

From perceived green product quality to purchase intention: the roles of price sensitivity and environmental concern

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Abstract

Purpose – This research seeks to address the existing gaps in the literature by rigorously investigating the influence of consumers' perceived green product quality (PPQ), price sensitivity to green products (PRS) and environmental concern (ENC) on their intention to purchase green products (GPI) within the context of green circular economies. Furthermore, the study will explore the role of PRS as a mediator and ENC as a moderator by applying the price-expectancy model (PEM) and social exchange theory (SET).

Design/methodology/approach – The purposive sampling technique was employed to analyse 412 online survey responses from consumers, utilising partial least squares structural equation modelling (PLS-SEM).

Findings – The findings indicate a positive relationship between PPQ and PRS and PRS and GPI, contradicting the hypothesised negative associations. This suggests that as consumers become increasingly price-sensitive, they perceive green products to possess higher quality without diminishing their purchase intentions. Additionally, PPQ is positively associated with GPI, implying that enhanced perceptions of quality directly contribute to an increased intention to purchase green products. Furthermore, the results demonstrate that while ENC moderates the relationship between PPQ and PRS, its practical significance is limited.

Practical implications – This research emphasises to marketers that they should prioritise quality features while addressing PRS, particularly for environmentally concerned consumers, which can effectively shape consumers' GPI.

Originality/value – This study's originality lies in its integration of PRS and ENC within green consumerism. This offers valuable insights into green marketing and provides marketers with practical strategies to tackle the challenges of the circular economy.

Keywords Perceived green product quality, Price sensitivity, Environmental concern, Price-expectancy model (PEM), Social exchange theory (SET), Consumer behaviour

Paper type Research paper

1. Introduction

In recent years, there has been a noticeable surge among consumers in “going green”, particularly in Malaysia, as the nation progresses toward a circular economy (Chow, 2023). This transformation in consumer behaviour is characterised by the deliberate selection of sustainable, green products that have minimal or no detrimental effects throughout their life cycle. Consequently, this significant shift has far-reaching implications for sustainable

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consumption, benefiting not only the current generation of environmentally conscious consumers but also future generations (Ghaffar and Islam, 2024).

Green products are specifically designed to minimise their environmental impact throughout their entire life cycle (Dangelico and Pujari, 2010). This includes sustainable sourcing, reduced energy consumption during production, and using recyclable or biodegradable materials. Additionally, these products aim to decrease pollution during disposal (Dangelico and Pontrandolfo, 2010). According to Dangelico and Pontrandolfo (2010), their goal is to align consumer demands with the principles of environmental sustainability.

In the global green product market, 73% of consumers across 60 countries have expressed their willingness to pay a premium for such products (“Green Industry Analysis, 2020 - Cost & Trends”, n.d.). In Malaysia alone, an impressive 67% of consumers strongly favour green products, including organic food, energy-efficient appliances, and cosmetics (Robinson, 2022). This reflects a growing awareness and interest in sustainability and green purchase intention (GPI) among these consumers. Additionally, the swing towards GPI reflects an increasing awareness and concern about global climate change (Zameer and Yasmeen, 2022) as consumers seek to minimise their carbon footprint and support businesses prioritising environmental sustainability (Maduku, 2024).

Evidently, consumers are not only reducing their environmental impact through their GPI, but they are also playing a crucial role in promoting the sustainable production of goods (Sajjad *et al.*, 2024). These active and influential actions align with the United Nations’ recognition of this issue as a high-priority component of its sustainable development goals (SDGs). In particular, SDG 12’s Responsible Consumption and Production (“Goal 12 | Department of Economic and Social Affairs”, n.d.) underscores the need for global efforts to promote sustainable practices, reduce waste, and enhance resource efficiency (Sorooshian, 2024). More specifically, these GPIs include using renewable energy, engaging in organic activities, reducing, recycling, and reusing, all of which have no adverse effects on the climate (Luthra *et al.*, 2024). As a result, this research is anticipated to bring about significant long-term changes in consumers’ GPI. This shift not only reflects a prevailing trend but also indicates a growing movement that possesses the potential to foster a more green and sustainable circular economy.

Even though numerous empirical studies have investigated consumers’ GPI (Ghali-Zinoubi and Toukabri, 2019; Hsu *et al.*, 2017; Lavuri, 2022; Patiño-Toro *et al.*, 2024; Srivastava and Gupta, 2023; Wang, 2014), still significant gaps remain in the literature. Amid the growing demand for green products, the issue of price sensitivity to green products (PRS) is a considerable barrier influencing consumers’ GPI (Ghali-Zinoubi and Toukabri, 2019; Patiño-Toro *et al.*, 2024; Srivastava and Gupta, 2023). A global survey found that 69% of consumers believe green products are almost always more expensive than their non-green counterparts (Bansal, 2023). Moreover, significant gaps exist on how perceived green product quality (PPQ) may mitigate PRS. Existing research often treats the PPQ of green products as independent or mediating variables. Besides, there is also a limited understanding of how PRS can act as a mediator in shaping consumers’ GPI as numerous past research has focused on its direct (Ghali-Zinoubi and Toukabri, 2019) and interaction effects (Hsu *et al.*, 2017; Lavuri, 2022; Srivastava and Gupta, 2023). Additionally, there has been limited research on the impact of environmental concern (ENC) on the relationship between PPQ and PRS in affecting GPI. This study would investigate whether consumers with higher ENC are generally more willing to pay a premium for green products, which mitigates the negative impact of PRS. In contrast, consumers with lower concerns may prioritise price over ENC, making them less likely to engage in green purchases, regardless of PPQ. Additionally, numerous studies on GPI (Jain *et al.*, 2022; Jebarajakirthy *et al.*, 2024; Zameer and Yasmeen, 2022; Zhang *et al.*, 2023) have concentrated on incorporating the theory of planned behaviour (TPB); theory of reasoned action (TRA), technology acceptance model (TAM), value-belief-norm (VBN), and the unified theory of acceptance and use of technology (UTAUT) in the context of Asian and European countries. To date, there has been a notable absence of comprehensive studies exploring how two primary theoretical frameworks—namely, the price-expectancy model

(PEM) and social exchange theory (SET) - adequately capture the dynamics of GPI, particularly within the context of green circular economies such as Malaysia. In contrast to TPB and the TAM, PEM integrates price expectations and perceived product quality. This integration aligns with TPB's focus on consumer attitudes while placing a greater emphasis on economic factors. Conversely, SET underscores the reciprocal nature of exchanges, emphasising the social and environmental benefits associated with green purchasing, which are not fully addressed by either TPB or TAM.

Hence, by integrating the PEM-SET into a robust framework, this study aims to bridge the identified gaps by rigorously examining the influence of PPQ on both PRS (first research objective) and GPI (second research objective) and the impact of PRS on GPI (third research objective). Additionally, it seeks to ascertain whether PRS mediates the link between PPQ and intention to buy (GPI) green products (fourth research objective). Furthermore, this research investigates how consumers' ENC (moderating effect) affects the relationship between PRS and their intention to purchase (GPI) green products (fifth research objective) and how ENC influences the impact of PPQ on GPI (sixth research objective).

Elucidating the above objectives, this research seeks to contribute to the theoretical underpinnings of green marketing research, offering a more thorough comprehension of the relationships between PPQ and GPI and the mediation and moderation effects of PRS and ENC, precisely consumers' intention to purchase green products. Practically, the findings promise to equip marketers to enhance product quality perceptions, develop strategic pricing approaches, and effectively target consumers with heightened environmental awareness. This study addresses significant theoretical gaps in the current literature regarding consumer behaviours and decision-making processes. On the other hand, it also responds to an urgent practical dilemma marketers face in an increasingly price-sensitive and rapidly evolving eco-conscious market.

2. Theoretical background and research hypotheses

2.1 Price-expectancy model (PEM)

The PEM is a framework grounded in consumer psychology and behavioural economics principles. It delves into the intricate dynamics between consumers' perceptions of a product's quality and their expectations regarding its price. This model recognises the influence of various psychological factors, such as anchoring effects and reference pricing, on how consumers evaluate and make decisions about the value of a product concerning its price. As proposed by [Ordóñez \(1998\)](#), when consumers perceive a product to be of high quality, they are generally less sensitive to its price and are more willing to accept higher costs. This is rooted in the belief that superior quality justifies a higher price point. Conversely, when consumers perceive a product to be of lower quality, they tend to become more price-sensitive and expect a lower price to align with their perceived lower quality.

In the context of GPI, PEM serves as a valuable framework for understanding how consumers develop pricing expectations based on their perceptions of a product's quality and eco-friendly characteristics. When assessing the "greenness" of a product, consumers often link it to its eco-friendly attributes, such as using sustainable packaging materials with superior quality ([Larranaga and Valor, 2022](#)). Research by [Cheung and To \(2019\)](#) indicates that higher-quality green products typically generate less packaging waste and utilise fewer chemicals in their production processes than their lower-quality counterparts. This association can further enhance consumers' positive attitudes towards the benefits of purchasing green products ([Cheung and To, 2019](#)). As green products entail higher production costs due to their use of sustainable materials, compliance with green certifications, and stricter controls ([Walter and Chang, 2017](#)), these expectations, in turn, influence consumers' sensitivity to price and purchasing decisions.

Moreover, integrating this model sheds light on why consumers may be willing to pay a premium for green products ([Homburg et al., 2005](#)). Thus, when customers perceive a green

product as having clear environmental benefits and find that its price aligns with their expectations, the actual pricing can significantly sway their purchasing choice (Chen *et al.*, 2024), which would, in turn, influence their willingness to pay more for the product.

2.2 Social exchange theory (SET)

1332 Besides PEM, this research also integrated the SET, a prominent paradigm, to grasp individuals' rational decisions in evaluating the potential gains (benefits) and losses (costs) of a transaction before engaging in it (Emerson, 1962). This cost-benefit analysis framework, which combines insights from social psychology and economics, operates on the principle that when the perceived benefits of a transaction outweigh the associated costs, individuals are more likely to view the engagement as meaningful and are, therefore, inclined to sustain their participation in the transaction (Jiang and Kim, 2015).

In the context of GPI, this notion highlights the consumer behaviours that involve making purchasing decisions based on the perceived higher benefits of a product to its cost, particularly when it aligns with their personal sustainability beliefs. This behaviour may lead consumers to pay a premium for products, even if priced higher because they believe that the long-term positive impact on the environment and the support for sustainability efforts will ultimately outweigh the initial higher expenses. This reflects a shift towards prioritising social and environmental well-being over short-term personal costs, demonstrating a growing consumers' awareness and willingness to invest in products that contribute to a more sustainable future.

This integrated PEM-SET framework advances the literature by revealing how perceived green product quality can offset the effects of price sensitivity to green products, particularly for environmentally concerned consumers. It also provides a basis for exploring the multi-dimensional complexity of green purchase intention, thereby contributing new insights to consumer behaviour and sustainable marketing.

2.3 Perceived green product quality (PPQ) and price sensitivity to green products (PRS)

When consumers perceive a product as surpassing their expectations, they are more inclined to pay a premium, believing its value outweighs any financial concerns (Lavuri, 2022). This increased perceived value enhances their quality assessment, reducing the emphasis on price. Monroe (1973) observed that price sensitivity reflects consumers' awareness of and response to price variations among products or services. In the realm of green products, consumers often view these items as symbols of sustainable practices. By choosing these products, they not only align with their personal sustainability values but also demonstrate their readiness to invest in them at a higher price. Consequently, the PPQ diminishes the importance of PRS while elevating its societal and personal values. As customers prioritise high-quality products, their focus on price diminishes, particularly regarding green products. Therefore, the proposed hypothesis is.

H1. Perceived green product quality of green products negatively affects the product's price sensitivity to green products.

2.4 Price sensitivity to green products (PRS) and green purchase intention (GPI)

As individuals evaluate their purchasing decisions, they thoughtfully assess the benefits of each purchase against its perceived costs. This sensitivity to pricing significantly influences buying behaviour (Srivastava and Gupta, 2023). When consumers grow more aware of pricing, their perception of the cost associated with green products often increases, diminishing the appeal of these purchases despite their positive impact on the environment and society (Huang *et al.*, 2014). Consequently, heightened price sensitivity can lead consumers to believe that the costs of buying green products exceed the benefits, which decreases their likelihood of making such purchases. Many consumers may feel that the extra

expense of these products is not justified by the advantages they provide to society or themselves, further dampening their inclination to buy them (Tan *et al.*, 2019). When the cost-benefit ratio appears unfavourable, consumers who view the tradeoff as unjustifiable may opt for more affordable alternatives. Thus, it can be theorised that.

H2. Price sensitivity to green products negatively affects consumer's green purchase intention.

2.5 Perceived green product quality (PPQ) and green purchase intention (GPI)

When customers view green products as high-quality, they are more likely to find them attractive and perceive them as durable, healthier, and energy efficient. This enhances the overall transaction and gives customers the impression that they receive better value for their money (Sun and Wang, 2019). Recognising superior product quality diminishes the perceived risk and amplifies the perceived value of endorsing environmental sustainability, thereby heightening the probability of purchasing green products. The improved quality motivates customers to align their behaviour with their environmental values, further enhancing the perceived value of the transaction. Based on these premises, the study puts forward the following hypothesis.

H3. The perceived quality of green products positively affects consumers' intention to purchase green products.

2.6 Mediating role of price sensitivity to green products (PRS)

When consumers perceive green products as high quality, they become less sensitive to the price as they believe they receive better value for their money (Carrete *et al.*, 2012). This perception increases their likelihood of purchasing these products, even with a higher price tag. Their initial concerns about the cost diminish due to the perceived high quality, increasing their willingness to purchase. Additionally, Dangelico and Vocalelli (2017) discovered that the interplay between price and perceived quality significantly influences consumer purchasing decisions within green marketing. Consequently, PRS is a mediating variable in this study, linking consumers' decision-making processes regarding green purchases with their perceptions of quality and value. Therefore, the following recommendations are proposed.

H4. Price sensitivity to green products mediates the relationship between the perceived green product quality of green products and green purchase intention.

2.7 Moderating role of environmental concern (ENC)

Price sensitivity to green products, which typically discourages purchase intention due to higher perceived costs, may be diminished when consumers believe their actions have a positive environmental impact (Lichtenstein *et al.*, 1993). As concern for the environment (ENC) indicates consumers' strong feelings about environmental issues and their eagerness to mitigate their effects (Zameer and Yasmeen, 2022; Zimmer *et al.*, 1994), therefore, highly environmentally concerned individuals prioritise the long-term benefits of green products over immediate financial costs. Even if price sensitivity to green products remains high, these consumers may still choose green products because they view them as essential for environmental sustainability, thus weakening the negative effect of price sensitivity to green products on green purchase intention.

Consumers with solid environmental consciousness tend to prioritise product quality when making green purchases (Cerri *et al.*, 2018). These environmentally aware consumers highly value the durability, performance, and eco-friendliness that often accompany high-quality products. Their ecological concerns lead them to perceive high-quality green products as not only beneficial for the environment but also as a worthwhile investment. Specifically, Ross and Milne (2021) found that consumers with higher ENC are more likely to prioritise green

attributes over price, which aligns with our hypothesis that higher ENC could reduce price sensitivity. As a result, the positive correlation between perceived green product quality and the intention to make green purchases becomes even more significant for environmentally conscious individuals, as their concern amplifies the perceived value of quality in green products. As such, the following hypotheses are formulated.

- H5. Environmental concern moderates (a) the direct relationship between price sensitivity to green products and green purchase intention and (b) the direct relationship between perceived green product quality and green purchase intention.

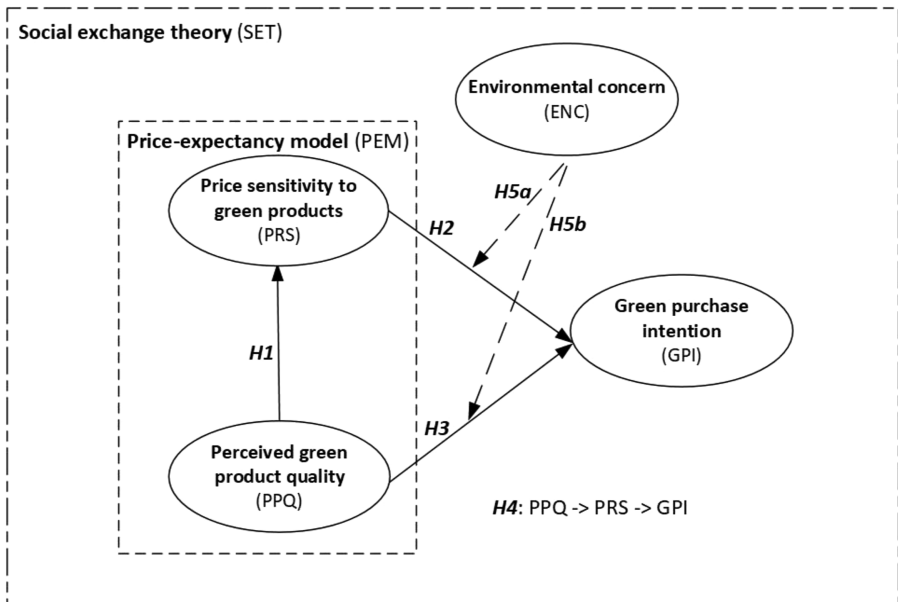
The conceptual model outlining the hypotheses can be found in [Figure 1](#).

3. Methodology

3.1 Study context and data collection method

In Malaysia, there is a growing availability of green products in the open market, which corresponds with the Malaysian government’s attempts to promote a green consumer pattern inside the country ([Chekima et al., 2016](#); [Tan et al., 2019](#)). This has led to a rising trend, with over two-thirds of Malaysians actively choosing to purchase these green products ([Robinson, 2022](#)). The government of Malaysia, along with non-governmental organisations, is proactively promoting the adoption of environmentally friendly and sustainable consumer behaviour. This initiative encourages consumers to opt for green products with minimal environmental impact.

To comprehensively capture green consumerism and green purchase behaviours in the dynamic and green marketing landscape, the respondents in this research were selected through non-probability purposive sampling. This method was chosen to ensure the validity and relevancy of the collected data. To qualify for participation in the study, each participant



Source(s): Authors’ own work

Figure 1. Conceptual model

was required to meet two specific criteria. Firstly, they had to confirm whether they had made any purchases of green products over the previous six months. Secondly, they were asked to name the specific green products they had purchased within the specified time frame. This rigorous selection process was designed to obtain accurate and insightful data regarding consumer behaviour in the context of eco-friendly purchases. Furthermore, to foster a common comprehension among participants regarding the definition of green products, the survey clearly delineated what constitutes green products.

The research employed Google Forms, a widely used platform for creating online surveys, to conduct an extensive online survey and gather participants' data. The study strategically initiated communication with the target respondents by disseminating the online survey link across popular social media platforms such as Instagram and Facebook, as well as within relevant online groups and communities related to the research topic. This approach aimed to establish a direct connection with the desired respondents, optimising the survey's reach and encouraging their active participation.

The study garnered 412 valid responses, indicating a robust dataset. To determine the suitable sample size for the study's purposive sampling strategy, the researchers utilised the formula " $N \geq 50 + 8m$ " as outlined by (Tabachnick and Fidell, 2018), where N denotes the minimum sample size, and m represents the number of items. Through this calculation ($50 + 8 * 16 = 178$), it was established that a minimum of 178 samples was needed for the study. Additionally, the "10-times rule" approach proposed by (Hair et al., 2022) was applied. Given that the study's model comprised 16 items spanning 4 constructs, it was deduced that the minimum sample size should be 160 ($16 * 10$). The results of the G*Power analysis (Faul et al., 2007) suggested that to ensure a 99% likelihood of detecting a significant effect, with an effect size of 0.15 and a margin of error of 1%, it is recommended that the study have a sample size of around 231 for data collection. These analyses highlight that the collected 412 usable samples exceeded the recommended standard for evaluating the proposed model, emphasising the strength of the dataset for the study.

The final sample's demographic profile shows that most respondents were female (58.5%), aged between 26 and 30 years (20.4%), married (47.3%), with an undergraduate degree (39.1%), working in the government sector, having a monthly household income of MYR 3,001 to MYR 4,000, and responsible for purchasing green products at home, office, or work (86.7%).

3.2 Instrumentation

This research used a comprehensive empirical examination to validate a conceptual model and hypotheses. This was accomplished by administering a meticulously constructed survey questionnaire to capture the multifaceted aspects of PPQ, PRS, ENC, and GPI. Notably, the measures employed in this study were firmly rooted in prior scholarly work, with great care taken to adapt all items and scales from validated instruments, thus ensuring their robustness and reliability. Measures were taken from PPQ (4-item instrument), ENC (3-item instrument), and GPI (5-item scale) (Issock et al., 2018), as well as PRS (4-item instrument) (Wang et al., 2017). The item selection criteria were based on reported reliability levels (Table 2). All the measurement items were on a seven-point Likert scale, from strongly disagree (1) to strongly agree (7), permitting the capturing of their attitudes and perceptions of each construct in a varied manner (Table 2). The scaling approach improves the study's analytical rigour, making it easier to understand the data.

Before proceeding with the pilot test, four marketing experts were consulted to review and pre-test the survey instruments, ensuring content and face validity. After making necessary edits and correcting grammar mistakes, a pilot test was conducted with 50 consumers to evaluate the questionnaire further. The primary objective of this pilot test was to assess the reliability of the constructs. The results indicated that the items (Table 2) showed internal consistency, as demonstrated by the composite reliability above 0.70 (Hair et al., 2022).

4. Data analysis

The participants' demographic information was meticulously analysed using the statistical software SPSS version 29 to identify any potential common method bias. Subsequently, the proposed hypotheses underwent thorough examination utilising partial least squares structural equation modelling (PLS-SEM) with SmartPLS version 4, given the exploratory nature of this study (Hair *et al.*, 2022).

Hair *et al.* (2022) highlight that this approach is recognised as a highly reputable and extensively utilised method for exploring the dynamics of PPQ, PRS, and GPI within a complex model involving mediating (PPQ - > PRS - > GPI) and moderating variables (ENC).

Another compelling reason for utilising PLS-SEM in this research is its ability to simultaneously explore and predict relationships among variables in a structural model. This makes it well-suited to this study's exploratory and predictive nature. Despite the causal underpinnings of the path model and its hypotheses, the model is expected to display robust predictive capabilities, offering valuable insights and guidance for this research.

4.1 Descriptive analysis

Based on the descriptive statistics in Table 1, the overall mean of latent variables ranged between 5.87 and 6.09. A mean value of 6.00 (SD = 1.03) for PPQ suggests that, on average, consumers rated PPQ as moderately high, whereby these means are calculated on a seven-point Likert scale. A mean value of 6.09 (SD = 1.04) for GPI indicates that the consumers' GPI was relatively the highest among the measured variables. The findings suggest that consumers, on average, view green products positively in terms of quality and express high intentions to purchase them. These insights help contextualise the relationship between the variables, indicating favourable attitudes toward green products among the sample population.

4.2 Assessment of common method bias (CMB)

Awareness of CMB in survey research is essential, as it can distort correlations between constructs. In this study, two statistical tests are used to identify and reduce CMB and protect the integrity of our findings.

First, a full collinearity test is conducted, where a dependent variable, created from random numbers, is regressed against all the variables in the conceptual model. The results show that all variance inflation factors (VIF) are below the critical value of 3.3 (Kock, 2015), indicating no problematic collinearity associated with CMB.

Next, the measured latent marker variable (MLMV) method (Chin *et al.*, 2013) involves using a specific variable unrelated to the study's substantive constructs as a marker for possible bias. Comparing the path coefficients of two models (with and without the marker variable) further strengthens the assertion that the CMB problem is not evident in the dataset.

4.3 Assessment of measurement model

The measurement model's integrity was rigorously evaluated by assessing internal consistency (reliability), convergent validity, and discriminant validity. This involved

Table 1. Descriptive statistics

Variables	Mean	Standard deviation (SD)
Perceived green product quality (PPQ)	6.00	1.03
Price sensitivity to green products (PRS)	5.87	1.09
Environmental concern (ENC)	6.03	0.98
Green purchase intention (GPI)	6.09	1.04

Source(s): Authors' own work

Table 2. Measurement model assessment of convergent validity and internal consistency (reliability)

Construct	Code	Item	Convergent validity		Internal consistency (reliability)	
			Loading	Average variance extracted	Cronbach's alpha	Composite reliability
Perceived green product quality	PPQ1	I perceive green products with no label or symbol as being rated lower	0.788	0.749	0.887	0.922
	PPQ2	I perceive green products to be better quality	0.901			
	PPQ3	I feel confident that green products are of good quality	0.876			
	PPQ4	I perceive green products to be of higher quality	0.892			
Price sensitivity to green products	PRS1	I will buy green products regardless of the price	0.882	0.775	0.903	0.932
	PRS2	I will purchase green products, although the price is quite high	0.892			
	PRS3	The price of green products provides value for money	0.861			
	PRS4	I prefer to buy green products even if they are more expensive than others	0.885			
Environmental concern	ENC1	I am concerned about air pollution	0.909	0.818	0.889	0.931
	ENC2	I am concerned about natural resource depletion/reduction	0.902			
	ENC3	I am concerned about climate change	0.903			
Green purchase intention	GPI1	I intend to purchase green products	0.864	0.754	0.918	0.939
	GPI2	I am willing to purchase green products over non-green products	0.863			
	GPI3	I will make an effort to purchase green products	0.892			
	GPI4	I intend to buy green products the next time I purchase them	0.861			
	GPI5	I intend to engage in activities related to purchasing green products in my daily life	0.859			

Source(s): Authors' own work

adhering to recognised procedures to ensure the accuracy and reliability of the assessment (Hair et al., 2019).

Two commonly used indicators, Cronbach’s alpha (CA) and composite reliability (CR), were used to confirm the internal consistency (reliability) of each component inside the model. Both measures are necessary to assess the constructions’ reliability and consistency. The analysis’s results for CA and CR across all constructs (Table 2) showed robust internal consistency, which was above the generally recognised criterion of 0.70 (Hair et al., 2022).

Examining each item’s factor loadings on the target construct and the average variance extracted (AVE) for each construct allowed for a comprehensive assessment of *convergent validity*. It was found that all item loadings surpassed the 0.70 threshold, and all AVEs were above 0.50 (Hair et al., 2019), thus satisfying the criteria for acceptable convergent validity (see Table 2). These results signify a significant alignment of measures within each construct and affirm that the corresponding items accurately represent the constructs.

The heterotrait-monotrait (HTMT) ratio of construct correlations was employed to assess discriminant validity in the analysis. Discriminant validity is crucial as it ensures that each construct in the study is distinct and not strongly correlated with other constructs. The HTMT values provide insight into the uniqueness of each construct. After the investigation, it was discovered that all the HTMT values (Table 3) in the study were below the critical threshold of 0.85. This finding demonstrates no issues with discriminant validity (Henseler et al., 2015).

4.4 Assessment of structural model

The structural model’s examination provides valuable insights into the dynamics outlined in the conceptual model. This involves thoroughly assessing the direct, indirect, and interaction effects, shedding light on the intricate interplay between moderating and mediating variables that modify the relationships between the constructs. Additionally, this analysis elucidates the direct correlations among them.

To assess data suitability, a thorough examination of multi-collinearity was conducted. The dataset exhibited no indications of collinearity issues, as evidenced by the variance inflation factor (VIF) values for all constructs (Table 4), which were below the threshold <3.33 (Hair et al., 2022).

4.4.1 Direct effects. Next, the bootstrapping techniques with 10,000 subsamples were employed for an in-depth evaluation to determine the significance of the relationships between constructs (Becker et al., 2023, p. 202).

The results shown in Table 4 and Figure 2 indicate that although the relationship between PPQ (H1: $\beta = 0.755, p < 0.001$) and PRS is positive and significant, H1 is not supported, as the hypothesis posited a negative relationship between PPQ and PRS. The result suggests that higher perceived quality of green products is associated with increased price sensitivity to green products. This unexpected outcome may stem from heightened consumer expectations when a product is perceived as high quality. Consumers might scrutinise pricing more closely to ensure it aligns with the product’s perceived value. In other words, while high perceived

Table 3. Discriminant validity assessment using Heterotrait-monotrait (HTMT) ratio of correlations

	1	2	3	4
1. Environmental concern				
2. Green purchase intention	0.623			
3. Perceived green product quality	0.575	0.697		
4. Price sensitivity to green products	0.520	0.648	0.844	

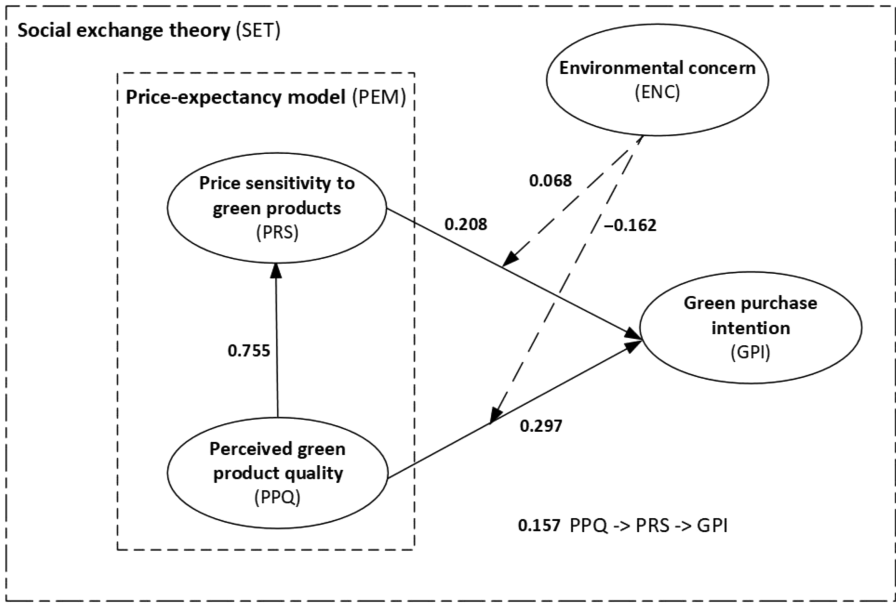
Source(s): Authors’ own work

Table 4. Structural model assessment

Effect	Hypothesis and relationship	Std beta	Std error	t-value	p-value	BCCI 95%		VIF	f ²	R ²	Q ² predict
						LB	UB				
Direct	H1: PPQ → PRS	0.755	0.038	19.644	0.000	0.683	0.809	1.000	1.325	0.570	0.567
	H2: PRS → GPI	0.208	0.070	2.979	0.001	0.097	0.327	2.376	0.038	0.520	0.481
	H3: PPQ → GPI	0.297	0.065	4.564	0.000	0.187	0.401	2.536	0.072		
Indirect	H4: PPQ → PRS → GPI	0.157	0.053	2.942	0.003	0.061	0.268				
Interaction	H5a: ENC × PRS → GPI	0.068	0.087	0.784	0.217	-0.075	0.208		0.003		
	H5b: ENC × PPQ → GPI	-0.162	0.082	1.982	0.024	-0.299	-0.032		0.019		

Note(s): PPQ = Perceived green product quality; PRSs = Price sensitivity to green products; GPI = Green purchase intention; ENC = Environmental concern. ****p* < 0.001, ***p* < 0.01, **p* < 0.05. BCCI = Bias-corrected bootstrap confidence interval; LB = Lower Bound; UB = Upper Bound; VIF = Variance Inflation Factor; Effect size (f²): T = Trivial (<0.02), S = Small (0.02–0.15), M = Medium (0.15–0.35), L = Large (0.35 and above) [Cohen \(1988\)](#)

Source(s): Authors' own work



Note(s): Structural model (with path coefficient results); *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, ns = not significant

Source(s): Authors' own work

Figure 2. Result of structural path

quality enhances the appeal of green products, it also amplifies consumers' price awareness and potentially their demand for justifiable pricing.

Additionally, contrary to the hypothesised negative relationship of H2, the analysis identified a strong positive relationship between PRS and GPI (H2: $\beta = 0.208$, $p < 0.01$), which proves that H2 is not supported. This means that the result suggests that consumers who are more sensitive to the price of green products are more likely to have an increased intention to purchase these products. A possible explanation could be that price-sensitive consumers actively seek value for money in their green purchases. When they perceive green products to offer value (e.g. competitive pricing, long-term savings, or superior quality), they may be more inclined to purchase these products. Moreover, price sensitivity might motivate consumers to seek affordable green products, thus increasing their purchase intentions. For example, consumers more attuned to price differences may be more likely to search for green products that align with their budget while offering sustainable benefits.

Subsequently, it is found that PPQ positively affected GPI (H3: $\beta = 0.297$, $p < 0.001$), thus supporting H3. The study's findings affirm that when consumers perceive green products as having superior features, reliable, durable and sustainable, they are more inclined to purchase. Additionally, green products are often produced using eco-friendly methods, typically with a higher price tag. However, consumers may justify the higher cost if they perceive these items to be higher quality. This supports the idea that green products are a worthwhile investment, as quality is a significant factor in convincing them to choose them over non-green products. It also suggests that consumers prioritise green products' characteristics that are eco-efficient and have reduced or zero carbon/plastic footprint when purchasing.

To gain a deeper understanding of the extent to which one construct influences another, effect sizes (f^2) were assessed in line with Cohen's guidelines (1988). In predicting PRS, the

PPQ demonstrated a large effect size ($f^2 = 1.325$). Conversely, when explaining GPI, both predictors—PRS ($f^2 = 0.038$) and PPQ ($f^2 = 0.072$) - showed a small impact. Overall, all exogenous variables demonstrated significant explanatory power for PRS ($R^2 = 0.570$) and GPI ($R^2 = 0.520$). Finally, the model's predictive accuracy was validated, with all endogenous variables producing $Q^2_{predict}$ values greater than 0 (Hair *et al.*, 2022).

The PLSpredict procedure was employed to evaluate the model's predictive relevance (Shmueli *et al.*, 2019). The model's predictive quality is demonstrated if the $Q^2_{predict}$ values are higher than the zero threshold, as proven in Table 5. As shown in Table 5, all indicators ($Q^2_{predict}$) values for GPI and PRS are within the range of 0.321–0.447, indicating that all the values are greater than 0. When comparing the root mean squared error (RMSE) values for the indicators between the PLS-path model (PLS-SEM_RMSE) and its linear model (LM_RMSE), the PLS-path model was found to be superior. The PLS-path model consistently demonstrated lower values across all indicators of the GPI (GPI1 – GPI5), which highlights its high predictive power. Regarding the PRS, all indicators (PRS1, PRS2, and PRS4), with the exception of PRS3, exhibited smaller prediction errors for PLS-SEM_RMSE compared to the corresponding LM_RMSE values, indicating that the model possesses moderate predictive power.

4.4.2 Indirect effect. The assessment of the indirect effect (Table 4) within the structural model (Hair *et al.*, 2022) reveals that PRS significantly and positively mediate the impact of PPQ ($\beta = 0.157, p < 0.01$) and GPI, thus supporting H4. The indirect effect highlighted in this context indicates that even when consumers perceive green products as high quality, their purchase decisions are still affected by their sensitivity to price. In other words, highly price-sensitive consumers may still be influenced by price considerations even when they perceive a green product as high quality. This underscores the importance of considering price sensitivity to green products when analysing the relationship between perceived green product quality and consumers' intentions to make green purchases.

4.4.3 Interaction effect. H5a and H5b investigated how ENC moderates the impact of PRS on GPI and PRQ on GPI, respectively, using a two-stage approach (Becker *et al.*, 2023). As presented in Table 4, ENC was found to successfully moderate the association between PPQ and GPI with a trivial effect size (H5b: $\beta = -0.162, p < 0.05, f^2 = 0.019$), but not on PRS and GPI (H5a: $\beta = 0.068, p > 0.05$). Thus, H5b was supported but not H5a. The trivial effect size found in H5b indicates that ENC alone may not significantly influence consumer behaviour towards green purchases when compared to factors such as price. This finding highlights the

Table 5. The PLSpredict assessment

Item	$Q^2_{predict}$	PLS-SEM_ RMSE	LM_ RMSE	PLS-SEM_RMSE–LM_ RMSE	Decision
GPI1	0.353	0.745	0.758	–0.013	High predictive power
GPI2	0.321	0.720	0.733	–0.013	
GPI3	0.403	0.689	0.704	–0.015	
GPI4	0.322	0.713	0.724	–0.011	
GPI5	0.399	0.749	0.756	–0.007	
PRS1	0.427	0.788	0.790	–0.002	Medium predictive power
PRS2	0.414	0.847	0.857	–0.010	
PRS3	0.463	0.715	0.707	0.008	
PRS4	0.447	0.782	0.788	–0.006	

Note(s): GPI = Green purchase intention; PRSs = Price sensitivity to green products. $Q^2_{predict}$ = Predictive relevance; PLS-SEM = Partial least squares structural equation modelling; LM = Linear model; RMSE = Root mean squared error; PLS-SEM_RMSE must produce smaller values than LM_RMSE, thus generating negative values in PLS-SEM_RMSE–LM_RMSE

Source(s): Authors' own work

necessity for marketers to integrate strategies that address environmental values alongside tangible incentives, such as cost reductions or improved accessibility, to foster broader acceptance of green products.

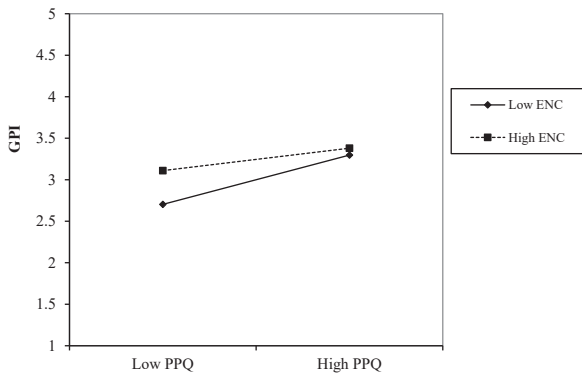
The interaction plot (Figure 3) indicates that ENC has a moderating effect, weakening the previously identified positive correlation between PPQ and GPI. Therefore, when ENC is present or at higher levels, the positive impact of PPQ on GPI diminishes. This implies that consumers with more significant ENC are less swayed by their perception of product quality when buying green products. The findings underscore that with the growing global environmental awareness, consumers prioritising environmental sustainability place greater importance on the ecological benefits offered by green products than on any potential reservations about their quality. Furthermore, the study concluded that the moderating impact of ENC on the relationship between PRS and GPI (H5a) was found to be non-significant. This finding indicates that consumers' ENC may not necessarily diminish or enhance the effect of PRS on their intention to purchase green products. One plausible explanation is that PRS remains a predominant factor, even among consumers with strong ENC. This phenomenon may occur because they prioritise immediate financial implications over potential long-term environmental benefits.

5. Exploration of the contributions and implications of theory and practice

The study's findings have significant implications for researchers in the theoretical aspect, which will be discussed below. By integrating the SET and PEM, the study significantly contributes to the ongoing discussion on green purchase behaviours and green consumerism. It provides a noteworthy addition to the existing body of knowledge on green marketing research through a comprehensive analysis of the intricate relationship between PPQ, PRS, GPI and ENC.

5.1 Theoretical implications

First, *PPQ for green products positively affects PRS*. This finding contradicts the hypothesised negative association, which suggests that, for green products, consumers may perceive higher quality as an indicator of a higher price, increasing their PRS. This challenges the traditional view of the quality-price relationship and suggests that other factors, such as sustainability concerns or the perceived cost of environmental responsibility, influence consumer decision-making.



Source(s): Authors' own work

Figure 3. The moderating effect of environmental concern (ENC) on the relationship between perceived green product quality (PPQ) and green purchase intention (GPI)

Second, *PRS positively affects GPI*. The finding challenges the hypothesised negative relationship, which posits that price-sensitive consumers may pursue green products not merely due to lower prices, but rather because they perceive additional value or long-term savings associated with the benefits of these products, such as energy efficiency, sustainability, and durability. This indicates that PRS should not only be considered a barrier; it may also serve as a motivating factor when consumers regard green products as avenues for achieving economic advantages over time.

Third, *consumers' GPI is positively and significantly impacted by their PPQ*. This result supports SET by demonstrating that the quality and capacity of green products to meet consumers' expectations are just as crucial as their potential to protect the environment. Thus, the success of green products in the market depends significantly on customers' perception that they provide sustainable appeal and high-quality value, including extended durability, enhanced performance, and improved efficiency, compared to non-green products. These perceptions of high quality can help overcome other potential barriers, such as price premiums or lack of familiarity with the product, by demonstrating that PPQ is a crucial factor, especially when consumers are evaluating their choices.

Fourth, *PRS's involvement as a significant mediator between PPQ and GPI* reinforces the notion that price tolerance and other economic considerations substantially impact how consumers react to the quality features of green products. The finding, grounded by PEM-SET, proves that *PPQ* alone does not enhance existing customer behaviour theories. It highlights the significance of understanding how pricing dynamics influence consumers' views of the value of green products. In addition, this theoretical refinement is especially relevant to these products, as consumers must weigh their perceptions of quality against the cost, where premium prices are typically expected.

Fifth, this study utilised *ENC to assess its moderating effect on the relationship between consumers' PPQ and GPI*. This study builds upon the SET by showcasing that consumers prioritising ENC place a higher value on green products. Conversely, for those less inclined to prioritise ENC, the advantages of high-quality products may not justify the expenses. This reinforces the idea that intrinsic values, such as eco-consciousness, impact the cost-benefit analysis when purchasing green products, thus reshaping the conventional decision-making process for such products. Moreover, it suggests that ENC is not just an antecedent to GPI but a moderator that influences how green products' attributes are evaluated. This introduces a more complex model of green consumer decision-making, where values-based moderators like ENC interact with product quality to drive purchase intention.

Finally, this study *advances the understanding of green purchase behaviour by integrating the PEM and SET frameworks*. It situates these insights within the broader context of global green consumerism and circular economies. The study's findings align with macro-level trends by exploring the interaction between PPQ, PRS, and ENC, emphasising the transition to sustainable consumption patterns. This contribution is particularly relevant in circular economies, which aim to redefine growth through waste minimisation and resource efficiency (MacArthur, 2013). Such alignment underscores the theoretical relevance of this study to ongoing global discussions on sustainability and green marketing.

5.2 Practical implications

In addition to its theoretical contributions, the research findings provide actionable recommendations for businesses and policymakers in green marketing (Dangelico and Vocalelli, 2017). The study offers several valuable insights to enhance the marketing strategies of companies operating in this sector.

First, the findings suggest that consumers' PRS is influenced by their expectations about the PPQ of green products. Marketers should *enhance the value communication strategy by clearly articulating the unique quality attributes of green products*, such as the sustainable sourcing of materials, environmentally friendly manufacturing processes, or superior product

performance. Ensuring consumers know the added value beyond just ENC will help justify the higher price. Transparent communication about the product's lifecycle impact (e.g. energy savings, waste reduction, or the product's longer lifespan) can reduce the harmful effects of price sensitivity.

Second, the finding suggests that PRS positively affects consumers' GPI, allowing marketers to *strategically position green products as economically beneficial over the long term*. These companies can address PRS to green products through strategies such as price adjustments, promotions, or emphasising the long-term value of green products, including encouraging energy-efficient appliances that reduce long-term energy consumption. In addition, marketers can collaborate with local governments and authorities to enable households with higher disposable incomes to be more inclined to purchase green products. This may involve offering incentives such as tax benefits or rebates to boost their purchase intention. Moreover, raising consumer awareness about the long-term health benefits of green products, such as organic food free from synthetic pesticides and fertilisers that promote long-term health benefits and reduce exposure to toxins could shift the focus from immediate cost to overall value to help mitigate the impact of price sensitivity to green products on purchasing decisions. Additionally, businesses might consider segmenting their target audience as some consumers may have strong intentions to buy high-quality green products but are held back by PRS. For instance, offering financing options or discounts could cater to those who are quality-focused but sensitive to price.

Third, the research results suggest that PPQ positively affects GPI, which indicates that companies should *highlight the quality features of their green products and their environmental benefits*. Messaging around product performance, durability, and long-term value can influence consumers' intention to purchase green products. Advertising and product packaging that emphasise quality and sustainability will likely appeal to a broader audience, including those whom environmental concerns may not primarily drive.

Lastly, it is crucial to recognise that consumers with high environmental concerns are more likely to choose green products even at higher prices. Policymakers should *implement policies that support green consumer behaviour*. Thus, policymakers should *implement tax incentives or subsidies* for companies to effectively lower production costs and enhance the competitive pricing of green products. By doing so, businesses could reduce their expenses and, in turn, offer consumers more affordable options that prioritise sustainability. This approach not only supports the growth of green industries but also encourages wider adoption of eco-conscious products in the marketplace.

6. Conclusion

6.1 Limitations and prospects for future research

This study has made significant contributions to empirical research on GP behaviours and green consumerism and the broader green marketing research literature. However, it is essential to acknowledge that the study also has certain limitations.

The primary limitation of this study is its cross-sectional design, which only captures a snapshot of data at a specific moment in time. This hinders establishing causal relationships between PPQ, PRS, and GPI. In the future, it would be beneficial for research to consider utilising longitudinal studies that track consumer behaviour over an extended period. These longitudinal studies would provide insights into the changes in green purchasing behaviour and the evolving impact of PRS and PPQ. By using longitudinal designs, researchers can better understand how perceptions evolve and determine whether the relationships identified in this study remain stable or change over time.

Another limitation is the study's focus on Malaysia, which may limit the generalisability of the findings to other cultural or economic contexts. The influence of ENC, PPQ, and PRS on GPI may differ significantly in countries with varying levels of environmental awareness, income levels, and government regulations. Future research should extend this study to a

cross-cultural analysis, comparing different regions or countries to identify whether similar factors influence green purchasing behaviours or if unique cultural and economic drivers play a role in different contexts.

The research primarily focuses on a narrow set of variables, such as PPQ, PRS, and GPI, while overlooking other influential factors like brand trust, social influence, and the availability of green alternatives. These factors could significantly impact consumer behaviour. To gain a more comprehensive understanding of GPI, future studies should broaden the conceptual model to include these additional variables. Additionally, researchers should consider other interaction effects, such as brand loyalty and perceived government support, as well as indirect effects, such as perceived risk and trust. This more inclusive approach will enable researchers to comprehend better the intricate nature of consumer decision-making within the green products market.

Finally, this study relies heavily on self-reported data, which may be susceptible to social desirability bias, particularly in the context of environmentally responsible behaviours. Respondents may overstate their ENC or GPI to align with perceived societal expectations. Future studies should aim to validate self-reported data with actual purchasing behaviour or other objective measures to ensure the accuracy of the findings. Utilising observational data or transactional records could offer deeper insights into the proper drivers of green purchases and reduce bias in consumer self-reporting.

In conclusion, this study underscores the significant roles of PPQ, PRS, and ENC in influencing GPI, thereby enhancing the understanding of consumer behaviour in green marketing, particularly within the basis of green circular economies. To strengthen scholarly rigour and provide contextual clarity, the research incorporates foundational theories of PEM-SET. This integration situates the findings within the broader context of global trends in green consumerism and establishes a solid foundation for future research in green marketing.

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