Understanding Sustainable Consumption of Eco-Labeled Products in an Emerging Market: An Extended Theory of Planned Behavior Approach

Cheng-Kun Wang[1], Yi-Hui Ho[2], Chieh-Yu Lin[3]

[1]Associate Professor, College of Management, Chang Jung Christian University, Taiwan (R.O.C.) (ORCID: https://orcid.org/0000-0002-3752-636X)

[2]Professor, Department of International Business, Chang Jung Christian University, Taiwan (R.O.C.) (ORCID: https://orcid.org/0000-0003-4779-682X)

[3]Professor, Department of International Business, Chang Jung Christian University, Taiwan (R.O.C.) (ORCID: https://orcid.org/0000-0003-3393-9674)

Abstract

This study examines sustainable consumption behavior toward eco-labeled products in an emerging market through an extended Theory of Planned Behavior (TPB) framework. By incorporating cognitive and contextual factors, including eco-labeling information, perceived product value, and self-efficacy, the research investigates both the mediating effects of core TPB constructs and the moderating influences of external variables. Data were obtained from Vietnamese consumers using a questionnaire survey. The findings indicate that TPB constructs significantly mediate the effect of environmental consciousness on purchase intention. Moreover, eco-labeling information moderates the positive effect of subjective norms on purchase intention, while perceived product value and self-efficacy strengthen the relationship between purchase intention and actual purchasing behavior. The present study advances the theoretical understanding of sustainable consumer behavior by extending the TPB model and offers practical implications for promoting eco-labeled product adoption in emerging market contexts.

Keywords: Eco-labeled products, Theory of planned behavior, Emerging market, Environmental consciousness, Perceived product value, Eco-labeling information, Self-efficacy.

INTRODUCTION

The escalating global challenges associated with climate change, resource depletion, and environmental degradation have heightened the imperative to promote sustainable consumption practices. In response to increasing environmental awareness, consumers are becoming more cognizant of their ecological footprints, leading to a growing preference for eco-labeled products. These products, certified through standardized labeling schemes to denote environmentally sustainable production processes, have gained considerable attention as mechanisms for guiding environmentally responsible purchasing decisions (Chi, 2021; Nagar & Verma, 2025). Beyond their informational function, eco-labels serve as strategic marketing tools that influence consumer behavior and encourage producers to adopt more sustainable practices (Asan et al., 2024; Velasco et al., 2024).

Although the determinants of sustainable consumption have been extensively examined in developed economies, emerging markets have received comparatively less empirical scrutiny (Alam et al., 2024; Biswas & Roy, 2015; Nagar & Verma, 2025). In these settings, environmental awareness often coexists with competing socio-economic development priorities, which may result in unique patterns of consumer decision-making in developing markets (Carlson & Palmer, 2016). Consequently, understanding the factors that influence eco-labeled product adoption in such contexts is critical for fostering broader environmental engagement and designing effective marketing and policy interventions (Asan et al., 2024; Pereira et al., 2022).

As a well-established framework, the Theory of Planned Behavior (TPB) effectively explains and predicts individual behavioral intentions, making it highly applicable to studies of pro-environmental consumption behaviors (Asih, 2020; Paul et al., 2016). As outlined in the TPB, three primary constructs, attitude toward the behavior, subjective norms, and perceived behavioral control, collectively shape an individual's behavioral intentions. However, when applied to emerging economies, this framework may not adequately account for the multifaceted nature of consumer behavior in these contexts (Asih, 2020). Factors external to the original TPB model, such as the availability and credibility of eco-labeling information, perceived product value, and

individual self-efficacy, may play a critical role in shaping both purchase intentions and actual behaviors (Alam et al., 2023; Yadav & Pathak, 2016).

To address these limitations, the present study proposes an extended TPB model that integrates eco-labeling information, perceived product value, and self-efficacy as key moderating and mediating variables. The objective of this research is to provide a more thorough exploration of the determinants of sustainable consumption behavior in emerging markets, with a particular focus on Vietnam. The present study seeks to (1) explore the influence of environmental consciousness on consumers' purchase intention and actual purchase behavior toward eco-labeled products; (2) assess the mediating roles of TPB's core constructs in this relationship; and (3) explore the moderating effects of eco-labeling information, perceived product value, and self-efficacy on critical behavioral pathways.

This study's focus on Vietnamese consumers enriches the literature on sustainable consumption in developing economies, a context where green consumer behaviors are continually evolving. Furthermore, it responds to the relative paucity of empirical investigations into eco-labeled product adoption in these settings (Biswas & Roy, 2015; Nagar & Verma, 2025). The results of this research are expected to contribute to the theoretical framework surrounding environmentally responsible consumer behavior while delivering practical recommendations for policymakers, marketers, and sustainability advocates striving to increase the adoption of eco-labeled products.

The subsequent sections detail the organization of this paper. Section 2 provides an overview of the conceptual framework and develops the research hypotheses grounded in theoretical and empirical evidence. Section 3 describes the research methodology and the procedures employed for data analysis. Section 4 presents a detailed account of the empirical results, including measurement model validation and hypothesis testing outcomes. Section 5 offers a discussion of the theoretical contributions and practical implications, addresses the study's limitations, and suggests avenues for future research. The final section provides concluding remarks.

RESEARCH HYPOTHESES

This research investigates the antecedents of eco-labeled product purchasing behavior through an extension of the TPB, a widely applied theoretical model for understanding individual intentions and behaviors in various domains (Ajzen, 1991). While TPB simplifies the understanding of rational decision-making by emphasizing the roles of subjective norms, attitude, and perceived behavioral control, scholars have increasingly argued that its explanatory power can be enhanced by integrating additional relevant variables (Ajzen, 1991; Conner & Armitage, 1998; Paul et al., 2016). In response, this study extends the TPB by incorporating cognitive and contextual factors, specifically environmental consciousness, perceived product value, self-efficacy, and eco-labeling information, to promote a detailed understanding of consumers' eco-labeled product purchasing behavior.

Although prior research has consistently confirmed the positive associations between TPB constructs and purchase intentions, the mediating roles of these constructs have received comparatively limited empirical attention (Alam et al., 2023). Godin et al. (2004) noted the underutilization of TPB constructs as mediators, despite Ajzen's (1991) original proposition that they could serve as intermediaries between external variables and behavioral intentions. This research responds to the gap by exploring the mediating roles of subjective norms, attitude, and perceived behavioral control in linking environmental consciousness to purchase intention, thereby aligning with the extended TPB perspective advanced by Altawallbeh et al. (2015).

Additionally, the conceptual distinction between perceived behavioral control and self-efficacy has been debated in the literature. While some researchers have treated these constructs interchangeably (Droms & Craciun, 2014), others have emphasized their theoretical and empirical distinctiveness (Parkinson et al., 2017; Yap & Lee, 2013). Following Parkinson et al. (2017), this study differentiates perceived behavioral control as encompassing both external and internal constraints on behavior, whereas self-efficacy is defined strictly in terms of internal cognitive confidence in one's capabilities.

Building upon the TPB framework, this study proposes a conceptual model, as illustrated in Figure 1, in which purchase intention is positioned as the immediate antecedent of actual purchasing behavior. The model hypothesizes positive associations among environmental consciousness, subjective norms, attitude, perceived behavioral control, and purchase intention. Furthermore, TPB constructs are examined as mediators in the effects of environmental consciousness on purchase intention. In total, sixteen hypotheses are proposed to

evaluate the interrelationships among environmental consciousness, TPB constructs, eco-labeling information, perceived product value, and self-efficacy. Actual purchase behavior is also modeled as an outcome variable, extending the TPB framework to better capture the complex psychological and informational processes influencing eco-labeled product adoption.
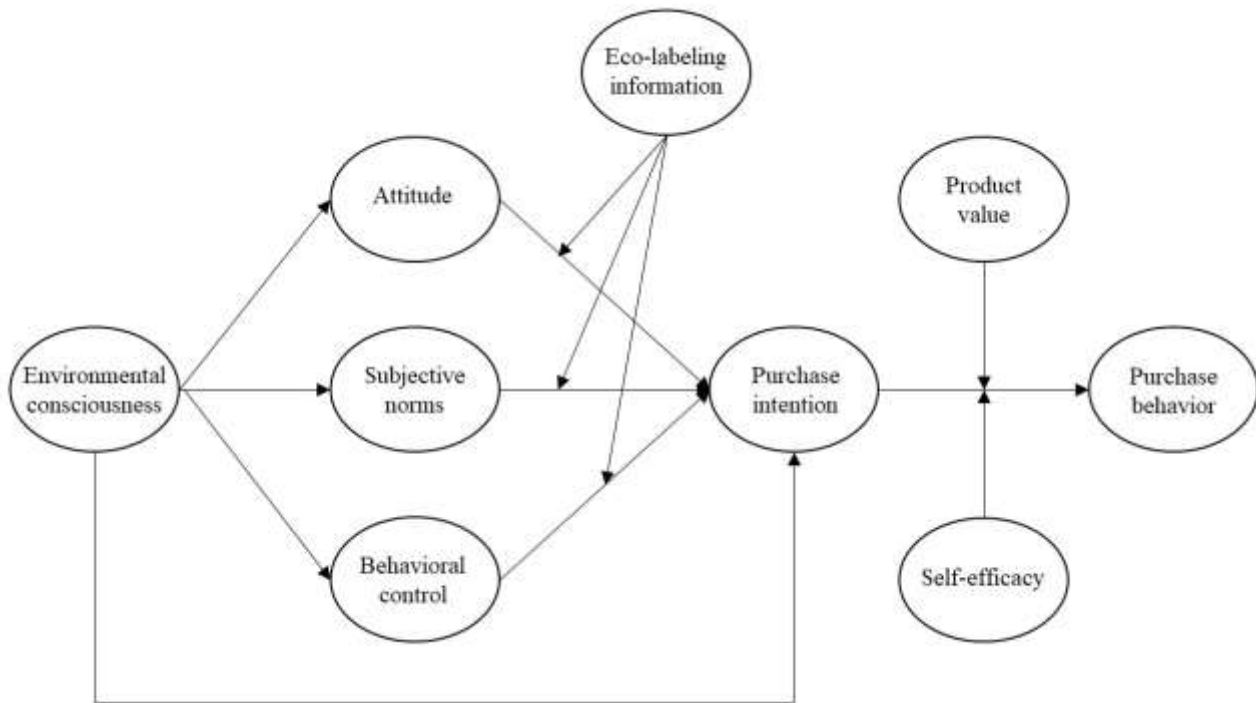

Figure 1 Conceptual Model

Effects of Environmental Consciousness on TPB Constructs and Purchase Intention

Environmental consciousness is broadly defined as an individual's awareness, concern, and sensitivity regarding environmental degradation and ecological issues (Laheri et al., 2024). It reflects not only cognitive awareness but also a personal commitment to environmental protection. According to Suki (2014), individuals who possess higher levels of environmental knowledge and concern are more inclined to exhibit favorable attitudes toward environmentally friendly products. Environmental knowledge, a key component of environmental consciousness, encompasses an individual's understanding of ecological systems, environmental problems, and sustainable practices (Pagiaslis & Krontalis, 2014). Prior research has consistently demonstrated that such knowledge significantly influences green purchase behavior (Yadav & Pathak, 2016).

Consumers possessing higher levels of environmental awareness and concern typically exhibit stronger purchase intentions for green products, stemming from an inherent motivation to lessen their ecological impact (Alam et al., 2022, 2023; Pagiaslis & Krontalis, 2014). Ko and Jin (2017) further corroborated that familiarity with environmental issues enhances consumers' willingness to buy environmentally responsible products. Moreover, empirical evidence from multiple studies supports a positive effect of environmental consciousness on both attitudes and behavioral intentions toward green consumption (Sang & Bekhet, 2015; Yadav & Pathak, 2017). Jaiswal and Kant (2018), in their study of Indian consumers, confirmed a significantly positive association between environmental consciousness and the intention to purchase green products. Informed by these findings, the following hypotheses are proposed:

H1: Environmental consciousness has a positive influence on attitudes toward eco-labeled products.

H2: Environmental consciousness has a positive influence on subjective norms.

H3: Environmental consciousness has a positive influence on perceived behavioral control.

H4: Environmental consciousness has a positive influence on eco-labeled product purchase intention.

Effects of TPB Constructs on Purchase Intention

Attitude is defined as a psychological predisposition to evaluate a particular entity with a degree of favor or disfavor, reflecting a relatively enduring cognitive and affective orientation toward a behavior (Eagly & Chaiken, 1993). In the context of consumer behavior, a positive attitude toward a product increases the likelihood of purchase, as individuals tend to act in accordance with their favorable evaluations. Empirical studies have consistently demonstrated a significant positive relationship between attitude and behavioral intention in environmentally relevant domains (Han & Yoon, 2015; Jin et al., 2020; Teng et al., 2014).

The term subjective norms describes the perceived social pressure to either carry out or avoid a certain behavior, shaped by the expectations of significant others such as friends, family, and peers (Ajzen, 1991). These normative influences can substantially shape individual choices, especially in collectivist cultures where conformity to group expectations is valued. Prior research has established that subjective norms are a key predictor of green consumption behaviors, including the intention to purchase green and organic products (Giampietri et al., 2018; Hsu & Chan, 2015; Irianto, 2015).

Perceived behavioral control represents the perceived capability or challenge an individual associates with performing a specific behavior, which is influenced by both internal and external control beliefs (Ajzen, 1991). A strong sense of control enhances the likelihood of behavioral execution, particularly in environmentally responsible contexts. Empirical evidence has confirmed the significant role of behavioral control in shaping behavioral intentions across various green practices such as recycling (Ramayah et al., 2012), green product consumption (Paul et al., 2016), eco-friendly hotel choices (Teng et al., 2014), and waste separation (Zhang et al., 2015). In the case of eco-labeled products, perceived control is affected by factors such as price, product availability, and access to credible information (Ricci et al., 2018; Sillani & Nassivera, 2015). When consumers perceive fewer barriers to access, their intention to purchase eco-labeled products tends to increase. In line with the Theory of Planned Behavior and supported by these empirical findings, the following hypotheses are proposed:

H5: *Attitude toward eco-labeled products has a positive influence on eco-labeled product purchase intention.*

H6: *Subjective norms have a positive influence on eco-labeled product purchase intention.*

H7: *Behavioral control has a positive influence on eco-labeled product purchase intention.*

Mediating Roles of TPB Constructs

A survey of current literature highlights that the mediating roles of subjective norms, attitude, and perceived behavioral control within the TPB framework have not been thoroughly investigated in relation to sustainable consumption (Alam et al., 2024). Recent studies by Altawallbeh et al. (2015) and Paul et al. (2016) have begun to address this gap by empirically testing the mediating functions of these constructs within the TPB framework. Their findings suggested that TPB components mediate the relationship between environmental consciousness and purchase intention, highlighting the underlying psychological mechanisms through which pro-environmental values are translated into behavioral intentions. According to Altawallbeh et al. (2015), these mediators are essential in elucidating the pathway through which external variables impact behavioral intentions.

Drawing upon these insights, the present study conceptualizes attitude, subjective norms, and perceived behavioral control as mediating variables in the relationship between environmental consciousness and purchase intention for eco-labeled products. This approach is further supported by Saleem and Gopinath (2013), who argued that environmental consciousness exerts its influence on behavioral outcomes primarily through TPB constructs. Informed by this body of research, the following hypotheses are proposed:

H8: *Attitude mediates the effect of environmental consciousness on eco-labeled product purchase intention.*

H9: *Subjective norms mediate the effect of environmental consciousness on eco-labeled product purchase intention.*

H10: *Behavioral control mediates the effect of environmental consciousness on eco-labeled product purchase intention.*

Moderating Effect of Eco-labeling Information

Eco-labeling information refers to identifiable symbols or marks affixed to products or their packaging that communicate the environmental performance, sustainability attributes, or ecological footprint of the product (Gosselt et al., 2017). As a central component of green marketing strategies, eco-labels have been widely recognized for their role in guiding consumer choices toward more sustainable options (Rex & Baumann, 2007). As noted by Prieto-Sandoval et al. (2016), eco-labels serve as a multifaceted means of communication, highlighting environmental benefits associated with a product's life cycle, from manufacturing and usage to final disposal. Atkinson and Rosenthal (2014) further emphasized that eco-labels function as critical

informational cues that help consumers make more informed decisions by increasing transparency about a product's environmental attributes.

Research has shown that consumers possessing extensive product knowledge are more inclined to engage in cognitive evaluations during decision-making, leading to stronger green purchase intentions (Chen & Deng, 2016; Fu & Elliott, 2013). This is largely attributed to their enhanced ability to assess the performance-to-price ratio of environmentally friendly products (Chen & Deng, 2016). Thus, eco-labels serve not only as persuasive marketing instruments but also as educational tools that improve communication and understanding between producers and consumers.

Additionally, subjective norms play a crucial role in shaping environmentally responsible consumption. These norms are often influenced by cultural orientations such as individualism and collectivism, which affect both environmental and broader social behaviors. In collectivist cultures such as Vietnam, societal expectations and group affiliations exert a strong influence on consumer behavior. Individuals with lower levels of product knowledge tend to exhibit reduced confidence in making autonomous purchase decisions and are more likely to conform to the purchasing patterns of reference groups. Conversely, individuals with higher product knowledge demonstrate increased self-assurance and are more likely to make environmentally motivated decisions independently.

Given the increasing consumer concern for environmental sustainability, eco-labels have become an influential factor in green purchasing behavior. Empirical evidence supports this claim. For instance, Song et al. (2019) found that eco-labels significantly impact the purchasing intentions of young Chinese consumers. In light of these insights, eco-labeling information is considered a salient factor in predicting sustainable consumption and, thus, is incorporated into the present study's conceptual framework. Based on the aforementioned literature, the following hypotheses are proposed:

H11: *Eco-labeling information strengthens the positive relationship between attitude and eco-labeled product purchase intention.*

H12: *Eco-labeling information strengthens the positive relationship between subjective norms and eco-labeled product purchase intention.*

H13: *Eco-labeling information strengthens the positive relationship between perceived behavioral control and eco-labeled product purchase intention.*

Purchase Intention and Purchase Behavior

The relationship between purchase intention and actual purchase behavior has been a subject of increasing scholarly interest, although empirical evidence remains relatively limited due to the scarcity of behavioral data. While Garbarino and Johnson (1999) examined the connection between attitude and intention, and Homburg et al. (2005) focused on self-reported behavioral outcomes, only a few studies have directly investigated the transition from intention to actual behavior (De Canniere et al., 2010). According to Ajzen (1991), behavioral intentions serve as immediate antecedents of actual behavior, forming a core tenet of the TPB. Some studies have confirmed the predictive strength of purchase intentions in shaping real-world actions. For example, Wee et al. (2014) found a significant positive relationship between green purchase intention and actual behavior. More recent research supports this finding, with evidence from Alam et al. (2023), Tang et al. (2021), and Zheng et al. (2021) demonstrating that behavioral intention is a robust predictor of environmentally responsible consumption behavior. Based on these empirical insights, the following hypothesis is suggested for empirical testing:

H14: *Purchase intention has a positive influence on actual purchase behavior.*

Moderating Effect of Product Value

Perceived product value encompasses the consumer's holistic evaluation of a product's worth, determined by weighing its perceived benefits against the costs incurred (Chen & Chang, 2012). Within the context of green consumption, as conceptualized by Patterson and Spreng (1997), green perceived value represents the total net benefit a consumer perceives from using a product or service, considering both positive and negative aspects. It encompasses environmental preferences, sustainability expectations, and ecological considerations. Empirical evidence underscores the importance of perceived value in shaping green purchase behavior. For instance, Doszhanov and Ahmad (2015) found that perceived product value significantly influences consumers' intention to purchase environmentally friendly products.

The Value-Attitude-Behavior (VAB) model further supports this relationship, positing that perceived value indirectly shapes behavior by influencing attitudes (Homer & Kahle, 1988). In tourism and hospitality

research, perceived value has been shown to significantly affect behavioral intentions, including destination loyalty and eco-friendly travel choices (Wang, 2022; Yen & Teng, 2015). Similarly, Yu and Lee (2019) identified green value as a salient predictor of pro-environmental purchasing behavior. In light of these findings, this study incorporates perceived product value as a moderating variable influencing the relationship between purchase intention and actual buying behavior. Accordingly, the following hypotheses are proposed:

H15: *Product value strengthens the positive relationship between purchase intention and purchase behavior.*

Moderating Effect of Self-Efficacy

Armitage and Conner (1999) expanded the TPB by incorporating self-efficacy as a supplementary construct, demonstrating that self-efficacy plays a significant role in shaping behavioral intentions. Similarly, Povey et al. (2000) contended that the inclusion of both self-efficacy and perceived behavioral control enhances the explanatory and predictive capabilities of the TPB framework. In their meta-analytic review, Armitage and Conner (2001) further confirmed that self-efficacy exhibits a stronger correlation with intention compared to perceived behavioral control, reinforcing its theoretical relevance.

Some empirical studies also support the pivotal role of self-efficacy in consumer behavior. For instance, Nystrand and Olsen (2020), in their investigation of functional food consumption in Norway, identified self-efficacy as a key determinant of purchase intention. Likewise, Xu et al. (2022) have demonstrated that individuals with higher confidence in their capabilities are more inclined to engage in targeted actions, including environmentally responsible behavior. Furner et al. (2018) also found that consumers' trust and willingness to adopt sustainable products are significantly influenced by their perceived competence and confidence in decision-making. Furthermore, research by Peña-García et al. (2020) confirmed that self-efficacy substantially affects both online purchase intentions and actual purchasing behavior. Taken together, these findings highlight the critical role of self-efficacy as a psychological driver in the context of green consumption. Accordingly, the present study integrates self-efficacy into the extended TPB framework and proposes the following hypotheses:

H16: *Self-efficacy strengthens the positive relationship between purchase intention and purchase behavior.*

METHODOLOGY

Sample

This study employed a structured questionnaire survey, targeting consumers in Vietnam. A total of 1,000 individuals were approached, from which 627 completed responses were retained as valid data for further analysis. The sample was predominantly female (58.49%), with the most represented age group being 25 to 35 years (35.71%), while individuals aged over 65 constituted the smallest proportion (7.38%). Regarding participants' educational background, the majority of respondents held either a university degree (33.82%) or a high school diploma (31.96%).

Measures

All constructs utilized in the present study were adapted from validated measurement instruments developed in the literature. Items assessing environmental consciousness were adapted from Laheri et al. (2024), while constructs related to subjective norms, attitude, perceived behavioral control, purchase intention, and purchase behavior were based on scales developed by Alam et al. (2023, 2024) and Laheri et al. (2024). Measures for eco-labeling information and perceived product value were adopted from Nhu et al. (2019), whereas items measuring self-efficacy were adapted from Nystrand and Olsen (2020). All items were rated on a six-point Likert scale, ranging from 1 ("strongly disagree") to 6 ("strongly agree").

Common Method Bias

To examine whether common method bias is present, Harman's single-factor test (Harman, 1967) was conducted using exploratory factor analysis (EFA). Both the Kaiser-Guttman criterion and the scree test were employed to determine the number of underlying factors. The analysis yielded seven factors with eigenvalues greater than one, collectively accounting for 63.52% of the total variance. The first factor accounted for 28.7% of the variance, indicating no single factor dominance and thereby suggesting that common method bias is unlikely.

In addition, a marker variable technique was implemented in accordance with the recommendations of Podsakoff et al. (2003) to further examine potential common method variance. The inclusion of a marker

variable resulted in a combined variance explanation of less than 1%, further confirming that common method bias was not a significant concern in this study.

Analysis of the Data

Partial Least Squares Structural Equation Modeling (PLS-SEM) served as the primary analytical method, a method selected for its suitability in estimating complex models and its robustness with smaller sample sizes (Ringle et al., 2010). The analysis followed a two-step approach: (1) assessment of the measurement model to evaluate reliability and validity, and (2) assessment of the structural model to examine the path coefficients and their statistical significance (Hair et al., 2021).

Construct validity and internal consistency reliability were evaluated in the measurement model. Convergent validity was confirmed as all constructs exhibited an Average Variance Extracted (AVE) value exceeding the recommended threshold of 0.50 (Fornell & Larcker, 1981). Discriminant validity was established using the Fornell-Larcker criterion, where the square root of the AVE for each construct exceeded the corresponding inter-construct correlations, as presented in Table 1.

Table 1 A summary of the correlation of latent variables and square roots of AVE

	EC	AT	SN	BC	EI	PI	PB	PV	SE
EC	**0.894**								
AT	0.321	**0.913**							
SN	0.361	0.379	**0.857**						
BC	0.354	0.403	0.435	**0.928**					
EI	0.373	0.326	0.478	0.531	**0.845**				
PI	0.605	0.528	0.625	0.468	0.637	**0.806**			
PB	0.427	0.458	0.331	0.517	0.529	0.459	**0.859**		
PV	0.390	0.406	0.366	0.430	0.612	0.627	0.389	**0.901**	
SE	0.511	0.362	0.631	0.534	0.473	0.516	0.475	0.394	**0.882**

Notes: EC= Environmental Consciousness, AT=Attitude, SN=Subjective Norms, BC=Behavioral Control, EI=Eco-labeling Information, PI=Purchase Intention, PB=Purchase Behavior, PV= Product Value, SE=Self-Efficacy.

Bold elements in the table are the square root of AVE.

Composite Reliability (CR) values for all constructs surpassed the 0.70 benchmark, indicating satisfactory reliability (Akter et al., 2011). To further validate discriminant validity, the Heterotrait-Monotrait ratio (HTMT) was assessed. All HTMT values were below the recommended threshold of 0.85–0.90, thus confirming the absence of discriminant validity concerns (Henseler et al., 2015; Hair et al., 2021), as shown in Table 2.

Preliminary statistical assumptions were tested, including homogeneity of variance, multivariate normality, and independence of residuals. Multicollinearity was assessed using the Variance Inflation Factor (VIF), following the guidelines of Kleinbaum et al. (1988). VIF values ranged from 1.026 to 2.814, well below the conventional threshold of 10, suggesting that multicollinearity was not a concern.

Table 2 A summary of Heterotrait-Monotrait ratio (HTMT)

	EC	AT	SN	BC	EI	PI	PB	PV	SE
EC									

AT	0.379						
SN	0.416	0.438					
BC	0.407	0.475	0.480				
EI	0.452	0.391	0.537	0.596			
PI	0.683	0.607	0.692	0.519	0.695		
PB	0.508	0.523	0.389	0.573	0.581	0.510	
PV	0.481	0.482	0.421	0.478	0.664	0.687	0.475
SE	0.573	0.429	0.718	0.595	0.527	0.571	0.564	0.502

To measure the explanatory strength of the model, the coefficient of determination (R^2) for each endogenous variable was examined. As recommended by Falk and Miller (1992), an R^2 value of at least 0.10 indicates acceptable explanatory power. All endogenous variables in this study met or exceeded this criterion, demonstrating that the structural model possesses adequate explanatory strength for further interpretation.

RESULTS

PLS-SEM Results

The results of the PLS-SEM analysis, as presented in Table 3, reveal statistically significant relationships between environmental consciousness and several key constructs. Specifically, environmental consciousness exerted a positive and statistically significant effect on attitude (β = 0.327, t = 8.817, p < 0.01), subjective norms (β = 0.218, t = 6.035, p < 0.01), perceived behavioral control (β = 0.263, t = 7.149, p < 0.01), and purchase intention (β = 0.139, t = 4.952, p < 0.01).

In addition, attitude was found to have a statistically significant positive effect on purchase intention toward eco-labeled products (β = 0.225, t = 6.506, p < 0.01), while subjective norms also exerted a significant positive effect on purchase intention (β = 0.104, t = 3.068, p < 0.01). Perceived behavioral control was similarly found to have a significant relationship with purchase intention (β = 0.176, t = 5.430, p < 0.10). Furthermore, purchase intention was shown to have a significant positive effect on actual purchase behavior (β = 0.342, t = 9.164, p < 0.10).

Based on these path coefficient results, hypotheses *H1, H2, H3, H4, H5, H6, H7,* and *H14* are supported.

Table 3 PLS-SEM and hypothesis testing results

Hypotheses	β	t	p	Results
H1: EC → AT	0.327	8.817	0.000	Supported
H2: EC → SN	0.218	6.035	0.000	Supported
H3: EC → BC	0.263	7.149	0.000	Supported
H4: EC → PI	0.139	4.952	0.000	Supported
H5: AT → PI	0.225	6.506	0.000	Supported
H6: SN → PI	0.104	3.068	0.000	Supported
H7: BC → PI	0.176	5.430	0.000	Supported
H14: PI → PB	0.342	9.164	0.000	Supported

Mediation and Moderation Effects

To examine the mediating roles of subjective norms, attitude, and perceived behavioral control in the relationship between environmental consciousness and purchase intention, this study employed the bootstrapping technique, in accordance with the guidelines proposed by Hair et al. (2021). Bootstrapping is advantageous in that it does not require assumptions about the sampling distribution of indirect effects. The mediation analysis was conducted using 627 observations and 5,000 bootstrap subsamples. As presented in Table 4, the results indicate that attitude significantly mediates the relationship between environmental consciousness and purchase intention (β = 0.043, t = 4.284, p < 0.01). Similarly, subjective norms were found to mediate this relationship (β = 0.036, t = 3.371, p < 0.01), as did perceived behavioral control (β = 0.028, t = 2.865, p < 0.01). These findings provide empirical support for Hypotheses *H8*, *H9*, and *H10*.

In addition, the study investigated the moderating role of eco-labeling information on the relationships between the TPB constructs and the outcome variable, purchase intention toward eco-labeled products. Using the PLS-SEM approach, the analysis as shown in Table 4 revealed that eco-labeling information does not significantly moderate the relationship between attitude and purchase intention (β = 0.025, t = 1.698, p > 0.05), nor between perceived behavioral control and purchase intention (β = 0.036, t = 1.859, p > 0.05). However, a significant moderating effect was observed in the relationship between subjective norms and purchase intention (β = 0.127, t = 5.427, p < 0.01). Thus, Hypothesis *H12* is supported, while Hypotheses *H11* and *H13* are not.

Furthermore, the study examined whether product value and self-efficacy moderate the connection between consumers' purchase intentions and their real purchasing actions. As shown in Table 4, both moderators exhibited significant interaction effects: product value (β = 0.194, t = 5.037, p < 0.01) and self-efficacy (β = 0.161, t = 3.922, p < 0.01). Consequently, Hypotheses *H15* and *H16* are supported, highlighting the critical roles these factors play in translating intention into behavior.

Table 4 Mediation and moderation testing results

Hypothesis	β	t	p	Results
Mediation				
H8: EC → AT→ PI	0.043	4.284	0.000	Supported
H9: EC → SN → PI	0.036	3.371	0.000	Supported
H10: EC → BC → PI	0.028	2.865	0.003	Supported
Moderation				
H11: EI*AT → PI	0.025	1.698	0.092	NS
H12: EI*SN → PI	0.127	5.427	0.000	Supported
H13: EI*BC → PI	0.036	1.859	0.053	NS
H15: PV*PI → PB	0.194	5.037	0.000	Supported
H16: SE*PI → PB	0.161	3.922	0.000	Supported

DISCUSSIONS

The present study sought to investigate the determinants of eco-labeled product purchase behavior among Vietnamese consumers by extending the Theory of Planned Behavior to incorporate environmental consciousness, eco-labeling information, perceived product value, and self-efficacy. By conceptualizing environmental consciousness as a cognitive antecedent to the traditional TPB constructs, subjective norms, attitude, and perceived behavioral control, this research offers a more comprehensive framework for understanding the psychological mechanisms that underpin sustainable consumption behavior in an emerging market context.

Consistent with previous studies (e.g., Setyawan et al., 2018), the findings reveal that environmental consciousness exerts a significant and positive influence on all three TPB constructs. Moreover, it directly

impacts purchase intention, reinforcing the notion that heightened environmental awareness fosters more favorable attitudes and stronger behavioral intentions toward eco-labeled products. This supports earlier work by Polonsky et al. (2012) and Setyawan et al. (2018), which suggested that individuals with environmental consciousness are more inclined to support sustainable consumption practices. Notably, while some prior studies (e.g., Laroche et al., 2002; Liu et al., 2020) have questioned the strength of this relationship, the robust effect observed in this study underscores the centrality of environmental consciousness as a driver of sustainable purchasing behavior in the Vietnamese context.

The study also confirms the core assumptions of the TPB framework. Attitude toward eco-labeled products was demonstrated to be a strong predictor of purchase intention, consistent with prior research (Han & Yoon, 2015; Paul et al., 2016; Verma & Chandra, 2018). Similarly, subjective norms were significantly associated with purchase intention, affirming findings from Teng et al. (2014) and Verma and Chandra (2018), though contrasting with studies that reported weaker or non-significant effects (e.g., Hsu & Chan, 2015; Paul et al., 2016; Tang et al., 2021). Interestingly, while subjective norms were significant, their influence was relatively weaker than that of attitude and perceived behavioral control, suggesting that social influence may play a more secondary role in the decision-making processes of Vietnamese green consumers. Perceived behavioral control was also shown to be significantly related to purchase intention, consistent with the foundational TPB model (Ajzen, 1991) and previous empirical findings (Paul et al., 2016; Verma & Chandra, 2018). This suggests that Vietnamese consumers are more likely to form strong purchase intentions when they feel capable of overcoming barriers to acquiring eco-labeled products, whether those barriers be financial, informational, or logistical.

As expected, purchase intention emerged as a significant predictor of actual purchase behavior, reinforcing the TPB's assertion that intention serves as the immediate antecedent to behavior (Ajzen, 1991). This finding echoes prior studies (e.g., Wee et al., 2014; Zheng et al., 2021) and validates the behavioral component of the model. Furthermore, perceived product value was identified as a significant positive moderator between purchase intention and actual behavior. This finding supports Doszhanov and Ahmad (2015), suggesting that consumers are more likely to follow through on their intentions when they perceive eco-labeled products as offering superior value, whether in terms of quality, status, or environmental benefit. This highlights the importance of product design and communication strategies that reinforce the premium or socially desirable aspects of green products.

In addition, self-efficacy emerged as an important moderating factor influencing the link between purchase intention and purchase behavior, consistent with Armitage and Conner (1999) and Nystrand and Olsen (2020). This suggests that consumers who are confident in their ability to make environmentally responsible decisions are more disposed to implement their intentions. Such a finding emphasizes the importance of empowering consumers through education and accessibility initiatives to reinforce their sense of agency in making sustainable choices.

In terms of eco-labeling information, the findings were partially supportive of previous research. Although the moderating effect of eco-labeling information on the associations between attitude and perceived behavioral control with purchase intention was not significant, contradicting earlier studies by Chen and Deng (2016) and Fu and Elliott (2013), a significant moderating effect was observed between subjective norms and purchase intention. This suggests that the social influence exerted by peers, family, or professional networks becomes more impactful when consumers are exposed to reliable and informative eco-labeling. In essence, increased knowledge amplifies the weight of normative pressures, which may be particularly relevant in collectivist cultures such as Vietnam's (Nguyen et al., 2023).

Furthermore, the mediation analysis demonstrated that subjective norms, attitude, and perceived behavioral control each mediate the association between environmental consciousness and purchase intention, in line with prior findings (Altawallbeh et al., 2015; Paul et al., 2016). Among these, attitude was identified as the most influential mediator, highlighting the pivotal role of consumer evaluations and perceptions in translating environmental concern into behavioral intentions. This finding suggests that interventions aiming to strengthen pro-environmental attitudes may yield the most significant improvements in green consumption behavior.

Taken together, these results not only validate and extend the TPB framework but also illustrate the complex interplay between individual-level cognitive factors and contextual variables such as product information and

perceived value. In doing so, this study provides a more holistic understanding of eco-labeled product consumption and offers a culturally grounded model for predicting sustainable behavior in emerging markets.

Theoretical Implications

The present study advances several significant theoretical contributions to the growing body of literature on green consumer behavior and eco-labeling, particularly within the context of emerging markets. First, this study responds to a critical void in the current body of knowledge by empirically investigating the mechanisms through which eco-labeling influences green purchasing behavior from the perspective of Vietnamese consumers. While prior studies have predominantly examined the direct relationships among constructs within the Theory of Planned Behavior, the present study advances the field by integrating eco-labeling as a contextual factor and exploring its influence on both the formation of behavioral intention and its translation into actual purchasing behavior. In doing so, the study facilitates a more comprehensive grasp of how consumers respond to eco-labeling in a developing economy, where green market maturity and regulatory enforcement may differ substantially from Western contexts.

Second, the research extends the traditional TPB framework by incorporating a set of cognitive and contextual constructs, namely, environmental consciousness, self-efficacy, perceived product value, and eco-labeling information. These additions enrich the explanatory power of the TPB model, allowing for a more comprehensive account of the psychological and informational determinants of green purchasing behavior. By situating TPB within a broader socio-cognitive framework, the study reflects contemporary theoretical advancements that emphasize the interplay between individual cognition and external environmental cues in shaping pro-environmental decision-making.

Third, the study contributes to theoretical refinement by empirically validating the extended TPB model in the context of eco-labeled products. The structural equation modeling results confirm the predictive utility of the added constructs and demonstrate how they interact with core TPB variables (subjective norms, attitude, and perceived behavioral control) to influence both purchase intention and self-reported behavior. This validation reinforces the model's robustness and enhances its applicability to sustainability-focused consumer behavior research.

Fourth, the identification of mediating and moderating relationships offers further theoretical insight. Specifically, the study finds that TPB constructs mediate the effect of environmental consciousness on purchase intention, revealing the cognitive pathways through which environmental values are operationalized into behavioral intentions. Additionally, the moderating roles of eco-labeling information, perceived product value, and self-efficacy underscore the importance of contextual and psychological enablers in facilitating or constraining green behavior. These findings suggest that TPB should be viewed not as a static model but as one that is sensitive to situational influences and consumer perceptions.

Finally, by extending the analysis beyond behavioral intention to include actual self-reported purchase behavior, the study addresses a common critique in TPB-based research, that intention does not always translate into action. By capturing both constructs, the study affirms the role of intention as a significant predictor of behavior while also highlighting the importance of bridging intention-behavior gaps through enhancing perceived control and product value. This more holistic approach contributes to the theoretical development of behavior change models and underscores the need to account for downstream behavioral outcomes when studying environmentally relevant consumer actions.

Managerial Implications

This study offers several important managerial implications for manufacturers, marketers, and policymakers attempting to promote the adoption of eco-labeled products, particularly within emerging markets such as Vietnam. First, the findings highlight the strategic importance of information transparency and consumer education. Given the significant influence of environmental consciousness and attitude on purchase intention, organizations should prioritize clear and standardized labeling of eco-labeled products. Including nutritional information, such as calorie content, protein levels, and shelf life, can enhance perceived product credibility and inform consumers of the associated health and environmental benefits. Beyond packaging, firms should invest in awareness-building campaigns that extend beyond traditional advertising. Educational initiatives conducted through schools, workplaces, and community groups can foster pro-environmental attitudes and reinforce sustainable consumption norms. Furthermore, leveraging social influence by engaging key opinion

leaders, such as family members, colleagues, educators, and public figures, can amplify the diffusion of green consumption behaviors through peer networks.

Second, the study reveals that perceived product value significantly moderates the connection between purchase intention and actual buying actions. Consumers are more likely to translate intention into action when they perceive eco-labeled products as offering functional, emotional, or symbolic value. To capitalize on this, marketers should position eco-labeled products as not only environmentally responsible but also as premium goods that confer social status or personal distinction. Product design, packaging aesthetics, and brand storytelling should emphasize quality, prestige, and contribution to societal well-being. Campaigns that frame sustainable consumption as a sophisticated, desirable, and impactful lifestyle choice may resonate particularly well with aspirational and values-driven consumer segments.

Third, the positive association between perceived behavioral control and purchase intention underscores the need to minimize structural and psychological barriers to green purchasing. Retailers and distributors play a critical role in enhancing product accessibility by ensuring that eco-labeled options are widely available across retail channels, including supermarkets, convenience stores, and e-commerce platforms. Strategies such as competitive pricing, prominent in-store displays, clear eco-labeling signage, and user-friendly shopping environments can reduce consumer effort and increase the likelihood of purchase. Furthermore, government and industry collaboration could lead to infrastructure improvements and policy incentives that support the broader availability and affordability of eco-labeled products.

In sum, a multi-faceted approach that integrates education, value-based positioning, and operational accessibility can significantly enhance consumer engagement with eco-labeled products. These insights offer practical guidance for stakeholders seeking to foster sustainable consumption behavior and drive the growth of the green economy.

Limitations and Recommendations for Future Research

Despite offering valuable insights, this study is subject to several limitations that should be acknowledged. First, the use of a convenience sampling method, restricted to respondents within Vietnam, may limit the external validity of the findings. Practical considerations, including time and budget constraints, influenced the decision to adopt this sampling strategy. However, convenience sampling is inherently prone to sampling bias, as it may not adequately represent the broader Vietnamese consumer population. Consequently, generalizations of the results should be made with caution.

Second, while the study provides a robust examination of the determinants influencing eco-labeled product purchase behavior, it does not delve deeply into the underlying motivations that drive such behavior. Future research would benefit from incorporating qualitative or mixed-method approaches to uncover the psychological, cultural, and emotional factors that shape consumers' environmental decision-making. Specifically, future studies could investigate how various types of perceived benefits, such as social approval, health and safety concerns, personal satisfaction, and broader environmental impacts, interact to influence green purchasing intentions.

Third, expanding the research beyond a single-country context would enhance the generalizability and cross-cultural relevance of the findings. Comparative studies using identical constructs across multiple countries could uncover variations in green consumer behavior shaped by cultural, economic, or regulatory factors. Such cross-national investigations would contribute to a more comprehensive understanding of global environmental consumerism and help identify culturally specific or universal drivers of sustainable consumption.

Lastly, this study examined eco-labeled products as a general category. Future research could adopt a more granular approach by focusing on specific product segments such as organic food, sustainable fashion, or eco-friendly household goods. Differentiating between product types could reveal category-specific consumer preferences, barriers, and motivators, thus offering more targeted implications for marketers and policymakers aiming to promote sustainable consumption within particular industries.

CONCLUSION

The present study contributes to the growing body of literature on sustainable consumer behavior by empirically examining the factors influencing the purchase intention and behavior toward eco-labeled products within the Vietnamese context. Grounded in the Theory of Planned Behavior and extended with constructs such as environmental consciousness, eco-labeling information, perceived product value, and self-

efficacy, the research provides a comprehensive framework for understanding green purchase decisions. The findings confirm the significant roles of subjective norms, attitude, and perceived behavioral control in shaping consumers' intentions, with environmental consciousness serving as a critical antecedent. Moreover, the moderating effects of eco-labeling information, product value, and self-efficacy underscore the importance of contextual and psychological factors in facilitating the transition from intention to actual behavior.

By integrating both mediation and moderation mechanisms, this study offers nuanced insights that can inform both academic inquiry and practical strategies for promoting environmentally responsible consumption. Policymakers, marketers, and sustainability advocates can leverage these findings to design targeted interventions that enhance consumer engagement with eco-labeled products. Nevertheless, the study's limitations, particularly regarding sampling and generalizability, highlight the need for continued research across diverse cultural and product contexts. As global environmental challenges intensify, understanding the drivers of sustainable consumption remains both a theoretical and practical imperative.

Consent to participate
Informed consent was secured from every individual participant involved in the research.

Funding
There was no financial sponsorship for the research, authorship, or publication of this article.

Declaration of Conflicting Interests
There are no conflicts of interest to declare in relation to this research and its publication.

Data Availability Statement
Raw datasets used in this study are available from the corresponding author upon reasonable request.

REFERENCES

1. Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179-211.
2. Akter, S., D'Ambra, J., & Ray, P. (2011). Trustworthiness in mHealth information services: An assessment of a hierarchical model with mediating and moderating effects using partial least squares (PLS). *Journal of the American Society for Information Science and Technology*, *62*(1), 100-116.
3. Alam, S. S., Ho, Y. H., Ahmed, S., & Lin, C. Y. (2024). Predicting eco-labeled product buying behavior in an emerging economy through an extension of theory of planned behavior. *Revista de Gestao Social e Ambiental*, *18*(9), 1-34.
4. Alam, S. S., Wang, C. K., Masukujjaman, M., Ahmad, I., Lin, C. Y., & Ho, Y. H. (2023). Buying behaviour towards eco-labelled food products: Mediation moderation analysis. *Sustainability*, *15*(3), 2474.
5. Alam, S.S., Masukujjaman, M., Lin, C. Y., Omar, N. A., Na, M., & Othman, A. S. (2022). Factors affecting photo voltaic solar energy usage intention in rural households in Bangladesh: A structural equation modelling approach. *Environmental and Climate Technologies*, *26*(1), 276-293.
6. Altawallbeh, M., Soon, F., Thiam, W., & Alshourah, S. (2015). The mediating role of attitude, subjective norm, and perceived behavioral control in the relationships between their respective salient beliefs and behavioral intention to adopt e-learning among instructors in Jordanian Universities. *Journal of Education and Practice*, *6*(11), 152-160.
7. Armitage, C. J., & Conner, M. (1999). Distinguishing perceptions of control from self-efficacy: Predicting consumption of a low-fat diet using the theory of planned behavior. *Journal of Applied Social Psychology*, *29*, 72-90.
8. Asan, S., Gabriel, D. S., Purba, J. T., & Berlianto, M. P. (2024). The drivers of green brand evangelism: The mediation role of green brand experience. *Revista de Gestao Social e Ambiental*, *18*(8), e06217, 1-24.
9. Asih, D., Setini, M., Soelton, M., Muna, N., Putra, I., Darma, D., & Judiarni, J. (2020). Predicting green product consumption using theory of planned behavior and reasoned action. *Management Science Letters*, *10*(14), 3367-3374.
10. Atkinson, L., & Rosenthal, S. (2014). Signaling the green sell: The influence of eco-label source, argument specificity, and product involvement on consumer trust. *Journal of Advertising*, *43*(1), 33-45.
11. Biswas, A., & Roy, M. (2015). Green products: an exploratory study on the consumer behavior in emerging economies of the East. *Journal of Cleaner Production*, *87*, 463-468.
12. Carlson, A., & Palmer, C. (2016). A qualitative meta-synthesis of the benefits of eco-labeling in developing countries. *Ecological Economics*, *127*, 129-145.
13. Chen, K., & Deng, T. (2016). Research on the green purchase intentions from the perspective of product knowledge. *Sustainability*, *8*(9), 943.
14. Chen, Y., & Chang, C. (2012). Enhance green purchase intentions: The roles of green perceived value, green perceived risk, and green trust. *Management Decision*, *50*(3), 502-520.
15. Chi, N. T. K. (2021). Understanding the effects of eco-label, eco-brand, and social media on green consumption intention in ecotourism destinations. *Journal of Cleaner Production*, *321*, 128995.
16. Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenue for further research. *Journal of Applied Social Psychology*, *28*, 1429-1464.
17. De Canniere, M. H., De Pelsmacker, P. and Geuens, M. (2010). Relationship quality and purchase intention and behavior: The moderating impact of relationship strength. *Journal of Business and Psychology*, *25*(1), 87-98.

18. Doshanov, A. and Ahmad, Z. A. (2015). Customers' intention to use green products: The impact of green brand dimensions and green perceived value. *SHS Web of Conferences*, 18(01008), 1-16.

19. Droms, C. M., & Craciun, G. (2014). The impact of attitudinal ambivalence on weight loss decisions: Consequences and mitigating factors. *Journal of Consumer Behaviour*, 13(4), 303-315.

20. Eagly, A.H., & Chaiken, S. (1993). *The Psychology of Attitudes*; Harcourt Brace Jovanovich College Publishers: New York, NY, USA.

21. Falk, R. F., & Miller, N. B. (1992). *A Primer for Soft Modelling*. University of Akron Press, Akron, OH.

22. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.

23. Fu, F. Q., & Elliott, M. T. (2013). The moderating effect of perceived product innovativeness and product knowledge on new product adoption: An integrated model. *Journal of Marketing Theory and Practice*, 21(3), 257-272.

24. Furner, C. P., Zinko, R., & Zhu, Z. (2018). Examining the role of mobile self-efficacy in the word-of-mouth/mobile product reviews relationship. *International Journal of E-Services and Mobile Applications*, 10 (4), 40-60.

25. Garbarino, E., & Johnson, M. S. (1999). The different roles of satisfaction, trust, and commitment in customer relationships. *Journal of Marketing*, 63(2), 70-87.

26. Giampietri, E., Verneau, F., Del Giudice, T., Carfora, V., & Finco, A. (2018). A theory of planned behaviour perspective for investigating the role of trust in consumer purchasing decision related to short food supply chains. *Food Quality and Preference*, 64, 160-166.

27. Godin, G., Gagné, C., & Sheeran, P. (2004). Does perceived behavioural control mediate the relationship between power beliefs and intention?. *British Journal of Health Psychology*, 9(4), 557-568.

28. Gosselt, J.F., van Rompay, T., & Haske, L. (2017). Won't get fooled again: The effects of internal and external CSR eco-labeling. *Journal of Business Ethics*, 155, 1-12.

29. Hair Jr, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks: Sage Publications.

30. Han, H., & Yoon, H. J. (2015). Hotel customers' environmentally responsible behavioral intention: Impact of key constructs on decision in green consumerism. *International Journal of Hospitality Management*, 45, 22-33.

31. Harman, H. H. (1967). *Modern Factor Analysis*. University of Chicago Press, Chicago.

32. Henseler, J., Ringle, C.M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modelling. *Journal of the Academy of Marketing Science*, 43(1), 115-135.

33. Homburg, C., Koschate, N., & Hoyer, W. D. (2005). Do satisfied customers really pay more? A study of the relationship between customer satisfaction and willingness to pay. *Journal of Marketing*, 69(2), 84-96.

34. Homer, P. M., & L. R. Kahle (1998). A structural equation test of the value-attitude-behavior hierarchy, *Journal of Personality and Social Psychology*, 54 (4), 638-646

35. Hsu, Y. P., & Chan, F. (2015). Surveying data on consumer green purchasing intention: A case in New Zealand. *International Journal of Business and Social Research*, 5(5), 1-14.

36. Irianto, H. (2015). Consumers' attitude and intention towards organic food purchase: An extension of theory of planned behavior in gender perspective. *International Journal of Management, Economic and Social Sciences*, 4(1), 17-31.

37. Jaiswal, D., & Kant, R. (2018). Green purchasing behaviour: A conceptual framework and empirical investigation of Indian consumers. *Journal of Retailing and Consumer Services*, 41, 60-69.

38. Jin, J., Zhao, Q., & Santibanez-Gonzalez, E. D. (2020). How Chinese consumers' intentions for purchasing eco-labeled products are influenced by psychological factors. *International Journal of Environmental Research and Public Health*, 17(1), 265.

39. Kleinbaum, D. G., Kupper, L. L., & Muller, K. E. (1988). *Applied Regression Analysis and Other Multivariable Methods*. USA: PWS Publishing Co. Boston, MA.

40. Ko, S. B., & Jin, B. (2017). Predictors of purchase intention toward green-apparel products: A cross-cultural investigation in the USA and China. *Journal of Fashion Marketing and Management*, 21, 70-87.

41. Laheri, V. K., Lim, W. M., Arya, P. K., & Kumar, S. (2024). A multidimensional lens of environmental consciousness: towards an environmentally conscious theory of planned behavior. *Journal of Consumer Marketing*, 41(3), 281-297.

42. Laroche, M., Tomiuk, M. A., Bergeron, J., & Barbaro-Forleo, G. (2002). Cultural differences in environmental knowledge, attitudes, and behaviours of Canadian consumers. *Canadian Journal of Administrative Sciences*, 19(3), 267-282.

43. Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors? The mediating role of environmental attitudes and behavioral intentions. *Science of The Total Environment*, 728, 138126.

44. Nagar, V., & Verma, P. (2025). Assessing the influence of eco-labelling on consumer purchasing behavior: A review. *Revista Gestão & Tecnologia*, 25(2), 232-257.

45. Nguyen, A. T., Ha, V. D., Ngo, H. K., Le, N. A., Khong, P. M., Do, N. T. T., Trinh, M. T., Nguyen, T. D., Ngo, T. Q. K., Vu, L. C., Do, M. L. T., Le, A. T., Tran, B. M., & Nguyen, V. T. (2023). Understanding the importance of eco-labeling for organic foods at UNESCO biosphere reserves: A case study of the cocoa powder at the Dong Nai, Vietnam. *Sustainability*, 15(12), 9603.

46. Nhu, N.T., My, D.V., & Thu, N.T.K. (2019). Determinants affecting green purchase intention: A case of Vietnamese consumers. *Journal of Management Information and Decision Sciences*, 22(2), 136-147.

47. Nystrand, B. T., & Olsen, S. O. (2020). Consumers' attitudes and intentions toward consuming functional foods in Norway. *Food Quality and Preference*, 80 (103827), 1-11

48. Pagiaslis, A., & Krontalis, A. K. (2014). Green-consumption behavior antecedents: Environmental concern, knowledge, and beliefs. *Psychology & Marketing*, 31, 335-348.

49. Parkinson, J., David, P., & Rundle-Thiele, S. (2017). Self-efficacy or perceived behavioural control: Which influences consumers' physical activity and healthful eating behaviour maintenance? *Journal of Consumer Behavior*, 16, 413-423.

50. Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services*, 29, 123-134.

51. Peña-García, N., Gil-Saura, I., Rodríguez-Orejuela, A., & Siqueira-Junior, J. R. (2020). Purchase intention and purchase behavior online: A cross-cultural approach. *Heliyon* 6(6), e04284–11.

52. Pereira, B. M., da Silva, C. R. M., Sobreira, E. M. C., & Oliveira, L. V. C. (2022). Intention to purchase organic food with certification label: Do trust and coolness matter? *Revista de Gestao Social e Ambiental*, 16(3), 1-22.

53. Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., & Podsakoff, N.P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.

54. Polonsky, M. J., Vocino, A., Grau, S. L., Garma, R., & Ferdous, A. S. (2012). The impact of general and carbon-related environmental knowledge on attitudes and behaviour of US consumers. *Journal of Marketing Management*, 28(3-4), 238-263.

55. Povey, R., Conner, M., Sparks, P., James, R., & Shepherd, R. (2000). Application of the theory of planned behaviour to two dietary behaviours: Roles of perceived control and self-efficacy. *British Journal of Health Psychology*, 5, 121-139.

56. Prieto-Sandoval, V., Alfaro, J.A., Mejía-Villa, A., & Ormazabal, M. (2016). Eco-labels as a multidimensional research topic: Trends and opportunities. *Journal of Cleaner Production*, 135(3), 806-818.

57. Ramayah, T., Wai, J., Lee, C., & Lim, S. (2012). Sustaining the environment through recycling: An empirical study. *Journal of Environmental Management*, 102, 141-147.

58. Rex, E., & Baumann, H. (2007). Beyond eco-labels: what green marketing can learn from conventional marketing. *Journal of Cleaner Production*, 15(6), 567-576.

59. Ricci, E.C., Banterle, A., & Stranieri, S. (2018). Trust to go green: An exploration of consumer intentions for eco-friendly convenience food. *Ecological Economics*, 148, 54-65.

60. Ringle, C. M., Sarstedt, M., & Mooi, E. A. (2010). Response-based segmentation using finite mixture partial least squares theoretical foundations and an application to American customer satisfaction index data. *Atom Probe Tomography: Put Theory into Practice*, 8, 19-49.

61. Saleem, F., & Gopinath, C. (2013). Antecedents of Environmental Conscious Purchase Behaviors. *Journal of Science Research*, 14(7), 979-986.

62. Sang, Y. N., & Bekhet, H. A. (2015). Exploring factors influencing electric vehicle usage intention: An empirical study in Malaysia. *International Journal of Business and Society*, 16(1), 57-74.

63. Setyawan, A., Noermijati, N., Sunaryo, S., & Aisjah, S. (2018). Does green product consumption gendered? investigating among millennials in an emerging market. *KnE Social Sciences*.

64. Sillani, S., & Nassivera, F. (2015). Consumer behavior in choice of minimally processed vegetables and implications for marketing strategies. *Trends in Food Science & Technology*, 46, 339-345.

65. Song, Y., Qin, Z., & Yuan, Q. (2019). The impact of eco-label on the young Chinese generation: The mediation role of environmental awareness and product attributes in green purchase. *Sustainability*, 11(4), 973.

66. Patterson, P. G., & Spreng, R. A. (1997). Modelling the relationship between perceived value, satisfaction and repurchase intentions in a business-to-business, services context: An empirical examination. *International Journal of Service Industry Management*, 8(5), 414-434.

67. Suki, N. M. (2014). Investigating the measurement of consumer ecological behaviour, environmental knowledge, healthy food, and healthy way of life. *International Journal of Social Ecology and Sustainable Development*, 5(1), 12-21.

68. Tang, H., Rasool, Z., Khan, M. A., Khan, A. I., Khan, F., Ali, H., & Abbas, S. A. (2021). Factors affecting e-shopping behaviour: Application of theory of planned behaviour. *Behavioural Neurology*, 2021.

69. Teng, Y. M., Wu, K. S., & Liu, H. H. (2014). Integrating altruism and the theory of planned behavior to predict patronage intention of a green hotel. *Journal of Hospitality and Tourism Research*, 39(3), 299-315.

70. Velasco, F., Itani, O. S., & Cajina, P. (2024). Ecolabel persuasion effect across cultures: a comprehensive meta-analysis. *International Marketing Review*, 41(6), 1190-1217.

71. Verma, V. K., & Chandra, B. (2018). Intention to implement green hotel practices: Evidence from Indian hotel industry. *International Journal of Management Practice*, 11(1), 24-41.

72. Wang, H. J. (2022). Antecedents of behavioral intentions for green city tourists. *Environment, Development, and Sustainability*, 24(1), 377-398.

73. Wee, C. S., Ariff, M.S.B.M., Zakuan, N., Tajudin, M.N.M., Ismail, K., & Ishak, N. (2014). Consumers perception, purchase intention and actual purchase behavior of organic food products. *Review of Integrative Business & Economics Research*, 3(2), 378-397.

74. Xu, Y., Du, J., Khan, M.A.S., Jin, S., Altaf, M., Anwar, F., & Sharif, I. (2022). Effects of subjective norms and environmental mechanism on green purchase behavior: An extended model of theory of planned behavior. *Frontiers of Environmental Science*, 10, 779629.

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

76. Yadav, R., & Pathak, G. S. (2017). Determinants of consumers' green purchase behavior in a developing nation: Applying and extending the theory of planned behavior. *Ecological Economics*, 134, 114-122.

77. Yap, S. F., & Lee, C. K. C. (2013). Does personality matter in exercise participation? *Journal of Consumer Behaviour*, 12(5), 401-411.

78. Yen, C. H., & Teng, H. Y. (2015). Celebrity involvement, perceived value, and behavioral intentions in popular media-induced tourism. *Journal of Hospitality & Tourism Research*, 39(2), 225-244

79. Yu, S., & Lee, J. (2019). The effects of consumers' perceived values on intention to purchase upcycled products. *Sustainability*, 11(4), 1034.

80. Zhang, D., Huang, G., Yin, X., & Gong, Q. (2015). Residents' waste separation behaviors at the source: Using SEM with the theory of planned behavior in Guangzhou, China. *International Journal of Environmental Research and Public Health*, 12, 9475.

81. Zheng, G.W., Akter, N., Siddik, A.B., & Masukujjaman, M. (2021). Organic foods purchase behavior among generation Y of Bangladesh: The moderation effect of trust and price consciousness. *Foods*, 10, 2278.