RESEARCH | Article in Press

Understanding green purchase intention among young consumers in an emerging market through social media influence, environmental awareness, and psychological mechanisms

Dang Thien Tam · Nguyen Thi Ly Na · Tran Anh Tuan · Nguyen Thi Thao · Nguyen Thi Thu Phuong · Mai Xuan Binh · Ngo Minh Hiep · Pham Thi Quynh Le · Hai Nguyen Ngoc Dang

Received: 30 April 2026 / Accepted: 9 September 2026

Abstract

Social media (SM) plays an important role in promoting sustainable consumption, especially among young consumers in emerging economies. However, previous studies have often focused on developed markets or examined only one psychological pathway at a time. Less is known about how SM shapes green purchase intention (GPI) through several mechanisms or whether green environmental awareness (GEA) changes these relationships. We analysed survey data from 936 consumers aged 18–30 in Da Nang, Vietnam, using an integrated stimulus-organism-response and theory of planned behaviour framework. SM was positively associated with GPI directly (β = 0.123) and indirectly through attitude, subjective norms, perceived green product value, and perceived behavioural control. All four indirect effects were significant (β = 0.046–0.095). GEA had the largest direct association with GPI (β = 0.322), and the model explained 74.7% of the variance in GPI. Two interactions were significant in the primary model, but neither was supported in the post hoc content-screened sensitivity model. Importance-performance map analysis showed that SM and GEA had the largest model-based total effects on GPI. These findings support testing credible SM communication and value-based messages as practical strategies to strengthen GPI, rather than assuming greater GEA will consistently amplify existing psychological pathways.

Keywords Social media · Green purchase intention · Green environmental awareness · Perceived green product value · Young consumers

Abbreviations

AT	Attitude
AVE	Average variance extracted
GEA	Green environmental awareness
GPI	Green purchase intention

Published online: 19 September 2026

HTMT	Heterotrait-monotrait ratio
PBC	Perceived behavioural control
PGPV	Perceived green product value
PLS-SEM	Partial least squares structural equation modelling
SN	Subjective norms
SM	Social media
S-O-R	Stimulus-organism-response
TPB	Theory of planned behaviour
VIF	Variance inflation factor

1 Introduction

Social media (SM) has become an important source of information about environmentally friendly products, particularly among young consumers [1, 2]. However, greater exposure to green content does not necessarily translate into stronger green purchase intention (GPI). Consumers may respond differently depending on whether SM changes their attitude (AT), makes subjective norms (SN) more salient, improves perceived green product value (PGPV), or reduces barriers reflected in perceived behavioural control (PBC) [3, 4]. The credibility of green claims further complicates this process because greenwashing, commercially motivated endorsements, and unverified environmental messages may generate scepticism rather than persuasion [5–7].

Existing research generally supports an association between SM and GPI [2, 3, 8], but much of this literature examines either a direct relationship or a limited number of psychological pathways. Studies have commonly focused on one psychological mechanism at a time rather than examining how several mechanisms operate concurrently [2, 3, 9, 10]. This approach provides only a partial account of the process. AT, SN, PBC, and PGPV represent conceptually distinct evaluations that may simultaneously link SM with GPI [4, 5, 11–13].

The stimulus-organism-response (S-O-R) framework provides an overarching structure for examining this process by distinguishing external stimuli, internal evaluations, and behavioural responses [14]. Within this structure, SM can be positioned as the stimulus, while AT, SN, PBC, and PGPV represent organism-level evaluations associated with GPI. The theory of planned behaviour (TPB) identifies AT, SN, and PBC as key predictors of intention [11, 15], whereas consumption value theory supports the inclusion of PGPV as an appraisal of the benefits associated with a product [12, 13]. Integrating these perspectives therefore allows the direct and parallel indirect associations between SM and GPI to be examined within a single model.

The role of green environmental awareness (GEA) is less certain. Higher GEA is generally associated with stronger GPI and has sometimes been proposed as a moderator of the relationships between psychological evaluations and intention [16–19]. The usual expectation is that GEA makes environmental consequences more salient and therefore strengthens the influence of AT, SN, PGPV, and PBC. However, higher GEA may also encourage consumers to scrutinise environmental claims more critically, particularly when such claims lack independent verification [5, 7, 17]. It is therefore unclear whether GEA strengthens all four relationships uniformly.

Vietnam provides a relevant setting for examining these relationships. SM use and social-commerce participation are widespread, while consumers continue to weigh environmental considerations against price, product value, and the credibility of green claims [20, 21]. Previous Vietnam-based studies have examined GPI through the TPB, social influence, PGPV, and related mechanisms, but evidence integrating these pathways within a unified SM model remains limited [9, 22, 23]. Da Nang is also a relevant setting because the city has pursued a long-term environmental development programme, while evidence concerning GPI in this local context remains limited [23, 24].

This study therefore integrates the S-O-R framework and the TPB to examine GPI among young consumers in Da Nang. It investigates whether SM is associated with GPI directly and indirectly through AT, SN, PGPV, and

PBC. It also tests whether GEA consistently strengthens the associations between these psychological evaluations and GPI. By examining these mechanisms simultaneously, the study seeks to distinguish relatively stable parallel pathways from moderation patterns that may depend on measurement specification.

2 Literature review

2.1 Theory of planned behaviour

The TPB proposes that behavioural intention is the most immediate psychological antecedent of behaviour and is shaped by AT, SN, and PBC [11, 15]. AT reflects whether performing a behaviour is evaluated favourably, SN captures perceived expectations from important others, and PBC represents the perceived ease or difficulty of performing the behaviour. These constructs are widely used to explain green consumption because purchasing environmentally friendly products involves evaluative, social, and feasibility-related considerations [4, 16].

The TPB identifies the proximal predictors of GPI but does not specify how exposure to a digital information environment shapes them. SM may affect the information consumers receive, the expectations they perceive, the value they assign to green products, and their assessment of purchasing feasibility [2, 3]. The S-O-R framework is therefore used to position SM as the external stimulus associated with these internal evaluations.

2.2 Integrating the theory of planned behaviour within the stimulus-organism-response framework

The S-O-R framework distinguishes an external stimulus, the internal states through which it is processed, and the resulting response [14, 25, 26]. In the present model, SM represents the stimulus; AT, SN, PGPV, and PBC form the organism component; and GPI represents the response.

This classification is based on the function of each construct rather than its theoretical origin. AT reflects an internal evaluation of green purchasing, while SN captures the individual's perception of social expectations [11]. PBC also represents a subjective appraisal rather than objective control: although price, resources, and availability are external conditions, PBC concerns consumers' perceived ability to act under those conditions [11, 27]. SM may shape this perception by reducing informational uncertainty and making purchasing options more visible [28, 29].

PGPV originates in consumption value theory but performs the same organism-level function. Perceived value reflects an overall evaluation of what is received relative to what is given [12]. In green consumption, this evaluation may incorporate functional, economic, social, and environmental benefits [5, 13]. PGPV can therefore operate alongside the TPB constructs as an internal appraisal linking SM with GPI. By contrast, GEA is treated as a relatively stable individual difference rather than as a state directly produced by the focal SM stimulus. It is therefore modelled as both a predictor and a moderator [17–19].

2.3 Green purchase intention

GPI refers to a consumer's intention to prioritise environmentally friendly products over conventional alternatives [5, 30]. It represents motivational readiness rather than observed purchasing behaviour [11, 15]. Although intention does not guarantee subsequent action, it remains the most immediate response examined in the proposed model.

2.4 Hypothesis development

2.4.1 Social media and green purchase intention

SM platforms expose consumers to environmental information, product recommendations, peer opinions, and marketing messages [1, 2]. Such exposure may increase the salience of green consumption, facilitate product comparison, and make environmentally responsible choices more socially visible [8, 31, 32].

The influence of SM is not necessarily favourable. Greenwashing, commercially motivated endorsements, and unsupported environmental claims may generate scepticism and reduce the persuasive value of online content [6, 7]. Consumers may consequently respond less to exposure itself than to whether the information changes how they evaluate green products and their ability to purchase them. SM may support favourable AT by communicating environmental and personal benefits, strengthen SN by increasing the visibility of peer expectations, enhance PGPV by facilitating comparisons of product benefits, and increase PBC by reducing search-related and informational barriers [3, 8, 28, 29]. Vietnam-based evidence similarly links SM and digitally visible social influence with green consumption-related evaluations and intentions [9, 10].

Accordingly, SM is expected to be associated with GPI both directly and through the four organism-level constructs.

H1 *SM is positively associated with GPI among young consumers.*

H1a–H1d *SM is positively associated with AT (H1a), SN (H1b), PGPV (H1c), and PBC (H1d).*

H1.1–H1.4 *SM has a positive indirect association with GPI through AT (H1.1), SN (H1.2), PGPV (H1.3), and PBC (H1.4).*

2.4.2 Attitude

AT reflects a favourable or unfavourable evaluation of green purchasing [11]. Consumers who regard green products as beneficial, responsible, or consistent with their values should report stronger GPI. Previous studies have repeatedly identified a positive association between AT and GPI [4, 33, 34]. However, favourable evaluations may be constrained by price and doubts about unsupported environmental claims [21]. Evidence from Da Nang also suggests that AT is relevant but may not be more influential than PGPV or PBC [23].

H2a *AT is positively associated with GPI among young consumers.*

2.4.3 Subjective norms

SN captures perceived expectations from important others concerning green purchasing [11, 35]. Family members, friends, and peers may signal whether environmentally responsible consumption is socially approved [4, 36]. SM may make these expectations more salient by increasing the visibility of recommendations, peer behaviour, and community discussions [3, 8]. Vietnam-based studies likewise indicate that family, peer, and socially visible influences are associated with sustainable purchasing intentions among younger consumers [9, 10].

H2b *SN is positively associated with GPI among young consumers.*

2.4.4 Perceived green product value

PGPV reflects consumers' overall evaluation of the benefits of a green product relative to its monetary and non-monetary costs [5, 12]. These benefits may include product quality, functional utility, long-term value, and environmental contribution [13, 36, 37]. Consumers should report stronger GPI when the perceived benefits justify the product's price, search effort, and purchase risk. Positive associations between PGPV and GPI have been reported across green-consumption settings, including Vietnam [22, 23, 38–40].

H2c *PGPV is positively associated with GPI among young consumers.*

2.4.5 Perceived behavioural control

PBC reflects consumers' perceived ability to perform green purchasing [11, 27]. This perception may depend on available information, time, affordability, product access, and confidence in identifying credible green alternatives. Green purchasing may be perceived as difficult when products are expensive, hard to find, or supported by unclear environmental claims [22, 41]. Although SM cannot remove all external constraints, it may reduce informational and search-related barriers by providing product information, user experience, and peer guidance [28, 29]. Higher PBC should therefore be associated with stronger GPI.

H2d *PBC is positively associated with GPI among young consumers.*

2.4.6 Green environmental awareness

GEA reflects recognition of environmental problems and understanding of the relevance of individual consumption choices to environmental outcomes [42, 43]. Consumers with higher GEA may pay more attention to the consequences of purchasing and be more motivated to consider environmentally friendly alternatives. Previous studies have consequently reported positive relationships between GEA and green consumption intention or behaviour [17–19].

H3 *GEA is positively associated with GPI among young consumers.*

GEA may also alter the strength of the relationships between the four organism-level constructs and GPI. Higher GEA may make favourable levels of AT and environmental product benefits more personally relevant, increase responsiveness to pro-environmental expectations, and encourage consumers to act on available purchasing opportunities [17–19]. However, GEA may also increase scrutiny of unsupported green claims, so its moderating role may differ across pathways [5, 7]. This issue is particularly relevant in Vietnam, where environmental concern coexists with price sensitivity and concerns about claim credibility [9, 21]. The four moderating relationships are therefore tested separately, while retaining the theoretically expected positive direction.

H3.1–H3.4 *GEA positively moderates the associations of AT (H3.1), SN (H3.2), PGPV (H3.3), and PBC (H3.4) with GPI, such that each positive association is stronger at higher levels of GEA.*

3 Research model

Figure 1 summarises the proposed model. SM is positioned as the stimulus; AT, SN, PGPV, and PBC as parallel organism-level evaluations; and GPI as the response. The model includes a direct SM-GPI association, four indirect associations through the organism-level constructs, a direct GEA-GPI association, and four interaction terms between GEA and the organism-level constructs.

4 Research methodology

This cross-sectional survey examined GPI among young consumers in Da Nang, Vietnam. Partial least squares structural equation modelling (PLS-SEM) was used to estimate direct, indirect, and interaction associations. Importance-performance map analysis was additionally conducted to examine the model-based importance and performance of the constructs associated with GPI.

4.1 Data collection process

Purposive sampling, supplemented by participant referral, was used to recruit young consumers in Da Nang [44]. Respondents were eligible if they were aged 18 to 30 and lived in Da Nang, Vietnam. The questionnaire was administered in Vietnamese between June and November 2025 in two formats, an online form and a paper version completed in person. Respondents were reached through university student groups and clubs, community groups on Facebook and Zalo, in-person distribution at public locations, and referral by earlier participants. All items used a five-point Likert scale. Participation was voluntary and anonymous, and all respondents gave

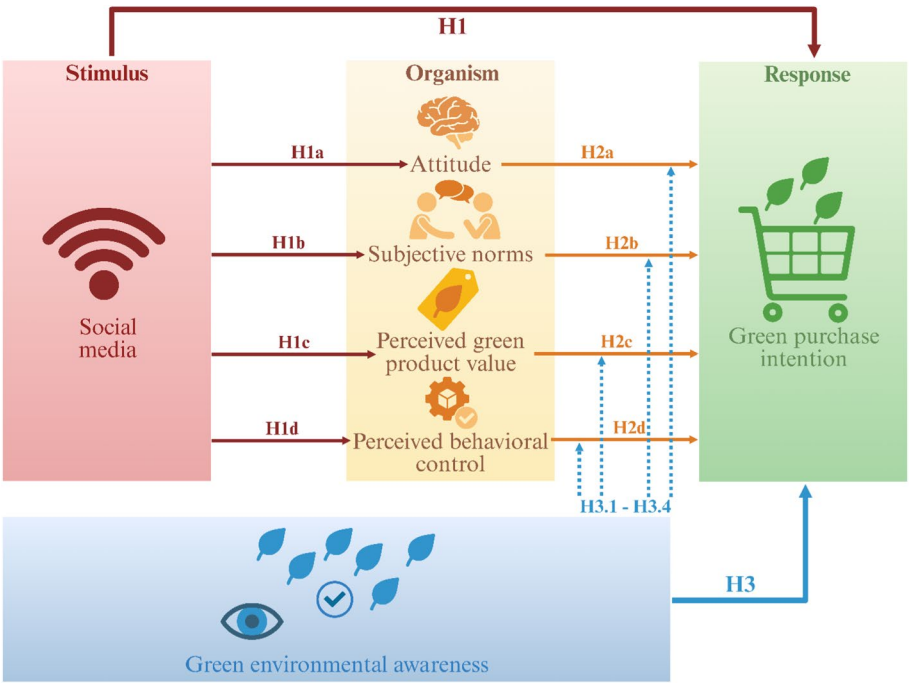

Fig. 1 Research model. *Note* H1.1-H1.4 represent the four indirect associations formed by the corresponding H1a-H1d and H2a-H2d component paths

informed consent. Ethics approval was granted by the Research Ethics Committee of Duy Tan University (No. DTU/REC2025/NHH08).

A total of 1000 responses were collected. Responses were screened for completeness, duplicates, uniform responding, and multivariate outliers on the Mahalanobis distance ($p < 0.001$). Sixty-four responses were excluded, leaving 936 valid cases. Pilot respondents were not included in the main sample.

The sample was predominantly female (69.1%), aged 20 to under 25 (62.4%), and living mainly in central Da Nang (94.9%). Monthly income was most often between 3 and 7 million Vietnamese dong (37.2%). Full demographic characteristics appear in Supplementary Table S1.

4.2 Sample size

Sample adequacy was assessed using two approaches. With a minimum expected path coefficient of 0.15, the inverse square root method required 580 cases at $\alpha = 0.05$ and power = 0.95 [45]. As a cross-check, G*Power 3.1 required 172 cases for a fixed-model linear multiple regression (R^2 deviation from zero) with ten predictors (SM, AT, SN, PGPV, PBC, GEA, and four interaction terms) at $f^2 = 0.15$, $\alpha = 0.05$, and power = 0.95 [46]. A target of 1000 responses was set in advance to exceed both requirements and to allow for losses at screening. After data screening, 936 valid responses were retained, which satisfies the more conservative of the two criteria.

4.3 Measurement procedure

All constructs were measured with multi-item reflective scales adapted from validated instruments. Item wording was adjusted to the green-product context and to young Vietnamese consumers. The instrument comprised 45 items rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Items for SM were adapted from Xie and Madni [3] and Sun and Xing [8], yielding eight items. The six AT items came from Jaiswal and Kant [47], Mohd Suki [39], and Chen and Deng [36]. The five SN items came from Paul et al. [4] and Taylor and Todd [35]. The six items for PGPV came from Mohd Suki [39] and Chen and Deng [36]. The five items for PBC came from Chen and Deng [36] and Ajzen [27]. The eight items for GEA were adapted from the ecological attitude and environmental concern scales of Ellen et al. [48], Maloney et al. [49], and Weigel and Weigel [50]. The seven items for GPI came from Chen and Deng [36]. Full item wording appears in Supplementary Table S2.

The original English items were translated into Vietnamese by bilingual members of the research team and reconciled by discussion. Semantic equivalence and item clarity were assessed during the pretest. The instrument was refined in two stages. In the pretest ($n = 30$), young consumers from the target population reviewed each item for clarity and flagged ambiguous or double-barrelled wording. Complex items were simplified and localised, and the negatively worded item AT2 was confirmed to be understood as intended. In the pilot ($n = 95$), preliminary reliability was satisfactory and all 45 items were retained. These design-stage procedures were intended to reduce ambiguity-related response error and one potential source of common method bias [51].

Following estimation of the primary model, we conducted a post hoc item-content audit to examine whether the findings were sensitive to items that could reflect neighbouring constructs (Supplementary Table S3). AT2 was reverse-coded before analysis so that higher scores represented a more favourable level of AT. PBC3 and PBC4 were written as facilitating conditions; the audit retained PBC3 but removed PBC4. GEA7 was judged to overlap with PGPV. Items selected for exclusion were removed in a post hoc content-screened sensitivity model, while SM3 and SM4 were reinstated to preserve content coverage because their loadings were close to 0.70. The resulting alternative specification was used only to evaluate robustness and was not treated as a newly validated measurement model (Supplementary Table S4).

4.4 Statistical analysis

PLS-SEM models were estimated using SmartPLS 4.1.0.9. This approach was used to estimate direct associations, parallel indirect effects, interaction terms, and construct-level importance within a single prediction-oriented framework [52, 53]. The choice does not imply that PLS-SEM resolves model misspecification or establishes superior predictive performance. Multivariate normality was checked with Mardia's test as a data description, not as the basis for selecting the estimator [54].

The measurement model was assessed first, using outer loadings, Cronbach's alpha, rho_A, composite reliability, average variance extracted (AVE), and the variance inflation factor (VIF) [52, 55]. Discriminant validity used the Fornell-Larcker criterion and the heterotrait-monotrait ratio (HTMT), with HTMT as the primary criterion [56]. Model fit used the standardised root mean square residual, squared Euclidean distance, geodesic distance, and normed fit index, and the bootstrap exact-fit test [57]. The structural model was evaluated using bootstrapping with 5000 subsamples and bias-corrected and accelerated 95% confidence intervals [58]. Statistical significance was judged using the bootstrap confidence interval. An effect was treated as significant only when its interval excluded zero. Indirect effects used the same procedure. Moderation used the two-stage approach with mean-centred latent variable scores. Johnson-Neyman analyses were conducted using these scores exported from the two-stage PLS-SEM moderation model [59, 60]. Explanatory power used R^2 and f^2 [61]. Predictive relevance used Q^2 predict from PLSpredict with ten folds and ten repetitions, together with root mean square error and mean absolute error [62]. Prediction errors were not benchmarked against a linear model, so no claim is made about the magnitude of out-of-sample predictive power. Importance-performance map analysis combined total effects with construct performance scores.

Common method variance was assessed using procedural remedies during questionnaire development and administration, inner VIF values, and a full-collinearity test using a randomly generated variable [63]. Robustness was examined using a post hoc content-screened specification, consistent PLS-SEM estimation, and random split-sample re-estimation. The original model remained the primary analysis because it reflected the administered instrument, whereas the content-screened specification was treated as a sensitivity analysis because item-removal decisions were made after data collection.

5 Results

Multivariate normality was not supported (Mardia's test, $p < 0.001$). Item-level descriptive statistics appear in Supplementary Table S5.

5.1 Common method variance

Inner VIF values ranged from 1.000 to 2.748. In the full-collinearity assessment, VIF values ranged from 1.862 to 3.605, with the value for GPI exceeding the conservative benchmark of 3.3. Detailed results are reported in Supplementary Table S6.

5.2 Measurement model evaluation

All 45 items were administered in the main survey. Two SM indicators, SM3 and SM4, fell below the 0.700 loading threshold at 0.675 and 0.679. They were excluded, leaving 43 indicators in the final measurement model. As shown in Table 1, the retained loadings ranged from 0.700 to 0.833. All VIF values were below 3. Composite reliability ranged from 0.864 to 0.932. AVE ranged from 0.525 to 0.662. All estimates met the recommended thresholds.

Table 1 Assessment of reliability, convergent validity, and collinearity

Variables	Outer loadings	VIF	Cronbach's alpha	Dijkstra-Henseler's rho_A	Composite reliability (rho_C)	AVE
Social media (SM)						
SM1	0.700	1.573	0.819	0.819	0.869	0.525
SM2	0.723	1.633				
SM3	Excluded, loading = 0.675					
SM4	Excluded, loading = 0.679					
SM5	0.736	1.617				
SM6	0.751	1.730				
SM7	0.739	1.724				
SM8	0.700	1.558				
Attitude (AT)						
AT1	0.743	1.733	0.871	0.872	0.903	0.608
AT2	0.735	1.815				
AT3	0.793	2.062				
AT4	0.810	2.337				
AT5	0.809	2.355				
AT6	0.783	1.942				
Subjective norms (SN)						
SN1	0.758	1.878	0.850	0.853	0.893	0.626
SN2	0.806	2.176				
SN3	0.819	2.084				
SN4	0.814	1.999				
SN5	0.756	1.691				
Perceived green product value (PGPV)						
PGPV1	0.716	1.600	0.843	0.844	0.884	0.560
PGPV2	0.735	1.783				
PGPV3	0.755	1.870				
PGPV4	0.753	1.814				
PGPV5	0.766	1.840				
PGPV6	0.765	1.788				
Perceived behavioural control (PBC)						
PBC1	0.737	1.542	0.804	0.804	0.864	0.560
PBC2	0.754	1.667				
PBC3	0.760	1.648				
PBC4	0.750	1.652				
PBC5	0.742	1.606				
Green purchase intention (GPI)						
GPI1	0.764	2.165	0.915	0.916	0.932	0.662
GPI2	0.817	2.602				
GPI3	0.813	2.313				
GPI4	0.833	2.586				
GPI5	0.833	2.693				
GPI6	0.831	2.582				
GPI7	0.802	2.186				
Green environmental awareness (GEA)						
GEA1	0.717	1.769	0.897	0.899	0.918	0.582
GEA2	0.738	2.081				
GEA3	0.736	2.002				
GEA4	0.752	1.959				
GEA5	0.793	2.256				
GEA6	0.813	2.433				
GEA7	0.792	2.384				
GEA8	0.760	2.089				

Estimates are based on the 43 indicators retained in the final measurement model. SM3 and SM4 were removed following the initial measurement-model assessment because their outer loadings were 0.675 and 0.679, respectively. VIF, variance inflation factor; AVE, average variance extracted.

Table 2 Assessment of discriminant validity

Fornell-Larcker criterion	AT	GEA	GPI	PGPV	PBC	SM	SN
AT	0.780						
GEA	0.627	0.763					
GPI	0.684	0.769	0.814				
PGPV	0.634	0.665	0.696	0.748			
PBC	0.540	0.640	0.641	0.590	0.748		
SM	0.555	0.605	0.643	0.603	0.541	0.725	
SN	0.523	0.572	0.642	0.537	0.550	0.517	0.791
HTMT	AT	GEA	GPI	PGPV	PBC	SM	SN
AT							
GEA	0.707						
GPI	0.765	0.846					
PGPV	0.740	0.761	0.791				
PBC	0.645	0.752	0.747	0.716			
SM	0.656	0.705	0.742	0.726	0.667		
SN	0.605	0.652	0.726	0.634	0.664	0.618	

Bold diagonal values are the square roots of average variance extracted. HTMT values below 0.85 indicate adequate discriminant validity.

Table 3 Model fit indices

Index	Saturated model	Estimated model
SRMR	0.042	0.122
d_ULS	1.679	14.106
d_G	0.636	0.863
Chi-square	3470.877	4271.268
NFI	0.848	0.813

SRMR, standardised root mean square residual; d_ULS, squared Euclidean distance; d_G, geodesic distance; NFI, normed fit index. The saturated model allows all construct correlations to be freely estimated, whereas the estimated model imposes the hypothesised structural relationships.

Discriminant validity results appear in Table 2. The square root of the AVE exceeded the interconstruct correlations for 20 of 21 pairs. The exception was the GEA and GPI pair, where the correlation of 0.769 exceeded the square root of the AVE for GEA of 0.763 by 0.006. All HTMT values fell below 0.85. The highest was GEA and GPI at 0.846. Every bootstrap confidence interval excluded 1 (Supplementary Table S7). Discriminant validity was generally supported by HTMT, although the GEA-GPI pair narrowly failed the Fornell-Larcker criterion and approached the conservative HTMT threshold.

Model fit results appear in Table 3. For the saturated model, the standardised root mean square residual was 0.042, below the 0.08 benchmark. For the estimated model, the standardised root mean square residual was 0.122 and the normed fit index was 0.813. The bootstrap exact-fit test rejected both the saturated model and the estimated model (Supplementary Table S8). Further interpretation of these model-fit findings is provided in Sect. 8.

Table 4 reports the explanatory and predictive results. The R^2 values ranged from 0.376 to 0.747. GPI recorded the highest value at 0.747. The adjusted R^2 values were within 0.006 of the corresponding R^2 values. All Q^2 predict values were positive, ranging from 0.264 to 0.589. Root mean square error ranged from 0.643 to 0.860. Mean absolute error ranged from 0.491 to 0.686.

5.3 Hypothesis testing

Table 5 reports VIF values for the direct paths, while the complete results, including the interaction terms, appear in Supplementary Table S6.

Table 4 Explanatory power and predictive relevance

	R-square	*R*-square adjusted	Q^2 predict	RMSE	MAE
AT	0.425	0.424	0.305	0.836	0.657
PGPV	0.376	0.374	0.361	0.801	0.636
PBC	0.448	0.447	0.290	0.845	0.671
SN	0.420	0.418	0.264	0.860	0.686
GPI	0.747	0.741	0.589	0.643	0.491

Q^2 predict, predictive relevance obtained from the PLSpredict procedure; RMSE, root mean square error; MAE, mean absolute error. Values are reported at the construct level.

Table 5 Results of testing the hypothesis of direct effects

Hypotheses		Original sample (O)	T statistics	BCaCI	VIF	f^2	Decisions
H1	SM → GPI	0.123***	3.906	[0.061;0.185]	1.949	0.029	Supported
H1a	SM → AT	0.555***	20.484	[0.499;0.604]	1.000	0.445	Supported
H1b	SM → SN	0.517***	17.916	[0.459;0.573]	1.000	0.365	Supported
H1c	SM → PGPV	0.603***	25.150	[0.553;0.648]	1.000	0.572	Supported
H1d	SM → PBC	0.541***	19.599	[0.483;0.592]	1.000	0.414	Supported
H2a	AT → GPI	0.170***	5.893	[0.115;0.229]	2.083	0.051	Supported
H2b	SN → GPI	0.165***	5.788	[0.109;0.221]	1.840	0.054	Supported
H2c	PGPV → GPI	0.158***	4.808	[0.096;0.226]	2.382	0.038	Supported
H2d	PBC → GPI	0.086**	3.059	[0.028;0.139]	2.033	0.013	Supported
H3	GEA → GPI	0.322***	9.150	[0.256;0.391]	2.567	0.148	Supported

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$. BCaCI, bias-corrected and accelerated 95% confidence interval.

5.3.1 Results of testing the hypothesis of direct effects

SM was positively associated with AT (β = 0.555, t = 20.484), SN (β = 0.517, t = 17.916), PGPV (β = 0.603, t = 25.150), and PBC (β = 0.541, t = 19.599), supporting H1a-H1d. SM was also positively associated with GPI (β = 0.123, t = 3.906), supporting H1. AT (β = 0.170, t = 5.893), SN (β = 0.165, t = 5.788), PGPV (β = 0.158, t = 4.808), and PBC (β = 0.086, t = 3.059) were positively associated with GPI, supporting H2a-H2d. GEA was positively associated with GPI (β = 0.322, t = 9.150), supporting H3. Effect sizes were large for the associations of SM with PGPV, AT, PBC, and SN. The GEA-GPI effect was close to the conventional medium benchmark ($f^2 = 0.148$), and the remaining effects were small. All bias-corrected and accelerated 95% confidence intervals excluded zero.

5.3.2 Results of the hypothesis testing for mediating effects

As shown in Supplementary Table S9, the indirect associations of SM with GPI through AT (β = 0.095, t = 5.609, $p < 0.001$), SN (β = 0.085, t = 5.460, $p < 0.001$), PGPV (β = 0.095, t = 4.682, $p < 0.001$), and PBC (β = 0.046, t = 3.005, $p = 0.003$) were statistically significant, supporting H1.1-H1.4.

5.3.3 Results of testing the moderating effect hypothesis

As shown in Table 6, one of the four moderation hypotheses was supported. Johnson-Neyman plots and detailed diagnostics appear in Supplementary Fig. S1.

The GEA and AT interaction was significant and negative (β = −0.055, t = 2.145, $p = 0.032$). Because H3.1 predicted a positive moderating effect, the negative coefficient was inconsistent with the hypothesised direction, so H3.1 was not supported. The GEA and SN interaction was not significant (β = −0.025, t = 0.938, $p = 0.348$), so H3.2 was not supported. The GEA and PGPV interaction was significant and positive (β = 0.068, t = 2.588,

Table 6 Results of testing the moderating effect hypothesis

Hypotheses		Original sample (O)	T statistics	BCaCI	*p*-values	Decisions
H3.1	GEA × AT → GPI	−0.055	2.145	[−0.107; −0.007]	0.032	Not supported
H3.2	GEA × SN → GPI	−0.025	0.938	[−0.077; 0.026]	0.348	Not supported
H3.3	GEA × PGPV → GPI	0.068	2.588	[0.017; 0.119]	0.010	Supported
H3.4	GEA × PBC → GPI	−0.031	1.193	[−0.080; 0.020]	0.233	Not supported

BCaCI, bias-corrected and accelerated 95% confidence interval. Hypothesis support required the BCaCI to exclude zero and the coefficient to have the predicted positive sign.

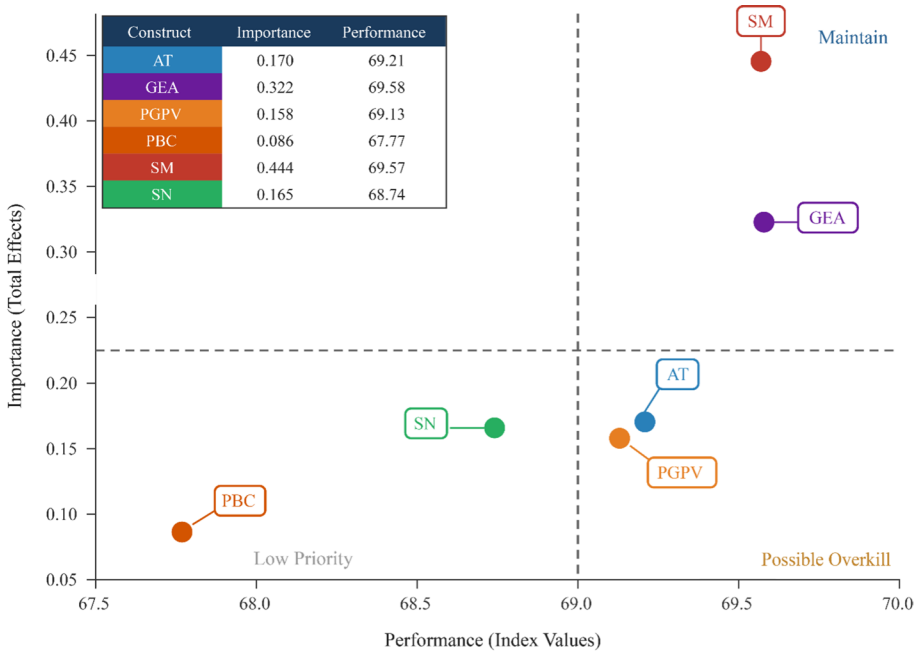

Fig. 2 Importance-performance map for constructs associated with green purchase intention

p=0.010), so H3.3 was supported. The GEA and PBC interaction was not significant (β = −0.031, t=1.193, *p*=0.233), so H3.4 was not supported.

5.4 Importance-performance map analysis

SM had the highest importance (0.444) and a performance score of 69.57 (Fig. 2), followed by GEA, with an importance of 0.322 and a performance score of 69.58. AT, PGPV, and SN had lower importance at similar performance levels, whereas PBC had the lowest importance (0.086) and performance (67.77). Detailed results are reported in Supplementary Table S10.

5.5 Robustness checks

The post hoc content-screened model contained 34 items (Supplementary Table S4). Composite reliability ranged from 0.851 to 0.902, and AVE ranged from 0.487 to 0.697. SM had an AVE of 0.487 and composite reliability of 0.884. The Fornell-Larcker criterion was met for all 21 construct pairs, the GEA-GPI correlation fell from 0.769 to 0.721, and the corresponding HTMT ratio was 0.843. All six direct associations with GPI retained their direction and statistical significance. In contrast, the GEA × AT and GEA × PGPV interactions were no longer supported by bootstrap confidence intervals. The random split-sample analysis supported the measurement structure in both halves.

Consistent PLS-SEM retained the direction of all ten structural paths. Among the predictors of GPI, the ranking was unchanged, with GEA showing the strongest and PBC the weakest association (Supplementary Table S11).

6 Discussion

This study examined how SM is associated with GPI through four parallel organism-level evaluations and whether GEA conditions these associations. The primary model supported the direct and parallel indirect associations. Direct-path estimates remained directionally stable across the reported sensitivity analyses, whereas the interaction findings did not.

6.1 Social media as a central stimulus in the stimulus-organism-response framework

SM was positively associated with each organism-level construct, consistent with the S-O-R framework and previous evidence on digitally influenced green consumption [1, 3, 8, 29]. Its strongest association was with PGPV, whereas its direct association with GPI was comparatively small. Together with the four indirect associations, this pattern suggests that SM is related to intention primarily through how consumers evaluate green purchasing, perceive social expectations, assess product value, and judge purchasing feasibility rather than solely as an immediate trigger of intention.

This finding extends previous research that has examined SM either as a direct predictor or through a limited number of psychological pathways [2, 3, 8]. It is also consistent with earlier evidence from Da Nang linking SM with AT- and PBC-related pathways, although that study did not position SM as a direct stimulus to GPI [23]. The comparatively small direct association may additionally reflect the ambivalent role of online green communication. SM can increase the visibility of green products and environmental information, but greenwashing, commercially motivated endorsements, and unverifiable claims may weaken its direct persuasive force. Consumers may respond more strongly when online information helps them identify credible and meaningful product value [5, 7].

6.2 Organism-level evaluations and parallel indirect pathways

AT, SN, and PGPV had similar associations with GPI, as indicated by their substantially overlapping confidence intervals, whereas PBC had the weakest association. The findings therefore do not identify one clearly dominant organism-level pathway. Instead, evaluative, normative, and value-based considerations appear to be comparably relevant to GPI in this sample. The positive association of AT with GPI is consistent with the TPB and previous green-consumption research [4, 11, 34], while the associations of SN and PGPV show that intention is also related to perceived social expectations and the benefits attributed to green products.

The comparatively weak role of PBC differs from earlier evidence among university students in Da Nang, where purchasing feasibility was more prominent [23]. This contrast indicates that perceived feasibility may not occupy the same relative position across young-consumer samples and model specifications. More broadly, the four statistically significant indirect associations show that SM is linked with GPI simultaneously through evaluative, normative, value-based, and control-related pathways. This extends studies that have focused on a single mediator and supports the use of the S-O-R framework to organise several theoretically distinct internal evaluations as parallel responses to the same external stimulus [2, 14].

6.3 Role of green environmental awareness

GEA had the largest direct association with GPI, indicating that environmentally aware consumers reported stronger intention to choose green products. However, the findings did not support the proposed assumption that

GEA consistently strengthens the four organism-to-response associations. In the primary model, the GEA × AT interaction was negative rather than positive, the GEA × PGPV interaction was positive, and the remaining interactions were not statistically significant. Neither of the two primary-model interaction patterns was reproduced in the post hoc content-screened model.

These findings distinguish the direct and conditional roles of GEA. GEA was consistently associated with GPI, but it did not operate as a stable amplifier of the four organism-to-response associations, questioning the assumption that environmental awareness uniformly strengthens favourable psychological evaluations.

6.4 Insights from the importance-performance analysis

The importance-performance map analysis placed SM and GEA highest in model-based importance, while the performance scores of most constructs were tightly clustered. The importance ranking is therefore more informative than the small differences in performance. SM emerged as the most important upstream construct because its total association with GPI incorporated both direct and indirect pathways, whereas GEA had the strongest direct association. PBC ranked lowest in both importance and performance, consistent with its comparatively small structural association with GPI. These results complement the structural estimates by distinguishing constructs with broad model-based relevance from those contributing through narrower pathways.

7 Implications

7.1 Theoretical implications

This study makes three theoretical contributions. First, it clarifies how the TPB and S-O-R framework can be integrated without treating them as interchangeable. The TPB specifies the proximal psychological evaluations associated with intention, whereas the S-O-R framework positions SM as an external stimulus and AT, SN, PGPV, and PBC as parallel organism-level appraisals. This functional integration accommodates constructs from different theoretical traditions while preserving their distinct conceptual roles.

Second, the findings indicate that SM is associated with GPI through multiple coexisting pathways rather than through a single dominant mechanism. The comparable associations of AT, SN, and PGPV with GPI, together with the four statistically significant indirect associations, show that evaluative, normative, value-based, and control-related processes operate in parallel. This provides a more comprehensive account of digitally influenced green consumption than models centred on one mediator.

Third, the study distinguishes GEA's strong direct association with GPI from its unstable conditional role, indicating that environmental awareness should not be assumed to amplify all organism-to-response pathways.

7.2 Implications for practice and policy

For firms, the high model-based importance of SM supports strategies that do more than increase exposure. Green communication should make product benefits concrete, provide verifiable environmental evidence, enable comparisons with conventional alternatives, and use credible peer or community-based content. Because SM was associated with AT, SN, PGPV, and PBC, campaigns should combine value-based information, social endorsement, and practical purchasing guidance rather than rely on generic environmental appeals [3, 5, 7, 8].

Policy and education initiatives should likewise move beyond awareness raising alone. Clearer eco-labelling, stronger oversight of misleading environmental claims, and accessible information about product value, availability, and performance may help young consumers make more informed green choices [5–7]. Environmental education can strengthen consumers' ability to assess environmental claims and identify credible products, while retailers can reduce search and access barriers through transparent information and easier online and offline

availability. Because GEA did not consistently strengthen the four psychological pathways, awareness initiatives should be paired with credible value signals and feasible purchasing options rather than assuming that awareness will automatically reinforce every route to GPI.

8 Limitations and future research

This study has several limitations. The cross-sectional design does not establish temporal ordering or causal effects; the direct, indirect, and interaction estimates should therefore be interpreted as statistical associations within the proposed model. In addition, all constructs were self-reported in a single survey, creating the possibility of social desirability and common method bias. Although procedural remedies and collinearity diagnostics were applied, the full-collinearity VIF for GPI exceeded the conservative benchmark of 3.3, and these checks cannot exclude shared-method inflation. GPI also represents behavioural intention rather than observed purchasing behaviour. Future studies should use longitudinal, time-lagged, experimental, or multisource designs and incorporate behavioural outcomes such as actual purchases, choice tasks, or follow-up measures.

Measurement and model specification also require further investigation. Several adapted items may not map exclusively onto their assigned constructs, including items that combine GEA with PGPV, AT with willingness to pay or product availability, and PBC with external facilitating conditions. This overlap may have contributed to the close relationship between GEA and GPI and to the sensitivity of the interaction estimates. The post hoc content-screened analysis reduced some overlap but does not constitute independent validation of revised scales. Moreover, formal back-translation was not conducted, and item-level records of pretest revisions were not retained, limiting independent verification of semantic equivalence. Future research should refine the construct definitions prospectively, document translation decisions, use forward and back translation, conduct expert assessment and cognitive interviews, and validate the revised measures in an independent sample.

Finally, the estimated model did not achieve exact fit, and its standardised root mean square residual and normed fit index indicated a substantial departure from commonly used fit criteria. Because the saturated model was also rejected, the observed misfit may reflect measurement specification as well as omitted or incorrectly specified structural relationships. The path estimates should therefore be viewed as conditional on the proposed specification rather than as evidence that the model fully represents the underlying process. The interaction findings were also not robust across item specifications and require replication before substantive conclusions are drawn. Generalisability is further limited by purposive and referral sampling and by the concentration of respondents among women, those aged 20 to under 25, and residents of central Da Nang. The number excluded at each screening step was not recorded separately. Future studies should compare alternative measurement and structural models, recruit more balanced probability-based or multi-site samples, and document participant screening prospectively.

9 Conclusions

This study integrates the TPB within the S-O-R framework to explain GPI among young consumers in Da Nang, Vietnam. SM was positively associated with GPI directly and indirectly through AT, SN, PGPV, and PBC, whereas GEA showed the strongest direct association with GPI. However, its moderating effects were not consistent across item specifications. These findings highlight the parallel psychological pathways linking SM with GPI and distinguish the direct from the conditional role of GEA.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s43621-026-04718-0.

Acknowledgements Not applicable.

Author contributions D.T.T. and H.N.N.D. contributed substantially to the conception and design of the study, development of the research framework, data analysis, interpretation of the findings, and drafting of the manuscript. D.T.T. led the data collection, literature review, and initial manuscript preparation. H.N.N.D. supervised the study, provided methodological guidance, critically revised the manuscript, and coordinated its finalisation. N.T.L.N., T.A.T., N.T.T., N.T.T.P., M.X.B., N.M.H., and P.T.Q.L. contributed to data collection, questionnaire preparation, literature review, data checking, and manuscript revision. All authors reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

Funding This research received no external funding.

Data availability The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval Ethics approval for this study was obtained from the Research Ethics Committee of Duy Tan University (No. DTU/REC2025/NHH08). The study was conducted in accordance with the Belmont Report (1979).

Consent to participate All participants were adults and provided written informed consent before completing the survey.

Consent to publish Not applicable.

Clinical trial number Not applicable.

Competing interests The authors declare no competing interests.

References

1. Appel G, Grewal L, Hadi R, Stephen AT. The future of social media in marketing. J Acad Mark Sci. 2020;48:79–95. https://doi.org/10.1007/s11747-019-00695-1.
2. Zhao L, Lee SH, Copeland LR. Social media and Chinese consumers' environmentally sustainable apparel purchase intentions. Asia Pac J Mark Logist. 2019;31:855–74. https://doi.org/10.1108/APJML-08-2017-0183.
3. Xie S, Madni GR. Impact of social media on young generation's green consumption behavior through subjective norms and perceived green value. Sustainability. 2023;15:3739. https://doi.org/10.3390/su15043739.
4. Paul J, Modi A, Patel J. Predicting green product consumption using theory of planned behavior and reasoned action. J Retail Consum Serv. 2016;29:123–34. https://doi.org/10.1016/j.jretconser.2015.11.006.
5. Chen Y, Chang C. Enhance green purchase intentions: the roles of green perceived value, green perceived risk, and green trust. Manag Decis. 2012;50:502–20. https://doi.org/10.1108/00251741211216250.
6. Delmas MA, Burbano VC. The drivers of greenwashing. Calif Manag Rev. 2011;54:64–87. https://doi.org/10.1525/cmr.2011.54.1.64.
7. Luo B, Sun Y, Shen J, Xia L. How does green advertising skepticism on social media affect consumer intention to purchase green products? J Consum Behav. 2020;19:371–81. https://doi.org/10.1002/cb.1818.
8. Sun Y, Xing J. The impact of social media information sharing on the green purchase intention among generation Z. Sustainability. 2022;14:6879. https://doi.org/10.3390/su14116879.
9. Luong T-B, Nguyen DTA. Examining social media influence's role in the TPB model for young Vietnamese visiting green hotels. J Ecotourism. 2025;24:20–42. https://doi.org/10.1080/14724049.2024.2332272.

10. Ngo TTA, Vo CH, Tran NL, et al. Factors influencing Generation Z's intention to purchase sustainable clothing products in Vietnam. PLoS ONE. 2024;19:e0315502. https://doi.org/10.1371/journal.pone.0315502.
11. Ajzen I. The theory of planned behavior. Organ Behav Hum Decis Process. 1991;50:179–211. https://doi.org/10.1016/0749-5978(91)90020-T.
12. Zeithaml VA. Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. J Mark. 1988;52:2–22. https://doi.org/10.1177/002224298805200302.
13. Sheth JN, Newman BI, Gross BL. Why we buy what we buy: a theory of consumption values. J Bus Res. 1991;22:159–70. https://doi.org/10.1016/0148-2963(91)90050-8.
14. Mehrabian A, Russell JA. An approach to environmental psychology. Cambridge: The MIT Press; 1974.
15. Armitage CJ, Conner M. Efficacy of the theory of planned behaviour: a meta-analytic review. Br J Soc Psychol. 2001;40:471–99. https://doi.org/10.1348/014466601164939.
16. Yadav R, Pathak GS. Determinants of consumers' green purchase behavior in a developing nation: applying and extending the theory of planned behavior. Ecol Econ. 2017;134:114–22. https://doi.org/10.1016/j.ecolecon.2016.12.019.
17. Shehawy YM, Ali Khan SMF. Consumer readiness for green consumption: the role of green awareness as a moderator of the relationship between green attitudes and purchase intentions. J Retail Consum Serv. 2024;78:103739. https://doi.org/10.1016/j.jretconser.2024.103739.
18. Kim N, Lee K. Environmental consciousness, purchase intention, and actual purchase behavior of eco-friendly products: the moderating impact of situational context. Int J Environ Res Public Health. 2023;20:5312. https://doi.org/10.3390/ijerph20075312.
19. Zhuang W, Luo X, Riaz M, Usman. On the factors influencing green purchase intention: a meta-analysis approach. Front Psychol. 2021;12:644020. https://doi.org/10.3389/fpsyg.2021.644020.
20. Kemp S. Digital 2025: Vietnam. DataReportal/Kepios; 2025.
21. PricewaterhouseCoopers. Voice of the consumer survey 2025: Vietnam snapshot. 2025.
22. Nguyen TN, Lobo A, Greenland S. Pro-environmental purchase behaviour: the role of consumers' biospheric values. J Retail Consum Serv. 2016;33:98–108. https://doi.org/10.1016/j.jretconser.2016.08.010.
23. Tam DT, Han BVG, Huy LTA, et al. Green purchase intention among Vietnamese university students: an extended theory of planned behavior study. Cogent Soc Sci. 2026;12:2700067. https://doi.org/10.1080/23311886.2026.2700067.
24. Da Nang People's Committee. Quyết định số 1099/QĐ-UBND phê duyệt Đề án Xây dựng Đà Nẵng - Thành phố môi trường giai đoạn 2021–2030 [Decision No. 1099/QĐ-UBND approving the project Building Da Nang – Environmental City for the 2021–2030 period]. Da Nang People's Committee; 2021.
25. Tam DT, Binh MX, Thien Tan LH, et al. Quality of work life and organizational citizenship behavior: beyond net effects. Soc Sci Humanit Open. 2026;14:103281. https://doi.org/10.1016/j.ssaho.2026.103281.
26. Thien Tam D, Kieu TTP, Huy LTA, et al. Core job characteristics and organizational commitment among Vietnamese educators: integrating the stimulus-organism-response framework with necessary condition analysis. Cogent Bus Manag. 2026;13:2700805. https://doi.org/10.1080/23311975.2026.2700805.
27. Ajzen I. Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. J Appl Soc Psychol. 2002;32:665–83. https://doi.org/10.1111/j.1559-1816.2002.tb00236.x.
28. Ng PML, Chan JKY, Lit KK, et al. The impact of social media exposure and online peer networks on green purchase behavior. Comput Hum Behav. 2025;165:108517. https://doi.org/10.1016/j.chb.2024.108517.
29. Md N, Naz F, Ramkissoon H, Fekete-Farkas M. Transforming consumers' intention to purchase green products: role of social media. Technol Forecast Soc Change. 2022;185:122067. https://doi.org/10.1016/j.techfore.2022.122067.
30. Wijekoon R, Sabri MF. Determinants that influence green product purchase intention and behavior: a literature review and guiding framework. Sustainability. 2021;13:6219. https://doi.org/10.3390/su13116219.
31. Lee L, Inman JJ, Argo JJ, et al. From browsing to buying and beyond: the needs-adaptive shopper journey model. J Assoc Consum Res. 2018. https://doi.org/10.1086/698414.
32. Meng Y, Chung D, Zhang A. The effect of social media environmental information exposure on the intention to participate in pro-environmental behavior. PLoS ONE. 2023;18:e0294577. https://doi.org/10.1371/journal.pone.0294577.
33. Murwaningtyas F, Harisudin M, Irianto H. Effect of celebrity endorser through social media on organic cosmetic purchasing intention mediated with attitude. KnE Soc Sci. 2020;4:152–65. https://doi.org/10.18502/kss.v4i3.6393.
34. Taufique KMR, Vaithianathan S. A fresh look at understanding Green consumer behavior among young urban Indian consumers through the lens of Theory of Planned Behavior. J Clean Prod. 2018;183:46–55. https://doi.org/10.1016/j.jclepro.2018.02.097.
35. Taylor S, Todd P. Assessing IT usage: the role of prior experience. MIS Q. 1995;19:561–70. https://doi.org/10.2307/249633.
36. Chen K, Deng T. Research on the green purchase intentions from the perspective of product knowledge. Sustainability. 2016;8:943. https://doi.org/10.3390/su8090943.
37. Kumar P, Ghodeswar BM. Factors affecting consumers' green product purchase decisions. Mark Intell Plan. 2015;33:330–47. https://doi.org/10.1108/MIP-03-2014-0068.

38. Maichum K, Parichatnon S, Peng K-C. Application of the extended theory of planned behavior model to investigate purchase intention of green products among Thai consumers. Sustainability. 2016;8:1077. https://doi.org/10.3390/su8101077.
39. Mohd Suki N. Green product purchase intention: impact of green brands, attitude, and knowledge. Br Food J. 2016;118:2893–910. https://doi.org/10.1108/BFJ-06-2016-0295.
40. Teng Y-M, Wu K-S, Liu H-H. Integrating altruism and the theory of planned behavior to predict patronage intention of a green hotel. J Hosp Tour Res. 2013. https://doi.org/10.1177/1096348012471383.
41. PricewaterhouseCoopers. Voice of the Consumer Survey 2024; 2024.
42. Bamberg S, Möser G. Twenty years after Hines, Hungerford, and Tomera: a new meta-analysis of psycho-social determinants of pro-environmental behaviour. J Environ Psychol. 2007;27:14–25. https://doi.org/10.1016/j.jenvp.2006.12.002.
43. Kollmuss A, Agyeman J. Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? Environ Educ Res. 2002;8:239–60. https://doi.org/10.1080/13504620220145401.
44. Campbell S, Greenwood M, Prior S, et al. Purposive sampling: complex or simple? Research case examples. J Res Nurs. 2020;25:652–61. https://doi.org/10.1177/1744987120927206.
45. Kock N, Hadaya P. Minimum sample size estimation in PLS-SEM: the inverse square root and gamma-exponential methods. Inf Syst J. 2018;28:227–61. https://doi.org/10.1111/isj.12131.
46. Faul F, Erdfelder E, Buchner A, Lang A-G. Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. Behav Res Methods. 2009;41:1149–60. https://doi.org/10.3758/BRM.41.4.1149.
47. Jaiswal D, Kant R. Green purchasing behaviour: a conceptual framework and empirical investigation of Indian consumers. J Retail Consum Serv. 2018;41:60–9. https://doi.org/10.1016/j.jretconser.2017.11.008.
48. Ellen PS, Wiener JL, Cobb-Walgren C. The role of perceived consumer effectiveness in motivating environmentally conscious behaviors. J Public Policy Mark. 1991;10:102–17.
49. Maloney MP, Ward MP, Braucht GN. A revised scale for the measurement of ecological attitudes and knowledge. Am Psychol. 1975;30:787–90. https://doi.org/10.1037/h0084394.
50. Weigel RH, Weigel J. Environmental concern: the development of a measure. Environ Behav. 1978;10:3–15. https://doi.org/10.1177/0013916578101001.
51. Podsakoff PM, MacKenzie SB, Lee J-Y, Podsakoff NP. Common method biases in behavioral research: a critical review of the literature and recommended remedies. J Appl Psychol. 2003;88:879–903. https://doi.org/10.1037/0021-9010.88.5.879.
52. Hair JF, Risher JJ, Sarstedt M, Ringle CM. When to use and how to report the results of PLS-SEM. Eur Bus Rev. 2019;31:2–24. https://doi.org/10.1108/EBR-11-2018-0203.
53. Ringle CM, Sarstedt M. Gain more insight from your PLS-SEM results: the importance-performance map analysis. Ind Manag Data Syst. 2016;116:1865–86. https://doi.org/10.1108/IMDS-10-2015-0449.
54. Mardia KV. Measures of multivariate skewness and kurtosis with applications. Biometrika. 1970;57:519–30. https://doi.org/10.1093/biomet/57.3.519.
55. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. J Mark Res. 1981;18:39–50. https://doi.org/10.2307/3151312.
56. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. J Acad Mark Sci. 2015;43:115–35. https://doi.org/10.1007/s11747-014-0403-8.
57. Henseler J, Hubona G, Ray PA. Using PLS path modeling in new technology research: updated guidelines. Ind Manag Data Syst. 2016;116:2–20. https://doi.org/10.1108/IMDS-09-2015-0382.
58. Aguirre-Urreta MI, Rönkkö M. Statistical inference with PLSC using bootstrap confidence intervals1. MIS Q. 2018;42:1001–20. https://doi.org/10.25300/MISQ/2018/13587.
59. Johnson PO, Neyman J. Tests of certain linear hypotheses and their application to some educational problems. Stat Res Mem. 1936;1:57–93.
60. Rockwood NJ, Hayes AF. Mediation, moderation, and conditional process analysis: regression-based approaches for clinical research. The Cambridge handbook of research methods in clinical psychology. New York, NY, US: Cambridge University Press; 2020. pp. 396–414.
61. Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. New York: Routledge; 2013.
62. Shmueli G, Sarstedt M, Hair JF, et al. Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. Eur J Mark. 2019;53:2322–47. https://doi.org/10.1108/EJM-02-2019-0189.
63. Kock N. Common method bias in PLS-SEM: A full collinearity assessment approach. Int J E-Collab. 2015;11:1–10. https://doi.org/10.4018/ijec.2015100101.

Authors and Affiliations

Dang Thien Tam[1] · Nguyen Thi Ly Na[1] · Tran Anh Tuan[1] · Nguyen Thi Thao[1] · Nguyen Thi Thu Phuong[1] · Mai Xuan Binh[1] · Ngo Minh Hiep[1] · Pham Thi Quynh Le[1] · Hai Nguyen Ngoc Dang[2]

✉ Hai Nguyen Ngoc Dang
hai.dang@utas.edu.au

[1] Faculty of Business Administration, Duy Tan University, Da Nang, Vietnam

[2] University of Tasmania, Hobart, Australia