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Models of Sustainable Consumption Practices of Consumers among Higher Education Institutions in the Philippines

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A B S T R A C T

This study simultaneously explored two (2) hypothesized models of Environmentally-Sustainable Consumption Practices (ESCP) of consumers among Higher Education Institutions (HEIs) in the Philippines. Using a quantitative, non-experimental, descriptive-predictive research design, this study analyzed 704 consumer responses collected through an online survey using purposive-quota sampling. Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed to test the hypothesized structural relationships of the models. Results revealed that in Model 1, only altruistic values, and perceived responsibility significantly influence ESCP while Model 2 revealed that all structural relationships were significant except for the influence of Subjective Norm on ESCP.

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INTRODUCTION

Sustainable consumption issues stemmed from the failure to understand the concerted effects of human activities. For instance, household-induced carbon emission was attributed to more significant carbon emissions (Liu et al., 2021). The overwhelming consumption patterns and behavior also posed a significant sustainability risk. The 2021 Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment also reported that human activities were responsible for 1.1 °C of global warming (Legg, 2021). As the population increases and technological advancements enabled a modern lifestyle, human consumption increasingly depends on sustainable resources to meet consumption needs (UNEP, 2011).

Accordingly, various issues related to sustainable consumption can be addressed by understanding the origins of consumer attitudes (Testa et al., 2021) and consumption behavior (Pristl, Kilian, & Mann, 2021). The dynamics of consumer characteristics and intention-based factors provided valuable insights into understanding sustainable consumption (Degli Esposti, Mortara, & Roberti, 2021). Gaps and possible implications for managerial, production, research, and policy-making can be identified when consumers' beliefs, values, norms, and observable actions are understood (Garcia, & Campos, 2025).

Understanding beliefs, norms, and behaviors as integral facets of sustainable Consumption was crucial for comprehending environmentally sustainable consumption practices in the Philippine context. Consumer Characteristics often reflected consumers' cognitive and affective predispositions toward sustainable practices. However, these internal dispositions did not always translate into actual sustainable consumption practices due to sociocultural, economic, and structural barriers. The existing sustainable consumption practices models published in the past had open several theoretical and methodological limitations of environmentally-sustainable consumption practices that reduced its wholistic understanding (Jackson, 2005). With these gaps at hand, the study explored the two (2) hypothesized structural models reflecting the various facets of sustainable consumption practices, such as consumer characteristics' (for Model 1), and intention-based factors' (for Model 2) explanatory, effect sizes, and predictive power on environmentally sustainable consumption practices among consumers of HEIs in the Philippines, simultaneously. Hence, this study offered a broader perspective of understanding sustainable consumption practices among consumers of HEIs in the country.

THEORETICAL REVIEW

Value-Belief-Norm (VBN) Theory

The Value-Belief-Norm (VBN) Theory suggests that values—biospheric (environmental concern), altruistic (concern for others), and egoistic (self-interest)—shape individuals' beliefs about environmental issues, which then activate personal norms or a moral obligation to engage in sustainable behavior. These personal norms act as the primary driver of action, often taking precedence over economic or convenience-based factors. Research indicates that consumers with strong biospheric or altruistic values are more likely to adopt favorable attitudes toward sustainable products and behaviors, as their choices align with

their internalized ethical and environmental principles (Stern, 2000). The VBN Theory effectively explains the motivations behind sustainable decision-making and the moral imperative individuals feel, making it particularly relevant in understanding the attitudinal and normative aspects of consumer behavior (Zhao et al, 2021).

However, the researcher has articulated a new framework within the constructs of this theory only. This means, the organization and the sequence of the original VBN theory (Value-Belief-Norm sequence) was no longer evident in the structurally-hypothesized model. Nevertheless, the constructs which were articulated and reconfigured still bear the VBN Theory variables. Additionally, environmental attitude was also included in the framework. Thus, the modified framework highlighted the specific causal pathways as they loosely-operate on the conceptual domain of VBN.

Theory of Planned Behavior (TPB)

Moreover, Model 2 was anchored on the Theory of Planned Behavior (TPB) by Ajzen (1991), which asserts that behavior is primarily influenced by attitudes (positive or negative evaluations of a behavior), subjective norms (perceived social pressures to perform or not to perform the behavior), and perceived behavioral control (the ease or difficulty of engaging in the behavior based on available resources and opportunities). The extension of TRA birthed the TPB which still emphasized behavioral intention as the central predictor of behavior. Intention plus perceived behavioral control jointly predict behavior. The intention-behavior gap, which is the difference between intention and action, is highlighted by TPB by taking these external restrictions into account. It also offers insights into how this gap might be closed through market or regulatory interventions. Empirical research supports the usefulness of TPB, continuously relating its elements to eco-friendly purchasing practices such as selecting sustainable apparel, energy-efficient equipment, or organic food. In the context of intention influencing sustainable consumption practices, TPB is a strong and valuable paradigm for comprehending sustainable consumer patterns.

Research Hypotheses

At the 0.05 level of significance, the following hypotheses were tested in this study, to wit:

$H0_1$: Environmental attitude does not significantly influence environmentally-sustainable consumption practices

$H0_2$: Biospheric values do not significantly influence consumers' environmentally-sustainable consumption practices.

$H0_3$: Altruistic values do not significantly influence environmentally-sustainable consumption practices.

$H0_4$: Egoistic values do not significantly influence consumers' environmentally-sustainable consumption practices.

$H0_5$: Personal norms do not significantly influence environmentally-sustainable consumption practices.

$H0_6$: Perceived responsibility does not significantly influence environmentally-sustainable consumption practices.
$H0_7$: Intention to buy green product does not significantly mediate the influence of attitude towards sustainable consumption on environmentally-sustainable consumption practices.
$H0_8$: Intention to buy green product does not significantly mediate the influence of Subjective Norms on environmentally-sustainable consumption practices.
$H0_9$: Intention to buy green product does not significantly mediate the influence of Perceived behavioral Control on environmentally-sustainable consumption practices.

METHODOLOGY

Research Design

To test the hypothesized models, a quantitative descriptive-predictive, non-experimental research design was employed. This design allowed for the description of consumer characteristics and intention-based factors, while PLS-SEM was used to estimate the predictive influence of exogenous variables on ESCP (Masengu, Chawuruka, & Muchenje, 2025; Essiz, 2024).

Instrument and Data Collection Method

Data were collected through an online survey using Google Forms, utilizing primary data to capture context-specific insights in consumer behavior research, with instruments adapted from Čapienė et al. (2022), Wu and Chen (2014), and Aksoy Canyolu et al. (2024). The instruments were validated by experts, pilot-tested with Cronbach's alpha values ranging from 0.706 to 0.867, and a purposive-quota sampling technique was used, resulting in 721 responses collected and 704 valid responses after screening based on ethical and inclusion criteria.

Statistical Treatment of the Study

The data were analyzed using Cronbach's alpha, frequency count and percentages, weighted mean, and Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the relationships among constructs and their influence on ESCP. These methods allowed for assessment of reliability, descriptive profiles, and structural relationships among variables in the study.

Procedures of the Study

The study followed a systematic process beginning with problem conceptualization, literature review, instrument development, validation, and pilot testing guided by Cronbach's alpha and expert evaluation. Data collection was conducted via Google Forms with additional online recruitment, followed by PLS-SEM analysis assessing measurement and structural models, and concluded with proposal and final defenses before academic panels.

RESULTS

Demographic Profile of the Respondents

The demographic profile of the 704 validated respondents is presented in Table 1. Most were aged 30–39 (52.3%), followed by 18–29 (30.0%), with nearly equal representation of males (47.9%) and females (47.6%). The majority were college graduates (53.4%) or master's degree holders (34.2%). In terms of income, most earned Php25,001–Php35,000 (43.8%) or less than Php25,000 (41.6%), indicating that respondents largely belong to an educated and economically active HEI population.

Table 1. Demographic Profile of Respondents, n=704

Categories	Sub-categories	Frequency (N)	Percentage (%)
Age	18 to 29 years old	211	30.0
	30 to 39 years old	368	52.3
	40 to 49 years old	90	12.8
	50 years old and above	35	5.0
Gender	Male	337	47.9
	Female	335	47.6
	Prefer not to say	32	4.5
Educational Level	Elementary Level	1	.1
	Elementary Graduate	0	0
	Tech-Vocational Graduate	4	.6
	High School Level	0	0
	High School Graduate	1	.1
	SH School Graduate	5	.7
	College Level	26	3.7
	College Graduate	376	53.4
	Master's degree	241	34.2
	Post-Graduate	50	7.1
Income Level	Less than Php25,000 monthly	293	41.6
	Php25,001-Php35,000	308	43.8
	Php35,001-Php45,000	85	12.1
	Php45,001 and above monthly	18	2.6

Level of Manifestation of Consumer Characteristics among Consumers in HEIs

Table 2 shows that Consumer Characteristics among HEI consumers are generally often manifested, with an overall mean of 4.07. Altruistic and biospheric values obtained the highest ratings (4.24 and 4.23), indicating strong pro-environmental and socially conscious orientations, while environmental attitude, perceived responsibility, and personal norms were also consistently manifested. Egoistic values received the lowest mean (3.61), suggesting that self-interest is present but less dominant, and overall, HEI consumers exhibit strong sustainability-related characteristics (Aksoy, Martini, & Sen; 2024).

Table 2. Level of Manifestation of Consumer Characteristics among HEI Consumers

Consumer Characteristics	Mean Rating	Verbal Description	Interpretation
Environmental Attitude	4.13	Agree	Often Manifested
Biospheric Values	4.23	Strongly Agree	Always Manifested
Altruistic Values	4.24	Strongly Agree	Always Manifested
Egoistic Values	3.61	Agree	Often Manifested
Personal Norm	4.07	Agree	Often Manifested
Perceived Responsibility	4.13	Agree	Often Manifested
Overall	**4.07**	**Agree**	**Often Manifested**

Level of Manifestation for Intention-Based Factors Among Consumers in HEIs

Presented in Table 3 is the level of manifestation of Intention-Based Factors among consumers in HEIs. The overall mean rating of 4.23, interpreted as "Agree" and described as "Often Manifested," indicates that intention-based determinants of sustainable consumption are generally strong among consumers.

Among the variables, Intention-to-Buy Green Products obtained the highest mean score (4.30, *Strongly Agree*, *Always Manifested*), suggesting that consumers consistently demonstrate a strong willingness to purchase environmentally sustainable products (Sharaf & Isa, 2017). This implies that behavioral intention—a central construct in the Theory of Planned Behavior (TPB) is highly pronounced among the respondents (Abeysekera, et al; 2022).

Table 3. Level of Manifestation of Intention-Based Factors among Consumers

Consumer Characteristics	Mean Rating	Verbal Description	Interpretation
Attitude Towards Sustainable Consumption	4.26	Strongly Agree	Always Manifested
Subjective Norm	4.28	Strongly Agree	Always Manifested
Personal Norm	4.07	Agree	Often Manifested
Perceived Behavioral Control	4.27	Strongly Agree	Always Manifested
Intention-to-Buy Green Products	4.30	Strongly Agree	Always Manifested
Overall	**4.23**	**Agree**	**Often Manifested**

Overall, the findings indicate that intention-based factors—particularly intention, subjective norm, perceived behavioral control, and attitude—are

strongly embedded among consumers, reinforcing the predictive strength of the TPB framework in explaining sustainable consumption practices.

Level of Environmentally-Sustainable Consumption Practices (ESCP)

Presented in Table 3 is the level of ESCP among Filipino consumers. Referred to as the way consumers use goods and services that minimizes negative environmental impact, the overall mean rating of 4.38 with a descriptive level of 'Strongly Agree', and a descriptive interpretation of 'Highly Evident'. This means that consumers reported a very high level of engagement with environmentally-sustainable consumption practices highlighting the idea that respondents were highly-conscious of and active in sustainable consumption. Additionally, this signals that consumers in HEIs consistently prioritizes a product's environmental impact over traditional factors like lower prices or convenience. Thereby, consumers in HEIs are more likely looking for products made with renewable energy, recycled materials (Kuduz, 2022).

Table 3. Level of Environmentally-Sustainable Consumption Practices

	Mean Rating	**Verbal Description**	**Descriptive Interpretation**
ESCP1: I prefer products produced without animals being in pain.	4.42	Strongly Agree	Highly Evident
ESCP2: I choose products produced with respect for animal rights	4.33	Strongly Agree	Highly Evident
ESCP3: I choose products produced with sufficient space for animals.	4.39	Strongly Agree	Highly Evident
ESCP4: I prefer free-range product or choices.	4.33	Strongly Agree	Highly Evident
ESCP5: I prefer products produced without exploitation.	4.40	Strongly Agree	Highly Evident
ESCP6: I choose products produced without child labor.	4.45	Strongly Agree	Highly Evident
ESCP7: I prefer products traded in a fair way.	4.37	Strongly Agree	Highly Evident
ESCP8: I choose products produced with minimal CO_2 emissions.	4.24	Strongly Agree	Highly Evident
ESCP9: I choose products packaged in an environmentally-friendly way.	4.45	Strongly Agree	Highly Evident
ESCP10: I choose a product produced locally or in the region.	4.49	Strongly Agree	Highly Evident
Overall Mean	**4.38**	**Strongly Agree**	**Highly Evident**

Consumer Characteristics' Influence on Environmentally-Sustainable Consumption Practices

Following Hair et al. (2019, 2021), this section presents Model 1 results, including PLS-SEM assessment criteria, multicollinearity tests, model fit indices, and structural model evaluation.

Assessment Criteria in PLS-SEM- Model 1

Table 4 shows that all constructs in Model 1 demonstrate acceptable indicator reliability, except for one Egoistic Values item (Ego_Val2 = 0.614), which remains acceptable for content validity (Hair et al., 2012). In terms of construct reliability, both Cronbach's alpha and Composite Reliability values exceeded the recommended 0.70 threshold, indicating good internal consistency across all constructs. For convergent validity, most constructs achieved acceptable AVE values, with Personal Norm (0.754) and Perceived Responsibility (0.716) showing strong validity, while Environmental Attitude (0.560) remained acceptable but near the threshold. Overall, the measurement model demonstrates adequate reliability and convergent validity, with only minor limitations observed.

Table 4. Summary Results for Reflective Measurement for Model 1

Model	Latent Variable	Indicators	Factor Loadings	Item Reliability	Cronbach's Alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
Model 1	Altruistic Values	Altru_Val1	0.707	0.841	0.686	0.827	0.616
		Altru_Val2	0.831	0.912			
		Altru_Val3	0.811	0.901			
	Biospheric Values	Bios_Val1	0.774	0.880	0.800	0.869	0.624
		Bios_Val2	0.796	0.892			
		Bios_Val3	0.770	0.877			
		Bios_Val4	0.820	0.906			
	Egoistic Values	Ego_Val1	0.771	0.878	0.782	0.862	0.613
		Ego_Val2	0.614	0.784			
		Ego_Val3	0.866	0.931			
		Ego_Val4	0.854	0.924			
	Environmental Attitude	Env_Att1	0.623	0.789	0.805	0.863	0.56
		Env_Att2	0.772	0.879			
		Env_Att3	0.788	0.888			
		Env_Att4	0.741	0.861			
		Env_Att5	0.803	0.896			
	Personal Norm	PN_1	0.850	0.922	0.837	0.902	0.754
		PN_2	0.876	0.936			
		PN_3	0.879	0.938			
	Perceived Responsibility	PerRes_1	0.831	0.912	0.868	0.910	0.716
		PerRes_2	0.851	0.922			
		PerRes_3	0.833	0.913			
		PerRes_4	0.868	0.932			
	Environmentally-Sustainable Consumption Practices	ESCP1	0.533	0.730	0.803	0.865	0.393
		ESCP2	0.603	0.777			
		ESCP3	0.649	0.806			
		ESCP4	0.628	0.792			
		ESCP5	0.681	0.825			
		ESCP6	0.666	0.816			
		ESCP7	0.666	0.816			
		ESCP8	0.552	0.743			
		ESCP9	0.680	0.825			
		ESCP10	0.589	0.767			

The ESCP construct initially showed poor convergent validity (AVE = 0.393) but improved to 0.502 after removing low-loading items, and discriminant validity was confirmed using the Fornell-Larcker criterion as all square roots of AVE exceeded inter-construct correlations (Hair, et al, 2019).

Table 5. Discriminant validity - Fornell-Larcker criterion (Model 1)

	Altruistic Values	Biospheric Values	Egoistic Values	Environmental Attitude	Environmentally-Sustainable Consumption Practices	Perceived Responsibility	Personal Norm
Altruistic Values	**0.785**						
Biospheric Values	0.574	**0.790**					
Egoistic Values	0.364	0.352	**0.783**				
Environmental Attitude	0.435	0.565	0.394	**0.746**			
Environmentally-Sustainable Consumption Practices	0.371	0.312	0.276	0.242	**0.708**		
Perceived Responsibility	0.484	0.437	0.450	0.358	0.450	**0.846**	
Personal Norm	0.438	0.427	0.460	0.356	0.342	0.710	**0.868**

Structural Model Assessment Results for Model 1

Multicollinearity Check. Table 6 shows that Model 1 constructs have VIF values ranging from 1.429 to 2.234 and tolerance values from 0.448 to 0.700, indicating that all predictor variables fall within acceptable thresholds. Based on Hair et al. (2017), these results confirm that no significant multicollinearity exists, allowing the structural model assessment to proceed.

Table 6. Multicollinearity Test Results for Model 1

Model 1		**Collinearity Statistics**	
		Tolerance	VIF
	(Constant)		
	Environmental Attitude	.637	1.570
	Biospheric Values	.531	1.884
	Altruistic Values	.594	1.682
	Egoistic Values	.700	1.429
	Personal Norm	.458	2.183
	Perceived Responsibility	.448	2.234

a. Dependent Variable: Environmentally-Sustainable Consumption Practices

**Guidelines set by Hair et al (2017) in interpreting Tolerance values, and VIFs were used*

Model Fit Evaluation. Table 7 presents the model fit indices (SRMR, d_ULS, d_G, Chi-Square, and NFI), which are reported with caution due to their limited interpretive value in PLS-SEM (Hair et al., 2021). Results show that Model 1 has an excellent fit based on SRMR, as both the saturated and estimated models meet the acceptable threshold set by Hu and Bentler (1999).

Table 7. Results of the Test for Fit Indices (Model 1)

	Model 1	
	Saturated model	Estimated model
SRMR	0.056	0.056
d_ULS	1.278	1.278
d_G	0.391	0.391
Chi-square	1631.550	1631.550
NFI	0.809	0.809

Model 1 showed no discrepancy in both d_ULS (1.272) and d_G (0.388) for the saturated and estimated models, indicating stability and low model complexity. Although the Chi-Square value (1631.550) suggests poor fit, this is commonly influenced by large sample sizes and is often deprioritized in PLS-SEM, while the NFI (0.80–0.89) indicates an acceptable fit, confirming that Model 1 demonstrates generally stable and satisfactory fit indices despite some limitations.

Structural Model Evaluation for Model 1

Figure 1 presents the structural model of Model 1, where Environmental Attitudes, Biospheric Values, Altruistic Values, Egoistic Values, Personal Norms, and Perceived Responsibility predict Environmentally Sustainable Consumption

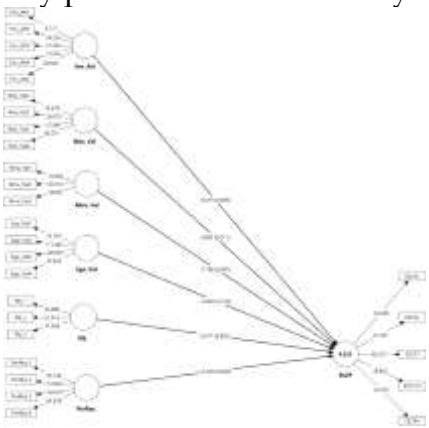

Figure 1. Structural Model Diagram- Model 1

Practices (ESCP). Results show that only Altruistic Values ($\beta = 0.166$, $p = 0.001$) and Perceived Responsibility ($\beta = 0.320$, $p < 0.001$) are significant predictors, with perceived responsibility having the strongest effect. The model explains 23.3% of the variance in ESCP ($R^2 = 0.233$), indicating modest but acceptable explanatory power. Overall, the findings suggest that ESCP among HEI consumers is mainly driven by responsibility-based and altruistic factors,

consistent with the Norm Activation Model and the attitude–behavior gap literature (Stern, 2000).

Results of Hypotheses Testing for Model 1

Table 8 shows that only altruistic values (β = 0.166, p = 0.001) and perceived responsibility (β = 0.320, p < 0.001) have significant positive effects on ESCP, based on the structural model results in Figure 1. This indicates that environmentally sustainable consumption practices are mainly driven by pro-social and responsibility-based factors, while other hypothesized predictors are not significant.

Table 8. Results of structural model analysis for Model 1

Hypotheses	Paths	Beta	T Statistics	P-Values	Results
H_{01}	Environmental Attitude → Environmentally-Sustainable Consumption Practices	*-0.019*	*0.406*	*0.685*	NS
H_{02}	Biospheric Values → Environmentally-Sustainable Consumption Practices	*0.086*	*1.807*	*0.071*	NS
H_{03}	Altruistic → Environmentally-Sustainable Consumption Practices	0.166	3.394	**0.001** **	S
H_{04}	Egoistic Values → Environmentally-Sustainable Consumption Practices	*0.040*	*1.008*	*0.313*	NS
H_{05}	Personal Norm → Environmentally-Sustainable Consumption Practices	*-0.011*	*0.199*	*0.842*	NS
H_{06}	Perceived Responsibility → Environmentally-Sustainable Consumption Practices	*0.320*	*6.280*	***0.000*** **	S

*Note: **p<0.05, based on a two-tailed test; NS= Not Significant; S= Significant*

Intention-Based Factors Influence on ESCP, and the Mediating Role of Intention-To-Buy Green Products

Following the suggestion of Hair et al (2019, 2021), before the structural model evaluation, assessment criteria check for PLS-SEM, structural model assessment in terms of multicollinearity checks and model fit evaluation should be assessed. Presented below are the assessment criteria in PLS-SEM results for Model 2, structural model assessment (for multicollinearity test, and model fit indices' evaluation), and structural evaluation of the model.

Assessment Criteria in PLS-SEM-Model 2

Table 9 shows that Model 2 demonstrates strong indicator reliability, as all constructs achieved factor loadings above 0.70, indicating acceptable measurement quality, although ESCP showed comparatively weaker loadings. Overall, the constructs exhibit good convergent validity with AVE values ranging from 0.602 to 0.754, confirming satisfactory measurement properties with only minor limitations in ESCP.

Table 9. Summary Results for Reflective Measurement for Model 2

Model	Latent Variable	Indicators	Factor Loadings	Item Reliability	Cronbach's Alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
Model 2	Attitude Towards Sustainable Consumption	Att_TSC1	0.787	0.887	0.753	0.859	0.669
		Att_TSC2	0.826	0.909			
		Att_TSC3	0.840	0.917			
	Intention-to-Buy Green Products	IntBuyG1	0.788	0.888	0.843	0.895	0.600
		IntBuyG2	0.824	0.908			
		IntBuyG3	0.856	0.925			
		IntBuyG4	0.829	0.910			
	Perceived Behavioral Control	PBC1	0.724	0.851	0.835	0.883	0.602
		PBC2	0.757	0.870			
		PBC3	0.799	0.894			
		PBC4	0.794	0.891			
		PBC5	0.803	0.896			
	Personal Norm	PN_1	0.849	0.921	0.837	0.902	0.754
		PN_2	0.872	0.934			
		PN_3	0.884	0.940			
	Subjective Norm	SN1	0.779	0.883	0.844	0.895	0.682
		SN2	0.852	0.923			
		SN3	0.856	0.925			
		SN4	0.814	0.902			
	Environmentally-Sustainable Consumption Practices	ESCP1	0.533	0.730	0.830	0.865	0.393
		ESCP2	0.603	0.777			
		ESCP3	0.649	0.806			
		ESCP4	0.628	0.792			
		ESCP5	0.681	0.825			
		ESCP6	0.666	0.816			
		ESCP7	0.666	0.816			
		ESCP8	0.552	0.743			
		ESCP9	0.680	0.825			
		ESCP10	0.589	0.767			

Table 10 shows that all square root of AVE values (diagonal elements) are higher than the inter-construct correlations (off-diagonal elements), confirming discriminant validity based on the Fornell-Larcker criterion. This indicates that Model 2 satisfies the required discriminant validity threshold for PLS-SEM.

Table 10. Discriminant validity - Fornell-Larcker criterion (Model 2)

	Attitude Towards Sustainable Consumption	ESCP	Intention-to-Buy Green Products	Perceived Behavioral Control	Personal Norm	Subjective Norm
Attitude Towards Sustainable Consumption	**0.818**					
ESCP	0.461	**0.708**				
Intention-to-Buy_Green Products	0.584	0.566	**0.825**			
Perceived Behavioral Control	0.631	0.534	0.739	**0.776**		
Personal Norm	0.501	0.342	0.527	0.529	**0.868**	
Subjective Norm	0.710	0.497	0.654	0.727	0.499	**0.826**

Structural Model Assessment Results for Model 2

*Multicollinearity Check***.** Presented in Table 11 is the multicollinearity test result for Model 2. The multicollinearity test is performed to assess any high correlations among the independent variables, because such high correlations may influence the results from the model estimation. The results revealed that the presence of multicollinearity were insufficient in the dataset. Since no multicollinearity issues were detected, the structural model assessment for Model 2 can be carried (Hair, et al, 2021).

Table 11. Multicollinearity Test Result for Model 2

		Collinearity Statistics	
Model 2		Tolerance	VIF
	(Constant)		
	Attitude Towards Sustainable Consumption	.549	1.823
	Subjective Norm	.363	2.757
	Personal Norm	.662	1.511
	Perceived Behavioral Control	.340	2.945
	Intention-To-Buy Green Products	.410	2.440

a. Dependent Variable: Environmentally-Sustainable Consumption Practices

**Guidelines set by Hair et al (2017) in interpreting Tolerance values, and VIFs were used*

Model Fit Evaluation. Table 12 shows that Model 2 has an SRMR of 0.120 and an NFI of 0.795, indicating suboptimal and borderline fit, with d_ULS suggesting reduced stability and higher complexity. However, these indices are not strict criteria in PLS-SEM, so the model remains valid as assessment prioritizes explanatory and predictive measures (Sarstedt, Ringle, & Hair, 2022).

Table 12. Results of the Test for Fit Indices (Model 2)

	Model 2	
	Saturated model	Estimated model
SRMR	0.055	0.120
d_ULS	0.838	4.005
d_G	0.309	0.454
Chi-square	1277.194	1595.618
NFI	0.836	0.795

Intention-Based Factors' Influence on ESCP

Figure 2 shows that Intention-to-Buy Green Products significantly mediates the effects of Attitude Toward Sustainable Consumption (β = 0.133, p = 0.001), Subjective Norm (β = 0.146, p < 0.001), and Perceived Behavioral Control (β = 0.554, p < 0.001). Personal Norm also significantly influences Subjective Norm (β = 0.482, p < 0.001), explaining 23.2% of its variance, while Attitude, Subjective Norm, and Perceived Behavioral Control jointly explain 58.2% of Intention-to-Buy Green

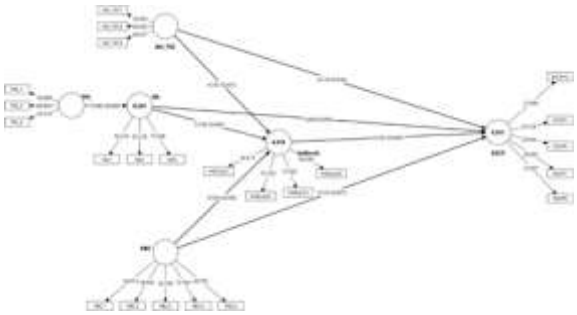

Figure 2. Structural Model Diagram- Model 2

Products (R^2 = 0.582), supporting the Theory of Planned Behavior (Ajzen, 1991). In addition, Perceived Behavioral Control (β = 0.155, p = 0.007) and Intention-to-Buy Green Products (β = 0.322, p < 0.001) both significantly influence ESCP. Overall, the findings confirm the relevance of the extended TPB framework in explaining pro-environmental consumer behavior (Shin, & Hancer, 2016).

Moreover, Table 13 summarizes the structural model results for Model 2. Most hypothesized relationships are statistically significant. Attitude toward sustainable consumption positively influences Intention-to-Buy Green Products (β = 0.134, p = 0.001.

Table 13. Summary Results of structural model analysis for Model 2

	Beta	***T statistics***	***p-values***
Attitude Towards Sustainable Consumption-> Intention-to-Buy Green Products	0.134	3.310	0.001**
Intention-to-Buy Green Products -> Environmentally-Sustainable Consumption Practices	0.334	6.545	0.000**

Perceived Behavioral Control -> Intention-to-Buy Green Products	0.555	14.055	0.000**
Personal Norm_ -> Environmentally-Sustainable Consumption Practices	0.023	2.910	0.004**
Personal Norm-> Intention-to-Buy Green Products	0.070	3.401	0.001**
Personal Norm -> Subjective Norm	0.482	12.158	0.000**
Subjective Norm -> Intention-to-Buy Green Products	0.145	3.693	0.092

*Note: **p<0.01, *p<0.05, based on a two-tailed test; S= Significant*

Mediating Role of Intention-to-Buy Green Products on the Influence of Intention-Based Factors on ESCP

Table 14 shows that Intention-to-Buy Green Products partially mediates the effects of Attitude Toward Sustainable Consumption and Perceived Behavioral Control on ESCP, while it fully mediates Subjective Norm. Overall, the results confirm that intention plays a central mediating role in translating psychological and social factors into environmentally sustainable consumption behavior (Azjen, 2002).

Table 14. Significance Analysis of the Direct and Indirect Effects

Hypothesis		**Direct Effects**	***Confidence Interval for Direct Effects***	***t* value**	***p* value**	**Indirect Effects**	***Confidence Interval for Direct Effects***	***t* value**	***p* value**	**Type of Mediation**
H_{O7}	Attitude Towards Sustainable Consumption -> ESCP	0.114	[0.015, 0.074]	2.875	0.019	0.071	[0.017,0.075]	3.432	0.001	Partial Mediation
H_{O8}	Perceived Behavioral_Control -> ESCP	0.155	[0.117, 0.244]	5.467	0.007	0.178	[0.119,0.245]	5.467	0.000	Partial Mediation
H_{O9}	Subjective Norm -> ESCP	0.084	[0.021, 0.078]	3.196	0.092	0.047	[0.022,0.079]	3.196	0.001	Full Mediation

Mediating variable: Intention-to-Buy Green Products (ITBGP)

Comparative Analyses for Models' Explanatory Power, Effect Sizes, and Predictive Relevance

Coefficient of Determination (R^2)

Table 15 shows that Model 2 (R^2 = 0.348) outperforms Model 1 (R^2 = 0.227) in explaining ESCP, with Intention-to-Buy Green Products showing moderate explanatory power (0.577) and Subjective Norm remaining low (0.231). Overall, this indicates that intention plays a central mediating role in improving predictive performance, supporting the Theory of Planned Behavior and prior studies (Ajzen, 1991).

Table 15. Coefficient of determination (R^2) for Both Models

Model		R Square	R-square adjusted	Interpretation
Model 1	Environmentally-Sustainable Consumption Practices	0.233	0.227	Insufficient explanatory power
Model 2	Environmentally-Sustainable Consumption Practices	0.351	0.348	Weak Explanatory Power
	Intention-to-Buy Green Products	0.579	0.577	Moderate Explanatory power
	Subjective Norm	0.232	0.231	Insufficient Explanatory Power

Hair et al (2021) Threshold for R^2 Interpretation:	*< 0.25*	*Insufficient Explanatory Power*	*0.50 to 0.75*	*Moderate Explanatory Power*
	0.25 to 0.50	*Weak Explanatory Power*	*> 0.75*	*Substantial Explanatory Power*

Effect Sizes (f^2)

Table 16 shows that Model 1 has mostly negligible effect sizes, with only altruistic values and perceived responsibility showing small effects on ESCP, while Model 2 demonstrates stronger effects, including medium effects from personal norm on subjective norm and perceived behavioral control on intention. Overall, Model 2 exhibits greater predictive power and stronger effect sizes than Model 1, consistent with TPB expectations.

Table 16. Effect sizes (f^2) for Models 1 and 2

Model	Constructs	f-square	Effects
Model 1	Altruistic Value -> Environmentally-Sustainable Consumption Practices	0.020	**Small effect**
	Biospheric Values -> Environmentally-Sustainable Consumption Practices	0.003	Negligible or No effect
	Egoistic Values -> Environmentally-Sustainable Consumption Practices	0.003	Negligible or No Effect

	Environmental Attitude -> Environmentally-Sustainable Consumption Practices	0.000	Negligible or No effect
	Personal Norm -> Environmentally-Sustainable Consumption Practices	0.000	Negligible or No effect
	Perceived Responsibility_ -> Environmentally-Sustainable Consumption Practices	0.064	**Small Effect**
Model 2	Attitude Towards _Sustainable Consumption -> ESCP	0.008	Negligible or No effect
	Attitude Towards _Sustainable Consumption -> Intention-to-Buy_Green Products	0.016	Negligible or No effect
	Intention-to-Buy_Green Products -> ESCP	0.070	**Small Effect**
	Perceived Behavioral_Control -> ESCP	0.014	**Small effect**
	Perceived Behavioral_Control -> Intention-to-Buy_Green Products	0.300	**Medium effect**
	Personal Norm -> Subjective Norm	0.332	**Medium Effect**
	Subjective Norm -> ESCP	0.005	Negligible or No Effect
	Subjective Norm -> Intention-to-Buy_Green Products	0.030	**Small effect**

Cohen's (1998) Benchmark for f2 Interpretation:	*Below 0.02*	*Negligible or No Effect*	*0.15 - 0.35*	*Medium (or Moderate) Effect*
	0.02 -0.15	*Small (or Weak) Effect*	*0.35 & above*	*Large (Strong) Effect*

Out of Sample Predictive Power

Table 17 presents the PLSPredict results assessing the out-of-sample predictive power of Model 1 using Q^2 predict, RMSE, MAE, and loss differences (Hair et al., 2021).

Table 17. Comparison of PLS-SEM Predictions with Linear Model (LM) Benchmark for Models 1 and 2

		PLS loss	LM loss	Average loss difference	t value	p value	Q^2 predict	RMSE	MAE
Model 1	Environmentally-Sustainable Consumption Practices	0.291	0.327	-0.035	4.529	0.000	0.216	0.888	0.736
	Overall	**0.291**	**0.327**	**-0.035**	**4.529**	**0.000**			
Model 2	Environmentally-Sustainable Consumption Practices	0.278	0.327	-0.049	6.008	0.382	0.298	0.840	0.694
	Intention-to-Buy Green Products	0.237	0.386	-0.049	6.565	0.000	0.570	0.662	0.498
	Subjective Norm	0.323	0.388	-0.065	4.515	0.000	0.246	0.874	0.672
	Overall	**0.298**	**0.275**	**0.023**	**6.468**	**0.000**			

CONCLUSIONS AND RECOMMENDATIONS

The study concludes that HEI consumers are generally educated and economically active, with most constructs such as consumer characteristics and intention-related variables being highly manifested, while environmentally sustainable consumption practices are also highly evident. In Model 1, only altruistic values and perceived responsibility significantly influenced ESCP, whereas Model 2 showed that most structural relationships were significant except for the effect of subjective norm on ESCP, and mediation analysis confirmed partial and full mediation through intention-to-buy green products. In terms of explanatory power, effect sizes, and predictive relevance, Model 2 consistently outperformed Model 1, making it the better model for explaining and predicting ESCP. Overall, the findings support both the Value-Belief-Norm Theory and the Theory of Planned Behavior in explaining sustainable consumption, integrating moral values and rational decision-making processes.

FURTHER STUDY

Future studies should explore a broader sample across different regions and incorporate longitudinal data to better understand changes in sustainable consumption practices over time.

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