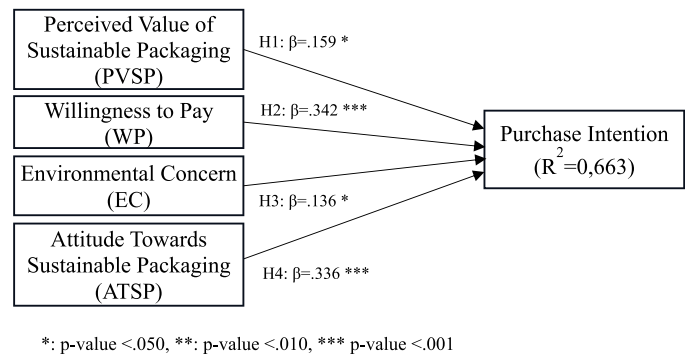


Fig. 2. Conceptual model results.

*: p -value < 0.050, **: p -value < 0.010, *** p -value < 0.001.

and symbolic value [21].

The results confirm that consumers’ willingness to pay more for sustainable products is primarily motivated by environmental concerns and the perception of higher product quality. This variable’s significant role in understanding consumer purchase intention aligns with the results by Prakash and Pathak [37] and is also the strongest predictor of purchase intention.

Straughan and Roberts [41] previously pointed to a positive link between environmental concern and purchase intention, which is also corroborated by the findings in this study. Similarly, Kanchanapibul et al. [64] and Paul et al. [40] suggested that a high level of environmental concern among consumers impacts their purchase intention. However, the results of this research indicate that this variable has the least predictive power regarding purchase intention. This may be due to consumers having environmental concerns, but other factors influence their purchase intention to a greater extent.

Finally, as noted by Straughan and Roberts [41], attitude is an antecedent that positively influences purchase intention. Limbu et al. [44] further emphasizes that people’s attitudes play a significant role in their intention to purchase products with sustainable packaging, although this may vary from person to person. The results from this study validate the existence of a positive relationship between the attitude variable and purchase intention, with the latter exerting the most substantial influence on predicting purchase intention. Additionally, it is worth highlighting that, as mentioned by Mainieri et al. [46], women tend to hold positive attitudes toward purchasing sustainable packaging because they perceive it as beneficial for the environment. The results also indicate a higher level of interest from women, with the majority (approximately 70 %) of respondents being female.

While our study aligns with previous research, it introduces unique contributions to the field. The comprehensive analysis of the measurement model, encompassing reliability, validity, and discriminant validity, establishes a robust foundation for future research in sustainable packaging. The stepwise multiple regression models offer insights into the relative importance of each predictor variable in explaining purchase intention.

The current study holds implications for both researchers and practitioners in the field of sustainable packaging. The findings underscore the critical role of perceived value, willingness to pay, environmental concern, and attitude in shaping consumer intentions toward sustainable packaging. The emphasis on WP, ATSP, and PVSP suggests that interventions and marketing strategies that focus on these aspects may significantly impact the promotion of sustainable consumption.

The divergence with previous studies regarding the relative importance of willingness to pay indicates the need to target interventions beyond economic incentives. Companies and policymakers should consider strategies that enhance perceived value and foster positive attitudes towards sustainable packaging, recognizing that these factors may substantially influence consumer behaviour.

In conclusion, our study provides support with established research but also adds value by offering additional insights about the specific dynamics of consumer behaviour toward sustainable packaging and the relative importance of each factor analyzed. The emphasis on attitudes and willingness to pay as primary drivers of purchase intention, much likely powered by the perceived value of sustainable packaging, provides actionable insights for businesses and policymakers aiming to promote sustainable practices in the market.

6. Conclusions, management implications and research limitations

This research contributes to the existing literature by enhancing our understanding of the factors influencing consumers' purchase intentions for products with sustainable packaging. This is particularly relevant as consumer preference for products with sustainable packages remains an underexplored area. It is possible to conclude that the willingness to pay a premium for products with sustainable packaging exerts the most significant influence on the intention to purchase such products. Therefore, public agents should devote special attention to developing consumers' willingness to pay for sustainability. Campaigns focusing on the value of sustainable packages instead of their price must be created. The cooperation between public agents and companies to decrease the extra cost of products with the sustainable package must be nurtured to improve consumers' willingness to shift toward this type of offer.

Sustainable consumption patterns are evolving, and consumers are increasingly placing a higher value on sustainable packaging and environmental conservation. While consumers express concerns about environmental degradation, interestingly, the environmental concern appears to be variable, with the least influence on the intention to purchase products with sustainable packaging. These findings stress the importance of researching additional factors related to environmental conscience among consumers to improve the acceptance of sustainable packaging.

Another noteworthy factor is the perceived value of sustainable packaging, a multi-dimensional product evaluation, which, according to the obtained results, ranks as the second least predictive factor for consumers' intention to buy products with sustainable packaging. This suggests a potential gap in recognizing the functional and symbolic value of sustainable packaging. Fostering the perceived value of sustainable packaging seems a crucial pathway for increasing consumer intent to favour products with sustainable packaging.

Regarding consumers' attitudes, which can vary widely from person to person, this variable emerges as a significant antecedent of purchase intention in this study, ranking as the second most relevant factor. Importantly, our results reveal that attitudes exert the most substantial influence on predicting purchase intention, emphasizing their critical role in shaping consumer behaviour. Additionally, the gender-based analysis indicates higher interest and positive attitudes among women toward purchasing sustainable packaging. Therefore, actions devoted to promoting the adoption of sustainable packages should be targeted, preferably to them. Adopting an integrated approach that addresses the set of variables in this study would improve the attitude of consumers, especially when targeting women, and increase the behavioural component of attitude, in this case, the purchase intention.

From a practical standpoint, this study offers valuable insights for several stakeholders. Companies can use the findings to conduct thorough market research and identify specific consumer segments that are more willing to pay for products with sustainable packages. By understanding the preferences and needs of these segments, businesses can tailor their product offerings to align with consumer expectations, thus enhancing their competitiveness in the market. Also, insights from the study suggest the importance of enhancing the perceived value of sustainable packaging among consumers. Companies can invest in communication and marketing strategies that highlight the functional and symbolic benefits of sustainable packaging, thereby justifying

potential price premiums. Additionally, businesses can explore pricing adjustments based on consumer perceptions of value, ensuring pricing strategies align with consumer expectations and market demand.

Governments play a pivotal role in fostering an enabling environment for sustainable consumption and production practices. Policy interventions, such as regulatory standards for eco-friendly packaging, can incentivize businesses to adopt sustainable practices while ensuring consumer protection and environmental conservation. Governments can also provide financial support or grants to encourage research and development in sustainable packaging technologies. Public agents can collaborate with industry stakeholders to develop consumer education and awareness campaigns focused on the value proposition of sustainable packaging. Governments can influence consumer behaviour and foster a culture of responsible consumption by emphasizing the environmental, social, and economic benefits of sustainable consumption. Educational initiatives can target various demographic groups, including women, who have shown higher interest and positive attitudes towards purchasing sustainable packaging.

However, it is important to acknowledge certain limitations of this study. Firstly, the sample size is relatively small, and expanding it would be beneficial for more robust conclusions. Additionally, the sample composition could be more diverse regarding generational representation to understand the perceptions of different age groups. Due to the small sample size, we decided not to conduct comparative analyses due to reliability issues. Further studies could address this limitation by collecting data from big samples. Also, consumer behaviours and perceptions can vary significantly across different cultural, economic, and geographical contexts. Hence, prudence is advised when extrapolating these findings to heterogeneous consumer populations. Finally, future research should include factors not explored, such as personal norms, perceived environmental knowledge, perceived risk, and brand associations on sustainable packaging preferences, which could influence consumers' intentions to purchase products with sustainable packaging.

CRedit authorship contribution statement

Paulo Duarte: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Susana C. Silva:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Afonso S. Roza:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Methodology, Investigation, Formal analysis, Conceptualization. **Joana Carmo Dias:** Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation, Conceptualization.

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.

Appendix A

Scales Used

Please rate the following sentences using a scale of 1 to 5, where '1' refers to 'Strongly Disagree' and '5' to 'Strongly Agree':

Perceived Value of Sustainable Packaging

1. The intended performance of the product with sustainable packaging meets my expectations.
2. The environmental function of products with sustainable packaging creates value for me.
3. I buy products with sustainable packaging because they have more environmental benefits than products with conventional packaging.
4. I buy products with sustainable packaging because they show more environmental concern than products with conventional packaging.
5. I buy products with sustainable packaging because they are sustainable.

Willingness to Pay

1. I agree to pay more for products with sustainable packaging.
2. I'm proud to have products with sustainable packaging in my home, even though they are more expensive than products with conventional packaging.
3. I would be willing to pay more to buy products with packaging that is less harmful to the environment.

Environmental Concern

1. The environment is my biggest concern.
2. I'm concerned about the deterioration in the quality of the environment.
3. I'm emotionally involved in environmental protection issues.
4. I often think about how environmental quality can be improved.

Attitude towards sustainable packaging

1. I have a favourable attitude towards sustainable packaging.
2. I use sustainable packaging because it's good for the environment.
3. In my house it's considered sensible to use sustainable packaging.
4. It would be nice to use sustainable packaging in my home.
5. I believe that sustainable packaging is just as safe as conventional packaging.

Purchase Intention

1. For sustainability, I'm going to consider switching to brands that sell their products with sustainable packaging.
2. In the future, I hope to buy products with sustainable packaging for their positive contribution to the environment.
3. I will consider buying products with sustainable packaging because they are less polluting.
4. I want to spend more money on products with sustainable packaging rather than those with conventional packaging.
5. In the near future I definitely want to buy products with sustainable packaging.

References

- [1] R. Blasiak, E. Leander, J.B. Jouffray, J. Virdin, Corporations and plastic pollution: trends in reporting, *Sustain. Futures* 3 (2021) 100061, <https://doi.org/10.1016/j.sfr.2021.100061>.
- [2] L.M. Carnero, *The Evolution of Packaging Towards Sustainability*, University of León, 2021.
- [3] I. Pérez, *The Effect of the Images Depicted on Food Packaging on Consumer Perception and Response*, Universidad de Zaragoza, 2018.
- [4] B. Wohnner, E. Pauer, V. Heinrich, M. Tacker, Packaging-related food losses and waste: an overview of drivers and issues, *Sustainability* 11 (1) (2019) 1–15, <https://doi.org/10.3390/su11010264>.
- [5] M.I. García Montes, J.M. Palma Ruiz, Consumers' perceptions toward eco-friendly food packages. A review of theories, models, and recent studies, *Excel. Adm. Online* 1 (1) (2022) 49–72.
- [6] J. Han, L. Ruiz-García, J. Qian, X. Yang, Food packaging: a comprehensive review and future trends, *Compr. Rev. Food Sci. Food Saf.* 17 (4) (2018) 860–877, <https://doi.org/10.1111/1541-4337.12343>.
- [7] F. Pietrulla, K. Frankenberger, A research model for circular business models—Antecedents, moderators, and outcomes, *Sustain. Futures* 4 (2022) 100084, <https://doi.org/10.1016/j.sfr.2022.100084>.
- [8] M.R. Pahlevi, D. Suhartanto, The integrated model of green loyalty: evidence from eco-friendly plastic products, *J. Clean. Prod.* 257 (2020), <https://doi.org/10.1016/j.jclepro.2020.120844>.
- [9] S.M. Geiger, D. Fischer, U. Schrader, Measuring what matters in sustainable consumption, *Sustain. Dev.* 26 (1) (2017) 18–33, <https://doi.org/10.1002/sd.1688/full>.
- [10] I. Baffo, M. Leonardi, B. Bossone, M.E. Camarda, V. D'Alberti, M. Travaglioni, A decision support system for measuring and evaluating solutions for sustainable development, *Sustain. Futures* 5 (2023) 100109, <https://doi.org/10.1016/j.sfr.2023.100109>.
- [11] G. Martinho, A. Pires, G. Portela, M. Fonseca, Factors affecting consumers' choices concerning sustainable packaging during product purchase and recycling, in: 103, 2015, pp. 58–68, <https://doi.org/10.1016/j.resconrec.2015.07.012>.
- [12] P. Kautish, A. Paço, P. Thaichon, Sustainable consumption and plastic packaging: relationships among product involvement, perceived marketplace influence and choice behaviour, *J. Retail. Consum. Serv.* 67 (2022) 103032, <https://doi.org/10.1016/j.jretconser.2022.103032>. Elsevier BV.
- [13] K. Adeyeye, K. She, A. Bãiri, Design factors and functionality matching in sustainability products: a study of eco-showerheads, *J. Clean. Prod.* 142 (2017) 4214–4229, <https://doi.org/10.1016/j.jclepro.2016.11.143>.
- [14] M. Ketelsen, M. Janssen, U. Hamm, Consumers' response to environmentally-friendly food packaging—A systematic review, *J. Clean. Prod.* 25 (4) (2020) 1–44, <https://doi.org/10.1016/j.jclepro.2020.120123>.
- [15] S.B. Ferraz, C. Buhadra, M. Laroche, A.R. Veloso, Green products: a cross-cultural study of attitude, intention and purchase behaviour, *Rev. Adm. Mack.* 18 (5) (2017) 12–38, <https://doi.org/10.1590/1678-69712017/administracao.v18n5p12-38>.
- [16] N. Rashid, K. Jusoff, K. Kassim, Eco-labelling perspectives among Malaysian consumers, *Can. Soc. Sci.* 5 (2) (2009) 4–5.
- [17] Y.S. Chen, C.H. Chang, Enhance green purchase intentions: the roles of green perceived value, green perceived risk, and green trust, *Sch. J.* 50 (3) (2012) 502–520.
- [18] B.T.H. Lan, T.T.L. Phuong, T.T. Dat, D.D. Truong, Factors affecting the purchase intention of products with environmentally friendly packaging of urban residents in Ho Chi Minh City, Vietnam, *Sustainability* 15 (2023) 7726, <https://doi.org/10.3390/su15097726>.
- [19] J. Macht, J. Klink-Lehmann, S. Venghaus, Eco-friendly alternatives to food packed in plastics: German consumers' purchase intentions for different bio-based packaging strategies, *Food Qual. Prefer.* 109 (2023) 104884.
- [20] A.S. Shimul, I. Cheah, Consumers' preference for eco-friendly packaged products: pride vs. guilt appeal, *Mark. Intell. Plan.* 41 (2) (2023) 186–198.
- [21] T. Chi, P.P.D. Kilduff, Understanding consumer perceived value of casual sportswear: an empirical study, *J. Retail. Consum. Serv.* 18 (5) (2011) 422–429, <https://doi.org/10.1016/j.jretconser.2011.06.004>.
- [22] R.L. Oliver, W.S. DeSarbo, Response determinants in satisfaction judgements, *J. Consum. Res.* 14 (4) (1988) 495, <https://doi.org/10.1086/209131>.
- [23] J.S. Adams, Equity Theory, in: J.B. Miner (Ed.), *Organizational Behaviour 1: Essential Theories of Motivation and Leadership*, 1st ed, Routledge, 2005, pp. 422–436.
- [24] V.V. Agrawal, A. Atasu, K. Van Ittersum, Remanufacturing, third-party competition, and consumers' perceived value of new products, *INFORMS Inst. Oper. Res. Manag. Sci.* 61 (1) (2015) 60–72, <https://doi.org/10.1287/mnsc.2014.2099>.
- [25] V.A. Zeithaml, Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence, *J. Mark.* 52 (3) (1988) 2–22, <https://doi.org/10.2307/1251446>.
- [26] K. Lane, Conceptualising, measuring, and managing customer-based brand equity, *J. Mark.* 57 (1) (1993), <https://doi.org/10.1177/002224299305700101>.
- [27] P.H. Bloch, Seeking the ideal form: product design and consumer response, *J. Mark.* 59 (3) (1995) 16–29, <https://doi.org/10.1177/002224299505900302>.
- [28] R.H. Trivedi, J.D. Patel, N. Acharya, Causality analysis of media influence on environmental attitude, intention and behaviours leading to green purchasing, *J. Clean. Prod.* 196 (2018) 11–22, <https://doi.org/10.1016/j.jclepro.2018.06.024>.
- [29] G. Rizzo, R. Testa, G. Schifani, et al., The value of organic plus. analysing consumers' preference for additional ethical attributes of organic food products, *Soc. Indic. Res.* (2023), <https://doi.org/10.1007/s11205-023-03123-8>.
- [30] K. Giannoutsos, D.I. Koukoumaki, M. Panagiotou, K. Gkatzionis, The effect of modern claim related to packaging sustainability on the sensory perception of traditional Greek rusks (paximathi), *Food Qual. Prefer.* 106 (2023) 104817.
- [31] W. Zhuang, K.J. Cumsiskey, Q. Xiao, B.L. Alford, The impact of perceived value on behavior intention: an empirical study, *J. Glob. Bus. Manag.* 6 (2) (2010) 1–7.
- [32] W.L. Tan, Y.N. Goh, The role of psychological factors in influencing consumer purchase intention towards green residential building, *Int. J. Hous. Mark. Anal.* 11 (4) (2018) 200–204.
- [33] S.B. Follows, D. Jobber, Environmentally responsible purchase behaviour: a test of a consumer model, *Eur. J. Mark.* 34 (5–6) (2000) 723–746, <https://doi.org/10.1108/03090560010322009>.
- [34] C.M. Anderson, Patients and Physicians as Collaborators in Patients' Health Care: A Communication Model of Willingness to Collaborate, *University Microfilms International*, 1992.
- [35] M. Roozen, P. Pelsmacker, Attributes of environmentally friendly consumer behaviour, *J. Int. Consum. Mark.* 10 (3) (1998) 21–41.
- [36] Bazoche P., Deola C., Soler L.G. 12 th Congress of the European Association of Agricultural Economists-EAAE. 2008 <http://www.legrenelle-environnement.fr/>.

- [37] G. Prakash, P. Pathak, Intention to buy eco-friendly packaged products among young consumers of India: a study on developing nation, *J. Clean. Prod.* 141 (2017) 385–393, <https://doi.org/10.1016/j.jclepro.2016.09.116>.
- [38] S. Bamberg, How does environmental concern influence specific environmentally related behaviours? A new answer to an old question, *J. Environ. Psychol.* 23 (1) (2003) 21–32, [https://doi.org/10.1016/S0272-4944\(02\)00078-6](https://doi.org/10.1016/S0272-4944(02)00078-6).
- [39] Bickart B.A., Ruth J.A. Green Eco-seals and Advertising Persuasion. 2012 <https://www.tandfonline.com/doi/abs/10.1080/00913367.2012.10672457>.
- [40] J. Paul, A. Modi, J. Patel, Predicting green product consumption using theory of planned behaviour and reasoned action, *J. Retail. Consum. Serv.* 29 (2016) 123–134, <https://doi.org/10.1016/j.jretconser.2015.11.006>.
- [41] R.D. Straughan, J.A. Roberts, Environmental segmentation alternatives: a look at green consumer behaviour in the new millennium, *J. Consum. Mark.* 16 (6) (1999) 558–575, <https://doi.org/10.1108/07363769910297506>.
- [42] M.J. Lavelle, H. Rau, F. Fahy, Different shades of green? Unpacking habitual and occasional pro-environmental behaviour, *Glob. Environ. Change* 35 (2015) 368–378, <https://doi.org/10.1016/j.gloenvcha.2015.09.021>.
- [43] I. Ajzen, M. Fishbein, Attitude-behaviour relations: a theoretical analysis and review of empirical research, *Psychol. Bull.* 84 (5) (1997) 894–896.
- [44] Y.B. Limbu, M. Wolf, D. Lunsford, Perceived ethics of online retailers and consumer behavioural intentions: the mediating roles of trust and attitude, *J. Res. Interact. Mark.* 6 (2) (2012) 133–154, <https://doi.org/10.1108/17505931211265435>.
- [45] P.M. Tikka, M.T. Kuitunen, S.M. Tynys, Effects of educational background on students' attitudes, activity levels, and knowledge concerning the environment, *J. Environ. Educ.* 31 (3) (2000) 12–19, <https://doi.org/10.1080/00958960009598640>.
- [46] T. Mainieri, E.G. Barnett, T.R. Valdero, J.B. Unipan, S. Oskamp, Green buying: the influence of environmental concern on consumer behaviour, *J. Soc. Psychol.* 137 (2) (1997) 189–204, <https://doi.org/10.1080/00224549709595430>.
- [47] J.I. Criado, F. Rojas-Martín, J.R. Gil-García, Enacting social media success in local public administrations. An empirical analysis of organisational, institutional, and contextual factors, *Int. J. Public Sect. Manag.* 30 (1) (2017) 31–47.
- [48] D. Polit, C. Beck, Data collection in quantitative research, in: D. Polit, C. Beck (Eds.), *Nursing Research, Generating and Assessing Evidence for Nursing Practice*, ninth ed., Wolters Kluwer Health/Lippincott Williams & Wilkins, Philadelphia, 2012, pp. 293–327.
- [49] L.T. Choy, The strengths and weaknesses of research methodology: comparison and complimentary between qualitative and quantitative approaches, *IOSR J. Humanit. Soc. Sci.* 19 (4) (2014) 102–103. www.iosrjournals.org.
- [50] Mackey A., Gass S.M. *Research Methods in Second Language Acquisition: A Practical Guide*, first ed. Edited (A. Mackey, S.M. Gass, Eds.; Vol. 7). 2011. Wiley-Blackwell.
- [51] K. Thompson Steven, *Sampling*, second ed., Wiley, 2002.
- [52] C.P. Coutinho, *Metodologia da Investigação em Ciências Sociais e Humanas: Teoria e Prática* 11 (20) (2011).
- [53] W. Kong, A. Harun, R.S. Sulong, J. Lily, The influence of consumers' perception of green products on green purchase intention, *Int. J. Asian Soc. Sci.* 4 (8) (2014) 924–939.
- [54] Y.J. Jang, W.G. Kim, M.A. Bonn, Consumers' selection attributes and behavioral intentions concerning green restaurants, *Int. J. Hosp. Manag.* 30 (4) (2011) 803–811.
- [55] D. Jaiswal, B. Singh, Toward sustainable consumption: Investigating the determinants of green buying behaviour of Indian consumers, *Bus. Strategy Dev.* 1 (2018) 64–73. <https://doi.org/10.1002/bsd2.12>.
- [56] M. Irfan, Z.Y. Zhao, H. Li, The influence of consumers' intention factors on willingness to pay for renewable energy: a structural equation modeling approach, *Environ. Sci. Pollut. Res.* 27 (2020) 21747–21761. <https://doi.org/10.1007/s11356-020-08592-9>.
- [57] J. Kaiser, Dealing with missing values in data, *J. Syst. Integr.* 5 (1) (2014) 42–51.
- [58] S.K. Kwak, J.H. Kim, Statistical data preparation: management of missing values and outliers, *Korean J. Anaesthesiol.* 70 (4) (2017) 407–411, <https://doi.org/10.4097/kjae.2017.70.4.407>.
- [59] P. Schober, L.A. Schwarte, Correlation coefficients: appropriate use and interpretation, *Anaesth. Analg.* 126 (5) (2018) 1763–1768, <https://doi.org/10.1213/ANE.0000000000002864>.
- [60] C. Agostinelli, Robust stepwise regression, *J. Appl. Stat.* 29 (6) (2002) 825–840, <https://doi.org/10.1080/02664760220136168>.
- [61] J.A. Tillman, J.A. Tillman, The power of the Durbin-Watson test, *J. Econom. Soc.* 43 (5) (1975) 959–974.
- [62] N.A.M.R. Senaviratna, T.M.J. Cooray, Diagnosing multicollinearity of logistic regression model, *Asian J. Probab. Stat.* 5 (2019) 1–9, <https://doi.org/10.9734/ajpas/2019/v5i230132>.
- [63] N. Kock, Common method bias in PLS-SEM: a full collinearity assessment approach, *Int. J. e-Collab.* 11 (4) (2015) 1–10.
- [64] M. Kanchanapibul, E. Lacka, X. Wang, H.K. Chan, An empirical investigation of green purchase behaviour among the young generation, *J. Clean. Prod.* 66 (2014) 528–536, <https://doi.org/10.1016/j.jclepro.2013.10.062>.