

ENVIRONMENTAL ACCOUNTABILITY PERCEPTION AS A MEDIATOR OF THEORY OF PLANNED BEHAVIOR ON SUSTAINABLE CONSUMPTION OF GENERATION Z

Sulfan Hedi¹, Abin Suarsa^{2*}, Mahamadaree Waeno³

Affiliation:

¹Accounting Study Program,
Faculty of Economics and
Business, Universitas
Muhammadiyah Bandung

²Universitas Muhammadiyah
Bandung,

³Fatoni University, Thailand

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*** Correspondence:**

abinsuarsa@umbandung.ac.id

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Abstract

Background: The environmental crisis drives the urgency of sustainable consumption, particularly in the food and beverage (F&B) sector. Generation Z as the primary cafe consumers exhibits a significant intention-behavior gap exacerbated by greenwashing.

Objective: To examine the mediating role of environmental accountability perception in the relationship between Theory of Planned Behavior (TPB) and sustainable consumption among Generation Z in cafe MSMEs in Bandung City.

Research Methods: Explanatory quantitative; cross-sectional survey; 452 respondents; purposive sampling;

Research Results: All four hypotheses were supported. Theory of Planned Behavior positively influences sustainable consumption both directly and indirectly through environmental accountability perception, which acts as a partial mediator. The proposed model explains a substantial proportion of the variance in Generation Z's sustainable consumption.

Originality/Novelty of Research: Empirical integration of TPB and Signalling Theory through environmental accountability mediation in the context of urban cafe MSMEs in Indonesia; first comprehensively tested in a developing country.

Keywords: Theory of Planned Behavior; Environmental Accountability; Sustainable Consumption; Generation Z

Introduction

The global environmental crisis is intensifying pressure on businesses to integrate sustainability into their reporting and accountability practices, particularly in the food and beverage (F&B) sector in Indonesia. Bandung City faces significant challenges in managing solid waste and carbon emissions from its rapidly growing cafe and tourism sector (Kouzbour et al., 2022). In sustainability accounting, businesses are required to disclose their environmental impacts as a form of responsibility to stakeholders (Schaltegger, S., Burritt, R., & Gunarathne, 2023); however, in cafe MSMEs in Bandung, the implementation of environmental accountability is often oriented merely toward regulatory compliance.

Generation Z, as the primary cafe consumers in Bandung, demonstrates strong ethical value preferences and high interest in sustainable consumption. Nevertheless, an intention-behavior gap frequently occurs due to greenwashing and information asymmetry (Ajzen, 2020; Barczak et al., 2023). Prior research grounded in the Theory of Planned Behavior (TPB) explains that behavior can be predicted through attitudes, subjective norms, and perceived behavioral control. Environmental accountability functions as a credible signal within the Signalling Theory framework that reinforces consumer trust (Bebbington, Jan; Russell, Shona; Thomson, 2021); however, TPB alone is insufficient to close the intention-behavior gap without such credible external signals. Existing research has largely examined these mechanisms in isolation: TPB-based studies (Nu'man & Novianti, 2021; Maulana et al., 2025) demonstrate that attitudes, subjective norms, and perceived behavioral control predict pro-environmental behavior, but do not incorporate any accountability-based construct that could explain how consumers evaluate the credibility of a business's environmental claims; conversely, environmental accountability and disclosure studies (Gray et al., 1995; Bebbington, Jan; Russell, Shona; Thomson, 2021; Schaltegger, S., Burritt, R., & Gunarathne, 2023) focus on organizational reporting practices without linking them to individual consumers' psychological antecedents. Consequently, no prior study has empirically tested environmental accountability perception as a mediating mechanism between TPB and actual sustainable consumption, particularly in the context of cafe MSMEs, indicating a clear research gap that this study addresses. To the researchers' knowledge, this study is also the first to position environmental accountability perception explicitly as a mediator—rather than as a direct antecedent or a stand-alone outcome—within a TPB-based structural model, distinguishing its novelty from prior TPB-only and accountability-only research streams.

Based on this gap, the present study aims to test four hypotheses: (H1) the effect of TPB on SC; (H2) the effect of TPB on EA; (H3) the effect of EA on SC; and (H4) the mediating role of EA in the TPB-SC relationship. The contribution of this research lies in developing an integrated model of TPB with environmental accountability that fills a gap in the behavioral accounting literature within the context of urban cafe MSMEs, and provides practical guidance for cafes and regulators in Bandung City in alignment with the SDG 12 agenda.

Literature Review

TPB is a multidimensional psychological model developed by (Ajzen, 1985, 1991) and updated in (Ajzen, 2020). The model encompasses three components: (a) Attitude toward Behavior (ATT) the individual's positive or negative evaluation of sustainable consumption behavior; (b) Subjective Norm (SN) social pressure from family, friends, and digital communities; and (c) Perceived Behavioral Control (PBC)

the individual's perception of their capability and access to engage in sustainable consumption. PBC represents Ajzen's original contribution that distinguishes TPB from the Theory of Reasoned Action (Villanthenkodath et al., 2022).

Environmental accountability perception refers to Generation Z consumers' assessment of cafes' transparency in plastic waste management, carbon footprint reporting, and ecological costs. This concept functions as a credible signal within the Signalling Theory framework (Spence, 1973) rooted in environmental accounting (Gray et al., 1995) and further developed by (Schaltegger, S., Burritt, R., & Gunarathne, 2023), encompassing three dimensions: (1) Waste Management Transparency; (2) Carbon Footprint Reporting; and (3) Eco-Cost Reporting (Bebbington, Jan; Russell, Shona; Thomson, 2021; Zhong Ai a et al., 2022)

Sustainable consumption refers to actual behavioral patterns in which consumers consistently minimize negative environmental impacts through sustainability-based purchasing decisions. Derived from (UNEP, 2015) and operationalized by (Singh, 2017) and (Kouzbour et al., 2022) in three dimensions: (a) Reusable Choice; (b) Menu Preference; and (c) Green Loyalty.

Based on the literature review above, four hypotheses are formulated:

H1: Theory of Planned Behavior has a positive and significant effect on Sustainable Consumption of Generation Z in Cafe MSMEs in Bandung City.

H2: Theory of Planned Behavior has a positive and significant effect on Environmental Accountability Perception of Generation Z in Cafe MSMEs in Bandung City.

H3: Environmental Accountability Perception has a positive and significant effect on Sustainable Consumption of Generation Z in Cafe MSMEs in Bandung City.

H4: Environmental Accountability Perception partially mediates the effect of Theory of Planned Behavior on Sustainable Consumption of Generation Z.

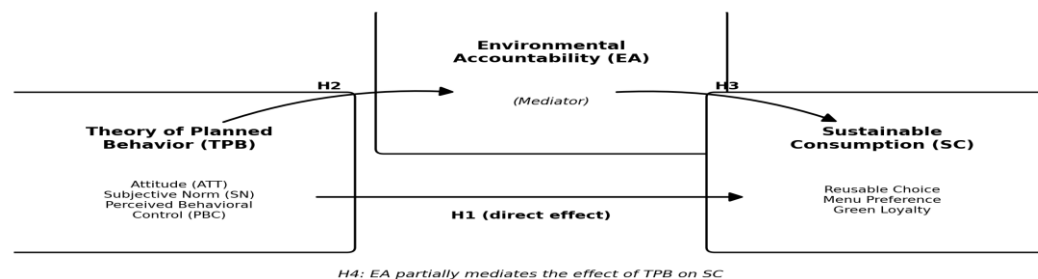


Figure 1. Integrated Conceptual Framework

Research Methods

This study employs an explanatory quantitative design with a causal-explanatory approach to test causal relationships among variables. A cross-sectional survey was conducted over a single measurement period (April–May 2026). Data analysis used Structural Equation Modeling-Partial Least Squares (SEM-PLS) via SmartPLS version 4.0. The SEM-PLS method was chosen for its ability to simultaneously estimate measurement and structural models, its suitability for reflective constructs, and its bootstrapping feature for accurate mediation testing (Hair et al., 2019)

The population consists of all Generation Z individuals in Bandung City who actively visit cafes (born 1997–2012; aged 14–29 years in 2026). Based on Bandung Open Data (2025), the Generation Z population totals 1,462,860 individuals. The sample size was determined using the Slovin formula with a 5% margin of error: $n = N / (1 + N.e^2) = 1,462,860 / (1 + 1,462,860 \times 0.0025) \approx 400$ respondents. Data collection yielded 452 respondents. Purposive sampling was employed with the following criteria: (1) aged 14–29 years; (2) visited a cafe at least once per week in the past 3 months; and (3) experience consuming at a minimum of 3 different cafes in Bandung City.

This study involves three main variables measured on a 5-point Likert scale: (1) Theory of Planned Behavior (TPB) as the exogenous variable, comprising Attitude toward Behavior (ATT), Subjective Norm (SN), and Perceived Behavioral Control (PBC) as previously discussed in the Literature Review 10 items (ATT1–2; SN1–4; PBC1–4); (2) Environmental Accountability Perception (EA) as the mediator, comprising Waste Management Transparency, Carbon Footprint Reporting, and Eco-Cost Reporting 8 items (EA1–8); and (3) Sustainable Consumption (SC) as the endogenous variable, comprising Reusable Choice, Menu Preference, and Green Loyalty 7 items (SC1–7). Total 25 questionnaire items ((Ajzen, 2020; Kouzbou et al., 2022; Schaltegger, S., Burritt, R., & Gunarathne, 2023).

Table 1. Summary of Research Variable Operationalization

Variable	Dimension	Item Code	No. of Items
TPB (Exogenous)	Attitude toward Behavior	ATT1-2	2
	Subjective Norm	SN1-4	4
	Perceived Behavioral Control (PBC)	PBC1-4	4
EA (Mediator)	Waste Management Transparency	EA1-2	2
	Carbon Footprint Reporting	EA3-5	3
	Eco-Cost Reporting	EA6-8	3

Variable	Dimension	Item Code	No. of Items
SC (Endogenous)	Reusable Choice	SC1-2	2
	Menu Preference	SC3-5	3
	Green Loyalty	SC6-7	2
Total			25

Source: Primary data processed by the researcher (2026), based on the operationalization of Ajzen (2020), Kouzbour et al. (2022), and Schaltegger et al. (2023).

Data were collected through an online questionnaire distributed via QR code links across three channels: (1) direct QR code scanning at cafe locations; (2) survey links through Generation Z Bandung WhatsApp community groups; and (3) survey links through Instagram and TikTok of Bandung student communities. Data were collected during April–May 2026.

Analysis was conducted in two stages: (1) Outer Model Evaluation convergent validity testing (outer loading > 0.70; AVE > 0.50), discriminant validity (HTMT < 0.85; Fornell-Larcker criterion), and construct reliability (Cronbach's Alpha and Composite Reliability > 0.70); and (2) Inner Model Evaluation collinearity testing (VIF < 5), coefficient of determination (R-Square), effect size (f-square), path coefficients, and mediation via total indirect effects with 5,000 bootstrapping resamples (Hair et al., 2019; Henseler et al., 2015)

Results and Discussion

Measurement Model Evaluation (Outer Model)

All indicators met the criterion of outer loading > 0.70. AVE values for all constructs exceeded 0.50 (EA = 0.784; SC = 0.656; TPB = 0.651), confirming adequate convergent validity. HTMT testing showed all values < 0.85 (HTMT EA-SC = 0.798; EA-TPB = 0.748; TPB-SC = 0.823), satisfying discriminant validity. Composite Reliability and Cronbach's Alpha for all constructs exceeded 0.70, confirming sufficient reliability.

Table 2. Convergent Validity — AVE and Composite Reliability

Construct	AVE	Composite Reliability	Cronbach's Alpha
Theory of Planned Behavior (TPB)	0.651	0.918	0.897

Construct	AVE	Composite Reliability	Cronbach's Alpha
Environmental Accountability (EA)	0.784	0.954	0.943
Sustainable Consumption (SC)	0.656	0.918	0.895

Source: SmartPLS 4.0 output, processed by the researcher (2026).

Table 3. Discriminant Validity — HTMT

	EA	SC	TPB
EA	—		
SC	0.798	—	
TPB	0.748	0.823	—

Source: SmartPLS 4.0 output, processed by the researcher (2026).

Table 4. Fornell-Larcker Criterion (Diagonal: square root of AVE)

	EA	SC	TPB
EA	0.886		
SC	0.692	0.810	
TPB	0.683	0.745	0.807

Source: SmartPLS 4.0 output, processed by the researcher (2026).

Structural Model Evaluation (Inner Model)

Table 5. R-Square and Adjusted R-Square

Endogenous Variable	R-Square	Adjusted R-Square	Interpretation
Environmental Accountability (EA)	0.467	0.466	Moderate (46.7% of EA variance explained by TPB)
Sustainable Consumption (SC)	0.618	0.616	Substantial (61.8% of SC variance explained by TPB & EA)

Source: SmartPLS 4.0 output, processed by the researcher (2026).

Table 6. F-Square (Effect Size)

Path	F-Square	Effect Size Interpretation
TPB → EA	0.876	Large (large effect; $f^2 > 0.35$)
TPB → SC	0.364	Large (large effect; $f^2 > 0.35$)
EA → SC	0.164	Moderate (medium effect; $f^2 > 0.15$)

Source: SmartPLS 4.0 output, processed by the researcher (2026).

Hypothesis Testing (Bootstrapping)

Table 7. Path Coefficients — Direct Paths (H1, H2, H3)

Hypothesis	Path	Beta (O)	t-stat	p-value	BC 95% CI	Decision
H1	TPB → SC	0.511	13.584	0.000	[0.440; 0.586]	Supported
H2	TPB → EA	0.683	21.092	0.000	[0.618; 0.744]	Supported
H3	EA → SC	0.343	8.663	0.000	[0.261; 0.416]	Supported

Source: SmartPLS 4.0 bootstrapping output (5,000 resamples), processed by the researcher (2026).

Table 8. Total Indirect Effects — Mediation (H4)

Mediation Path	Indirect Beta	t-stat	p-value	BC 95% CI	Decision
TPB → EA → SC	0.234	9.622	0.000	[0.186; 0.282]	Supported — Partial Mediation

Source: SmartPLS 4.0 bootstrapping output (5,000 resamples), processed by the researcher (2026).

Table 9. Summary of Hypothesis Decisions

Hypothesis	Statement	Beta	t-stat / p-value	Decision
H1	TPB has a positive and significant effect on SC	0.511	13.584 / 0.000	SUPPORTED
H2	TPB has a positive and significant effect on EA	0.683	21.092 / 0.000	SUPPORTED
H3	EA has a positive and significant effect on SC	0.343	8.663 / 0.000	SUPPORTED

Hypothesis	Statement	Beta	t-stat / p-value	Decision
H4	EA partially mediates TPB → SC (indirect effect = 0.234)	0.234	9.622 / 0.000	SUPPORTED

Source: Summarized by the researcher (2026) based on Tables 7 and 8.

Discussion

Effect of Theory of Planned Behavior on Sustainable Consumption

Hypothesis H1 was confirmed: TPB has a positive and significant effect on Generation Z's sustainable consumption (beta = 0.511; $t = 13.584$; $p < 0.001$). The effect size $f^2 = 0.364$ (large effect) indicates a substantial influence. This finding is consistent with (Nu'man & Noviati, 2021) and (Maulana et al., 2025), who affirm that TPB components particularly perceived behavioral control are strong predictors of pro environmental behavior among Indonesian university students. This result indicates that Generation Z's sustainable consumption is driven primarily by internal psychological readiness rather than external pressure alone. One plausible explanation is that Bandung's Generation Z consumers, being highly exposed to digital sustainability discourse, have internalized environmental values strongly enough that these values translate directly into purchasing behavior without needing an external trigger. This finding extends prior TPB research conducted in campus settings by demonstrating that the same psychological mechanism also holds among cafe consumers in a commercial, non-academic context. Practically, this implies that cafe MSMEs can encourage sustainable consumption by strengthening consumers' sense of personal capability and social support for eco-friendly choices, for example through peer-based sustainability campaigns rather than relying solely on external certifications.

Effect of Theory of Planned Behavior on Environmental Accountability Perception

Hypothesis H2 was confirmed: TPB has a positive and significant effect on cafes' environmental accountability perception (beta = 0.683; $t = 21.092$; $p < 0.001$; $f^2 = 0.876$ very large effect). This is the strongest path in the model, indicating that Generation Z individuals with high TPB more actively evaluate cafes' environmental transparency. This finding reinforces the view that environmental accountability is not merely an objective characteristic of cafes, but a perceived quality actively constructed based on consumers' psychological dispositions (Ajzen, 2020; Schaltegger, S., Burritt, R., & Gunarathne, 2023). Being the strongest path in the model suggests that TPB does more than shape behavioral intention directly; it also shapes how consumers interpret and evaluate the credibility of a cafe's environmental claims. A likely explanation is that Generation Z consumers with stronger attitudes, subjective norms, and perceived

control toward sustainability pay closer attention to environmental cues and are therefore more discerning in judging whether a cafe's transparency claims are genuine. This result is consistent with, and extends, prior signalling-theory-based accounting research by showing that the receiver's own psychological disposition -- not only the sender's disclosure quality shapes how credible an environmental signal is perceived to be. The contribution of this finding is that cafe MSMEs cannot treat environmental reporting as a one size fits all signal; transparency initiatives are likely to be most effective when paired with efforts that first build consumers' underlying sustainability attitudes and sense of behavioral control.

Effect of Environmental Accountability Perception on Sustainable Consumption

Hypothesis H3 was confirmed: environmental accountability perception has a positive and significant effect on sustainable consumption ($\beta = 0.343$; $t = 8.663$; $p < 0.001$; $f^2 = 0.164$ medium effect). This finding affirms the central role of environmental accountability as a credible signal that reduces information asymmetry and strengthens consumer trust in businesses' sustainability claims (Bebbington, Jan; Russell, Shona; Thomson, 2021; Gray et al., 1995). This finding means that once consumers perceive a cafe as environmentally accountable, that perception itself becomes a direct driver of greener purchasing choices, not merely a background attitude. A plausible reason is that transparent waste, carbon, and cost reporting reduces the information asymmetry that typically allows greenwashing to persist, giving consumers confidence that their sustainable choices genuinely make a difference. This is consistent with, and reinforces, prior environmental accounting literature that positions accountability disclosure as a trust-building mechanism between organizations and stakeholders. For cafe MSMEs, this implies that even modest, verifiable environmental reporting can function as a practical lever for converting environmentally conscious consumers into repeat, loyalty-driven customers.

Mediating Role of Environmental Accountability Perception

Hypothesis H4 was confirmed: environmental accountability perception partially mediates the effect of TPB on sustainable consumption (indirect $\beta = 0.234$; $t = 9.622$; $p < 0.001$; BC 95% CI [0.186; 0.282]). Partial rather than full mediation indicates that environmental accountability complements and amplifies the role of TPB without replacing it. TPB influences sustainable consumption through two simultaneous pathways: a direct path ($\beta = 0.511$) and an indirect path through EA ($\beta = 0.234$), consistent with (Ajzen, 2020) view that external variables can strengthen the predictive power of TPB. This partial-mediation pattern means that environmental accountability perception is best understood as an amplifying mechanism rather than the sole channel through which TPB translates into sustainable

consumption. A plausible explanation is that Generation Z consumers act on sustainability values through habitual, low-deliberation choices as well as through more deliberate, trust-based evaluations of a cafe's environmental claims, so both pathways operate simultaneously rather than one replacing the other. This finding builds on prior TPB extension research by empirically demonstrating, in the specific context of urban cafe MSMEs, how an accountability-based construct can be integrated into the classic TPB framework without displacing its direct explanatory power. Its significance lies in showing cafe MSMEs and regulators that interventions should pursue both tracks together: nurturing consumers' underlying TPB based dispositions while also investing in credible environmental reporting, since neither track alone captures the full pathway to sustainable consumption.

Conclusion

This study successfully tested an integrated model of TPB and environmental accountability perception on Generation Z's sustainable consumption in cafe MSMEs in Bandung City, using SEM-PLS (SmartPLS 4.0) with 452 respondents and 25 questionnaire items. What was found: all four hypotheses were supported TPB positively shapes sustainable consumption both directly and indirectly, and environmental accountability perception partially mediates this relationship, complementing rather than replacing TPB's direct influence. What this means: Generation Z's sustainable consumption choices in cafe MSMEs are driven jointly by their own psychological readiness (attitudes, subjective norms, and perceived behavioral control) and by how credible they perceive a cafe's environmental transparency to be, indicating that neither internal disposition nor external signalling alone is sufficient to close the intention-behavior gap. What this signifies: the study offers empirical evidence that integrating Signalling Theory with TPB provides a more complete explanation of green consumer behavior in emerging-market food and beverage settings, filling a gap in the behavioral accounting literature and offering an evidence base for both cafe management and sustainability policy in urban Indonesia. Theoretically, this study contributes to the development of TPB by extending its nomological network beyond the original attitude norm control framework: it demonstrates that TPB's explanatory power for sustainable consumption can be meaningfully strengthened by incorporating an accountability-based, Signalling Theory-derived mediator, showing that TPB's predictive validity is not confined to purely internal psychological antecedents but can be extended to account for consumers' evaluation of external credibility signals.

Managerial implications: For cafe MSMEs, implementing publicly verified environmental reporting systems is a strategic investment that directly enhances Generation Z's green loyalty. For Bandung

City regulators, affordable MSME environmental reporting standards should be developed, accompanied by fiscal incentives as part of F&B waste mitigation strategies aligned with the SDG 12 agenda.

Research limitations: (1) the cross-sectional design limits temporal causal inference; (2) purposive sampling limits generalizability; (3) EA measurement is based on subjective perception susceptible to response bias; and (4) geographic coverage is limited to Bandung City. Longitudinal research with actual behavioral measurement will enhance the causal validity of this model.

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Author's Contribution

Sulfan Hedi, Abin Suarsa and Mahamadaree Waeno made equal contributions. All authors contributed to the formulation of the research idea, the development of the methodology, data collection, data analysis, the interpretation of the research findings, and the drafting and editing of the manuscript. All authors have reviewed and approved the final version of the article and are responsible for its entire content.

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Conflicts of Interest

The authors affirm that the work described in this publication was not influenced by any known competing financial interests or personal relationships.

Declaration about Generative AI Tools

In the preparation of this article, the author made limited use of Generative AI tools to assist with language editing, grammar checking, and to improve the clarity and readability of the manuscript. Generative AI was not used in the research design, data collection, data analysis, or

interpretation of the research results. The author takes full responsibility for the entire content, accuracy, originality and conclusions of this article.