MULTIDISCIPLINARY SCIENCE JOURNAL

RESEARCH ARTICLE
Published Online: February 15, 2025
https://doi.org/10.31893/multiscience.2025401

Key factors shaping students' intention to choose green industrial products: A Hanoi, Vietnam case study

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Abstract The study employs the extended Theory of Planned Behavior to explore the factors influencing students' intention to consume green industrial products in Hanoi. Utilizing SPSS for data analysis, the research gathers insights from 282 students across six universities in Hanoi, Vietnam. The findings confirm that all proposed hypotheses are supported, highlighting five key factors: Attitudes toward green consumption, Subjective norms, Willingness to pay, Perceived behavioral control, and Environmental awareness. These factors collectively shape students' intentions, reflecting a blend of personal beliefs, social influences, and perceived capabilities. The study underscores the importance of promoting environmental education, enhancing market accessibility, and fostering a supportive social environment to encourage green consumption among students. The findings provide valuable insights for policymakers and businesses aiming to engage young consumers in the Vietnamese market, First, raising awareness is crucial. Educational campaigns should be strategically designed to target students through various media channels. Second, enhancing students' willingness to pay for green products requires creating a supportive environment that encourages sustainable purchasing decisions. Third, fostering a social environment that supports green consumption is essential. Policies that reward both consumers and producers for engaging in green practices can create a culture of sustainability. For example, universities could incorporate sustainability modules into their curricula, fostering the generation of environmentally conscious graduates. Finally, enhancing the branding and appeal of green industrial products is vital for their market success. Collaborating with universities to organize targeted training sessions, awareness campaigns, and promotional events can help in this regard. Competitive pricing strategies, coupled with accessible distribution channels, further increase the attractiveness of these products to the student market. These insights could significantly contribute to advancing sustainable consumption patterns within this demographic.

Keywords: green industrial products, consumer's intention, green consumption, willingness to pay

1. Introduction

In Vietnam, the pressing issues of environmental pollution, frequent natural disasters, and increased saline intrusion underscore the urgent need for changes in production and consumption behaviors (Nguyen & Dekhili, 2019). Green industrial products, manufactured via eco-friendly methods and materials, play a vital role in addressing these environmental challenges. These products help reduce emissions, conserve energy, and minimize waste, thus offering significant benefits such as lowering negative ecological and human health impacts, enhancing resource efficiency, creating new business opportunities, and promoting sustainable development within the industrial sector (Phuong et al., 2024).

Consumer intention refers to the likelihood or prediction of consumers purchasing or using a specific product. Studying consumer intention is often a crucial step before the actual purchase or use of a product. Various factors, including environmental, social, economic, and personal factors, can significantly influence consumers' intentions to consume green industrial products. Environmental factors such as awareness of the impact of green products on the environment, including recyclability, energy and material savings, and effects on climate change, play a significant role in the decision-making process (Bamberg, 2003; Rustam et al., 2020; Usman & Balsalobre-Lorente, 2022). Social factors are also important, influencing consumer behavior through community or peer pressure, social role awareness, and the positive impact on the community

 Received: November 12, 2024 | Accepted: December 23, 2024

from using green products (Li et al., 2023; Phuong et al., 2024). Economic factors are related primarily to product pricing, the convenience of using green products, and long-term cost savings (Appolloni et al., 2022; van Birgelen et al., 2009; Zhang et al., 2019). Finally, personal factors include environmental consciousness, personal values, and an understanding of individual roles in environmental protection, all of which can affect consumers' intentions to consume green industrial products (Barbarossa & De Pelsmacker, 2016; Cheah & Phau, 2011; Chen & Chai, 2010).

When the factors influencing the intention to consume green industrial products are studied, several research gaps need to be addressed. First, the subjective norms of students concerning green products must be considered. Although previous studies have mentioned beliefs, attitudes, and environmental awareness, the specific subjective norms regarding green industrial products and their impact on the intention to consume these products have not been fully explored. Additionally, most current research has focused on the intention to consume green products in general rather than green industrial products specifically. Furthermore, the influence of peer groups and social media on students' intentions to consume green industrial products needs more research. The potential role of education and social awareness is also worth exploring. The impact of education and social awareness on students' intentions to consume green industrial products has not been thoroughly studied. Additionally, research on students' consumption intentions remains limited, with previous studies not focusing specifically on the Hanoi area. Finally, the influence of personal drive and individual values on the intention to consume green industrial products is an important aspect that warrants further investigation.

This study seeks to address these gaps by examining the factors influencing students' intentions to consume green industrial products in Hanoi, Vietnam. It analyzes key elements such as attitudes toward behavior, subjective norms, environmental awareness, willingness to pay, and perceived behavioral control. The objective is to provide actionable insights and propose strategies to encourage green industrial product consumption among students, thereby contributing to broader efforts toward environmental sustainability in Vietnam.

2. Theory and hypothesis development

2.1. Key concepts

2.1.1. Green Products and Green Industrial Products

According to Mehta & Chahal (2021), green products are produced via green technology and do not harm the environment. Green products have the following characteristics: they are recyclable, reusable, and biodegradable; they are made from natural raw materials; they can be recycled and reused; they are free of harmful chemicals; they are free of chemicals not yet approved for use; they do not harm or pollute the environment; and they are not tested on animals. Additionally, green products incorporate recycling and environmental nonpollution, minimize plastic packaging, or use fewer toxic materials to reduce the impact on the natural environment (Yadav & Pathak, 2017). In Vietnam, green products are considered nontoxic products that use energy and water efficiently and are harmless to the environment (Prime Minister, 2012).

There are two different understandings of the concept of green industrial products: (i) The concept of green industrial products as products of the green industry is based on the definition of the green industry. According to Huzaifa et al. (2023), green industry activities increase energy and resource use efficiency, minimize environmental pollution, and protect and improve the environment. According to UNIDO (2018), the green industry involves sustainable economic development activities through public investment and the implementation of public policies to encourage environmentally responsible investment from the private sector. Thus, green industrial products have characteristics that increase energy and resource use efficiency, minimize environmental pollution, and protect and improve the environment. This makes the concept of green industrial products in this context similar to the concept of green products. (ii) The concept of green industrial products as green products within the industry is based on the classification of green products. Currently, there are many ways to classify green products. The two main classifications are by environmental protection purpose and byproduct industry group. According to Appolloni et al. (2022), green products are classified into different groups, such as green transportation products, green building products, green household products, and many other energy- and resource-saving products. Thus, green industrial products are a subset of green products.

Currently, there are no official statistical data in Vietnam on the current state of production and business of both green products and green industrial products. Overall, green industrial products constitute a significant proportion of green products (Nguyen & Dekhili, 2019). The two main groups of green industrial products are energy-saving products and products bearing the Vietnam Green Label, with energy-saving products making up the majority. Some industrial products are essentially green industrial products but have not yet been recognized as such. Policies to promote and encourage the consumption of green industrial products focus mainly on economic benefits for consumers.

On the basis of the above analysis, this paper adopts the concept of green industrial products as green products within the industrial sector. In other words, green industrial products in Vietnam are understood as products of the industrial sector that possess one or more of the following characteristics: recyclability, reduced packaging, minimal use of raw materials, and minimal environmental impact.

2.1.2. Intention to Consume Green Products and Intention to Consume Green Industrial Products

Yadav & Pathak (2017) define the intention to purchase green products as the probability and willingness of a person to prioritize environmentally friendly products over traditional products during their purchasing consideration process. The intention to purchase green products is defined as an individual's interest in and preference for green products over conventional products during the decision-making process (Dagher & Itani, 2014). In summary, the intention to purchase green products is the consumer's interest, preference, and willingness to prioritize and purchase environmentally friendly products over conventional products during their purchasing process.

A unified definition of the intention to consume green industrial products needs to be unified. The intention to consume green industrial products by students can be understood as a stage in the intention to consume green industrial products that benefit the environment through the use and disposal of green industrial products with characteristics such as minimal use of raw materials, reduced packaging, nontoxic components, energy and fuel savings, health safety, and the ability to be recycled and reused.

2.2. Theoretical Framework

The theoretical framework for consumer behavior includes several key theories:

Based on TRA, in 1991, Icek Ajzen further developed the TPB by incorporating the element of perceived behavioral control, which represents factors that individuals have less control over. According to this model, perceived behavioral control influences behavioral intention. Perceived behavioral control reflects how easy or difficult it is to perform the behavior and the extent to which performing the behavior is restricted or controlled. Like the TRA, the TPB focuses on studying behavioral intentions rather than actual behavior (Ajzen, 1991). The TPB has been recognized by many researchers and used to study consumer behavior in general and green product consumption behavior in particular. The TPB, including the concept of perceived behavioral effectiveness, is used to study green product consumption (Cheah & Phau, 2011; Chen & Chai, 2010; Zaremohzzabieh et al., 2021).

The value-attitude-behavior (VAB) theory, proposed by Homer & Kahle (1988), suggests that personal values are fundamental determinants of behavior, with attitudes serving as the mediating factor between values and behavior. This theory has been widely applied in various fields, including environmental psychology and consumer behavior, to understand how deeply held values influence specific actions. In the context of green purchasing, VAB theory emphasizes the importance of environmental concern, which is a reflection of an individual's broader value system that prioritizes ecological well-being. This concern then translates into pro-environmental attitudes, such as a positive self-image associated with being environmentally responsible and favorable attitudes toward green products. These attitudes, in turn, motivate consumers to engage in green purchasing behaviors, as they align with their core values (Cheah & Phau, 2011; Huzaifa et al., 2023; Tan & Lau, 2010; Zaremohzzabieh et al., 2021). The theory highlights the interconnectedness of values, attitudes, and behaviors, suggesting that fostering strong environmental values and positive attitudes toward green products can lead to more consistent and widespread adoption of sustainable consumption practices.

The theory of self-perception (TSP), developed by Bem (1967), offers a complementary perspective by focusing on the role of attitudes in shaping behavior. According to this theory, individuals infer their attitudes from their behaviors, especially in situations where their attitudes are ambiguous or not well defined. This process of self-perception can lead to a reinforcing cycle, where engaging in a particular behavior strengthens the corresponding attitude, which in turn makes the behavior more likely to occur again in the future. In the context of green purchasing, the TSP explains why individuals who choose to buy environmentally friendly products are also likely to engage in related pro-environmental behaviors, such as proper disposal of these products or reducing their overall environmental impact. Both behaviors reflect a shared pro-environmental attitude, which is reinforced each time the individual engages in green behavior (Ali et al., 2023; Song et al., 2021; van Birgelen et al., 2009). This theory underscores the importance of initial behavior change in promoting long-term proenvironmental habits, suggesting that encouraging consumers to take even small steps toward green purchasing can have a lasting effect on their overall consumption patterns.

2.3. Hypotheses Development

On the basis of the scientific foundation provided by fundamental theoretical models, including consumer behavior theory, the theory of planned behavior (TPB) by Ajzen (1991), the value-attitude-behavior (VAB) theory by Homer & Kahle (1988), and the theory of self-perception (TSP) by Daryl (1967) and Marcel et al. (2009), along with previous domestic and international studies, this research identifies five factors influencing students' intention to consume green industrial products: attitude toward behavior, subjective norms, willingness to pay, perceived behavioral control, and environmental awareness.

According to Ajzen (1991), attitudes toward a behavior—whether positive or negative—play a critical role in shaping behavioral intentions. Attitudes reflect an individual's overall evaluation of behavior and are often based on beliefs about the consequences of engaging in that behavior. In the context of green products, a positive attitude is typically formed when

consumers believe that purchasing green products contributes to environmental sustainability, aligns with their personal values, or enhances their self-image as responsible consumers. Research consistently shows that a positive attitude toward green products significantly enhances the intention to purchase them (ElHaffar et al., 2020; Mehta & Chahal, 2021; Zaremohzzabieh et al., 2021). This finding suggests that when students hold favorable attitudes toward green industrial products, they are more likely to express an intention to consume these products. Therefore, *H1: Attitude toward green industrial products positively impacts students' intention to consume* them.

Ajzen (1991) also emphasized the role of subjective norms in influencing behavioral intentions. Subjective norms refer to the perceived social pressure from significant others, such as family members, friends, or societal groups, to perform or not perform a particular behavior. In the case of green product consumption, subjective norms could include expectations from one's social circle to engage in environmentally responsible purchasing or to align with the broader societal trend toward sustainability. While most studies confirm that subjective norms positively influence the intention to purchase green products (Li et al., 2023; Quynh & Phuong, 2023; Xu et al., 2022), some research suggests that this influence may vary depending on the context or the strength of the social pressure (Roh et al., 2022). These mixed findings indicate that the impact of subjective norms on green purchasing intentions is complex and may be moderated by factors such as cultural background, social identity, or individual differences in susceptibility to social influence. Hence, *H2: Subjective norms toward green industrial products positively impact students' intention to consume green industrial products.*

Willingness to pay reflects an individual's readiness to incur extra costs for green products, which are often priced higher due to their environmentally friendly attributes. Willingness to pay is influenced by various factors, including the perceived benefits of green products, the individual's environmental value, and the perceived financial impact of higher prices. Studies on this topic have produced mixed results: some suggest that environmentally conscious consumers may be willing to overlook higher prices in favor of the long-term environmental benefits and personal satisfaction derived from purchasing green products (Zhang et al., 2019; Yadav & Pathak, 2017). However, other studies find that there is resistance to paying more, particularly among consumers who prioritize economic considerations over environmental concerns (Irfan et al., 2020). These conflicting findings suggest that willingness to pay may vary depending on the specific context, the perceived value of green products, and the financial constraints faced by consumers. Therefore, *H3: Willingness to pay positively influences the intention to consume green industrial products.*

Perceived behavioral control refers to an individual's perception of how easy or difficult it is to perform a particular behavior, which can affect both behavioral intentions and actual behavior (Ajzen, 1991). In the context of green purchasing, perceived behavioral control might involve factors such as the availability of green products, the ease of finding information about their environmental benefits, or the consumer's confidence in their ability to make environmentally responsible choices. Research shows that perceived behavioral control has a weak but positive effect on the intention to purchase green products (Lim & Weissmann, 2023; Vamvaka et al., 2020). This suggests that while perceived behavioral control may not be the strongest predictor of green purchasing intentions, it still plays a role in shaping consumers' decisions, particularly when they feel empowered to make sustainable choices. Thus, *H4: Perceived behavioral control toward green industrial products positively influences the intention to consume green industrial products among students.*

Finally, environmental concern is a key factor that reflects an individual's personal values and beliefs about the importance of protecting the environment. Environmental concern is directly related to the intention to purchase eco-friendly products, as individuals who are deeply concerned about environmental issues are more likely to seek out and purchase products that align with their values (Huzaifa et al., 2023; Rustam et al., 2020; Song et al., 2021). Studies also highlight the influence of environmental concern on green consumption, indicating that consumers who prioritize environmental protection are more likely to adopt sustainable consumption behaviors (Tri, 2022). Therefore, *H5: Environmental concern positively influences the intention to consume green industrial products among students.*

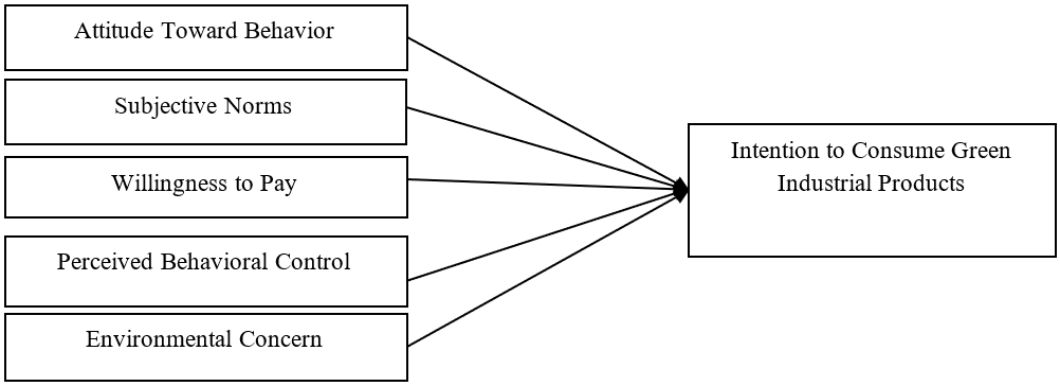

Figure 1 Proposed Research Model.
Source: Survey (2024).

A research model with five factors involving students' intentions to consume green industrial products in Hanoi, Vietnam, is depicted in the following diagram:

3. Research Methodology

3.1. Questionnaire development

The study employed a focus group method involving 10 students in Hanoi city. Surveys were conducted through group interviews using predefined questions adapted on the basis of discussion dynamics. Following the discussions, identified factors needing modification or supplementation to align with the research objectives were refined. A formal questionnaire was subsequently developed. Preliminary research has helped identify deficiencies in the scale, factors, and observed variables influencing students' intention to consume green industrial products in Hanoi, which were not addressed in this study. The research instrument details are presented comprehensively in Table 1.

Table 1 Measurement Scale Table.

Code	Attitude Toward Behavior	Source
A1	In the near future, I will consider purchasing products that are less polluting, consume fewer resources, and save energy.	(Li et al., 2023; Mehta & Chahal, 2021; Tan & Lau, 2010)
A2	In the near future, I will consider purchasing green industrial products to replace the current ones for environmental protection reasons.	
A3	I intend to buy products with eco-labels and energy-saving features when shopping.	
A4	I intend to buy green industrial products because they do not or minimally harm the environment.	
	Subjective Norms	
SN1	People who are important to me think that I should buy eco-friendly products.	(Phuong et al., 2024; Quynh & Phuong, 2023; Xu et al., 2022)
SN2	My family expects me to purchase green products.	
SN3	My friends believe that buying energy-efficient products is a good idea.	
SN4	People whose opinions I value prefer me to buy environmentally friendly products.	
	Willingness to Pay	
WP1	I am willing to pay more for products that are environmentally friendly.	(van Birgelen et al., 2009; Zhang et al., 2019)
WP2	I would spend extra money to purchase green products.	
WP3	Paying a premium for eco-friendly products is acceptable to me.	
WP4	I am ready to pay a higher price for products that are energy efficient and sustainable.	
	Perceived Behavioral Control	
PBC1	I feel confident that I can buy environmentally friendly products even if they are more expensive.	(Li et al., 2023; Vamvaka et al., 2020)
PBC2	I am able to choose green products despite external pressures (such as social norms or marketing).	
	Environmental Concern	
EC1	I am aware of the environmental issues caused by pollution.	(Bamberg, 2003; Usman & Balsalobre-Lorente, 2022; Zameer & Yasmeen, 2022)
EC2	I understand the impact of excessive resource consumption on the environment.	
EC3	I am knowledgeable about the benefits of using eco-friendly products.	
EC4	I stay informed about environmental conservation efforts.	
	Intention to Consume Green Industrial Products	
I1	I intend to buy green industrial products in the future.	(Barbarossa & De Pelsmacker, 2016; Kennedy & Adhikari, 2022; Kumar et al., 2017; Zaremohzzabieh et al., 2021)
I2	I am likely to purchase green industrial products as a regular habit.	
I3	I am committed to buying green industrial products for the sake of the environment.	

3.2. Data collection method

The survey targets students and learners from six universities in Hanoi who have consumed green industrial products and who are employed with various characteristics (gender, occupation, etc.). Convenience sampling via survey questionnaires is employed for initial data collection. Nonprobability sampling methods involve random samples used for the main survey,

which are distributed via email, messaging platforms, Facebook, Zalo, etc., via randomized survey forms. Surveys are conducted via Google Forms to accurately reflect participant requirements and attitudes. Valid survey results can be used as input data for analysis processes.

Fidell & Tabachnick (2003) calculates the total sample size (N) as N = 8*m + 50, where m represents the number of independent study variables. For this research topic, with a confidence level of 95% and a permissible error of 5%, the recommended sample size is 290 respondents on the basis of previous methods of sample size determination.

4. Results

4.1. Profiles of the respondents

From the 290 survey forms distributed for the study in Hanoi, 282 responses were collected, resulting in a response rate of 97.24%. After excluding invalid survey responses, such as those with many unanswered questions, multiple responses to a single question, or indications of unreliability (such as selecting the same response across all questions), the number of valid survey forms remaining was 282, maintaining a response rate of 97.24%. In summary, the statistical results and tests presented below are based on the processing and analysis of data obtained from these 282 valid survey forms.

4.2. Assessing the reliability of variables

These results from Table 2 indicate that all the attitude scales used in the study have good internal consistency reliability, as evidenced by Cronbach's alpha coefficients above 0.6 and satisfactory interitem correlations. Therefore, all observed variables within each scale contribute effectively to measuring the respective constructs.

Table 2 Reliability Analysis of the Measurement Scale via Cronbach's Alpha Coefficient.

Variable	Mean	Variance	Correlation Coefficient	Cronbach's Alpha (if applicable)
Cronbach Alpha = 0.833				
A1	10.68	5.428	.642	.798
A2	10.86	5.109	.733	.757
A3	10.84	5.463	.648	.796
Cronbach Alpha = 0.770				
SN1	11.25	3.853	.600	.698
SN2	11.29	3.972	.586	.706
SN3	11.24	3.949	.613	.692
SN4	11.25	4.410	.486	.757
Cronbach Alpha = 0.790				
WP1	10.87	5.471	.547	.763
WP2	10.88	4.972	.621	.726
WP3	10.98	5.114	.618	.728
WP4	10.85	5.112	.607	.733
Cronbach Alpha = 0.691				
PBC1	3.81	.715	.528	
PBC2	3.88	.678	.528	
Cronbach Alpha = 0.830				
EC1	10.84	5.712	.693	.771
EC2	10.90	5.908	.624	.801
EC3	10.78	5.608	.626	.801
EC4	10.79	5.374	.693	.769
Cronbach Alpha = 0.729				
I1	7.88	2.270	.586	.602
I2	7.98	2.152	.587	.598
I3	7.95	2.336	.485	.722

Source: SPSS results (2024).

On the basis of these EFA results (Table 3), the data exhibit sufficient sampling adequacy (KMO > 0.5). There is a significant correlation among the observed variables (sig. < 0.05). The eigenvalues suggest meaningful factors. The factors extracted explain a substantial portion (65.882%) of the variance in the original variables. These findings collectively support the suitability and validity of conducting factor analysis on the dataset, affirming that the data are well suited for identifying underlying factors that explain the relationships among observed variables.

4.3. Regression Results

Table 4 shows that the adjusted R^2 of 0.299 indicates that the variables EC, SN, A, PBC, and WP explain 29.9% of the variance in students' intention to consume green industrial products in Hanoi, leaving 70.1% unexplained by the model. The

correlation coefficient of 0.558 confirms the model's suitability. The remaining 70.1% variance may be due to factors not included, such as personal values or characteristics such as gender and income. The Durbin–Watson statistic of 1.872, within the acceptable range of 1--3, confirms that there is no first-order autocorrelation among the residuals, upholding the assumption of error independence.

Table 3 EFA analysis results.

Coding	Factor				
	1	2	3	4	5
A2	.843				
A3	.793				
A1	.787				
A4	.758				
EC4		.819			
EC1		.806			
EC2		.777			
EC3		.743			
WP3			.793		
WP2			.758		
WP4			.752		
WP1			.704		
SN3				.781	
SN2				.776	
SN1				.763	
SN4				.684	
PBC2					.835
PBC1					.817
Cronbach's Alpha	0.833	0.770	0.790	0.691	0.830
Kaiser–Meyer–Olkin Measure of Sampling Adequacy					0.819
Bartlett's Test of Sphericity			Approx. Chi-Square		1814.375
			Degrees of Freedom (df)		153
			Significance Level (Sig.)		.000
Total Variance Explained			65.882%		65.882% > 50%
Lowest Eigenvalue			1.574		1.574 > 1

Source: SPSS results (2024).

Table 4 Significance of the Model Coefficient.

Model Summary					
Model	R	R^2	R2 Adjustment	Standard Deviation	Durbin-Watson
1	.558[a]	.312	.299	.58953	1.872

a. Independent Variables: Constant, EC, SN, A, PBC, WP. b. Dependent Variable: I. *Source:* SPSS results (2024).

In Table 5, the significance test results for the regression coefficients Sig = 0. This indicates that the independent variables in the model are linearly correlated with the dependent variable, meaning that the combination of independent variables can explain the variation in the dependent variable. Therefore, the regression model is appropriate for the data and can be used.

Table 5 ANOVA results of the model analysis.

						ANOVAa
Model		Sum of Squares	df	Mean Square	F Test	Sig.
1	Regression	43.456	5	8.691	25.007	.000[b]
	Residual	95.923	276	.348		
	Total	139.379	281			

a. Dependent Variable: I. b. Independent Variables: Constant, EC, SN, A, PBC, WP.
Source: Author's SPSS results (2024)

The regression results (Table 6) clearly indicate that the independent variables A, SN, WP, PBC, and EC all have significance levels (p values) less than 0.05, indicating their significance at the 95% confidence level. Therefore, at the 95% confidence level, these independent variables all influence the dependent variable (I). The standardized regression coefficients (Beta) for each predictor are all positive, indicating that these variables positively contribute to I. Thus, hypotheses H1, H2, H3, H4, and H5 are all accepted on the basis of these findings. The regression model also shows no multicollinearity among the independent variables, as all the VIFs are less than 10, indicating that there are no issues with multicollinearity. Therefore, the

linear regression model is entirely meaningful and appropriate for explaining the relationship between the independent variables and the intention to consume green industrial products.

Table 6 Regression Results.

Model		Regression Coefficient		Standardized Regression Coefficient	t value	Sig.	Collinearity Diagnostics	
		B	Standard Deviation	Beta			Tolerance	VIF
1	Constant	.837	.285		2.932	.004		
	A	.144	.050	.154	2.862	.005	.860	1.163
	SN	.233	.058	.214	4.001	.000	.873	1.146
	WP	.200	.054	.208	3.683	.000	.778	1.285
	PBC	.145	.053	.150	2.731	.007	.830	1.205
	EC	.125	.052	.137	2.424	.016	.781	1.280
Dependent Variable: I								

Source: SPSS results, 2024.

The importance of each variable (A, SN, WP, PBC, and EC) with respect to (I) is assessed on the basis of standardized beta coefficients. The larger the absolute value of the standardized beta coefficient is, the more important the variable is in influencing the intention to consume green industrial products. Therefore, the variables ranked by their importance in influencing the dependent variable (I) are as follows: (SN) with Beta = 0.214, (WP) with Beta = 0.208, (A) with Beta = 0.154, (PBC) with Beta = 0.150, and (EC) with Beta = 0.137. These rankings highlight that SN and WP are the most significant factors influencing the intention to consume green industrial products, followed by A, PBC, and EC.

The linear regression equation for the dependent variable I (the intention to consume green industrial products) is represented as follows:

$$I= 0,154A + 0,214SN + 0,208WP + 0,150PBC + 0,137EC + \varepsilon$$

In this model, the factor that most strongly influences the intention to consume green industrial products among students is SN, with a standardized beta coefficient of 0.214, which is dominant over A, WP, PBC, and EC. This finding indicates that subjective norms play a crucial role in students' decision-making regarding the consumption of green products.

5. Discussion of Research Findings

The regression model (unstandardized form) for the intention to consume green industrial products among students in Hanoi is defined as follows:

$$I= 0,154A + 0,214SN + 0,208WP + 0,150PBC + 0,137EC + \varepsilon$$

The research findings suggest that a variety of factors significantly impact the intentions of students in Hanoi to consume green industrial products. The strength of these influences is quantitatively demonstrated through beta coefficients, where higher coefficients correspond to a more substantial impact on students' green consumption behavior. This nuanced understanding underscores the importance of these factors in shaping the eco-friendly purchasing habits of this demographic.

The increasing demand for green industrial products among students is closely linked to heightened environmental awareness, which is particularly strong among younger generations. This growing consciousness is not an isolated trend but aligns with a broader global movement toward sustainability, which has been documented in numerous studies. Researchers such as Song et al. (2021); Yang et al. (2021) have reported on the proliferation of green products across various markets, driven by this expanding environmental awareness. Their work highlights that the demand for green products is not only growing but also becoming increasingly diversified to cater to different consumer preferences, further emphasizing the depth and breadth of this trend.

Family, peers, and social networks are identified as critical influences on students' green industrial consumption habits, with family members, particularly parents, playing a predominant role. Research suggests that parents who prioritize environmental sustainability are more likely to instill these values in their children, thereby fostering a stronger preference for green products among the younger generation. This finding is consistent with the work of Li et al. (2023); Xu et al. (2022), who demonstrated the intergenerational transmission of environmental values and their subsequent impact on green consumption. The role of the family in shaping environmental values highlights the importance of early education and consistent messaging about sustainability within the home.

Price sensitivity emerges as another critical factor influencing students' decisions regarding green industrial products. Many students weigh the cost-effectiveness of green products against their environmental benefits, a process that reflects a broader trend in consumer behavior. This decision-making dynamic mirrors the findings of Appolloni et al.,(2022); van Birgelen et al. (2009); Zhang et al. (2019), who identified affordability as a key determinant in the choice of environmentally friendly products. The tension between the desire to make environmentally responsible choices and the need for economic practicality is a recurring theme in the literature, underscoring the complexities involved in promoting green consumption among price-sensitive consumers such as students.

Additionally, students who are actively engaged in environmental matters exhibit a stronger preference for green industrial products. These students tend to be more involved in environmental activities and display a proactive attitude toward sustainability, setting them apart from their less-engaged peers. This behavior pattern is corroborated by Kumar et al., (2017); Yang et al., (2021), who highlighted the connection between environmental activism and a greater propensity for green consumption. The findings suggest that fostering environmental engagement among students could be a key strategy in promoting the consumption of green industrial products.

Access to information about green industrial products is another vital factor that empowers students to make informed purchasing decisions. The availability of this information, whether through media channels or the presence of green products in retail stores, plays a crucial role in enhancing students' ability to choose environmentally friendly options. This access is further reinforced by students' awareness of broader environmental issues, such as climate change, which strengthens their commitment to opting for green products over conventional alternatives. Bamberg, (2003); Vamvaka et al., (2020) emphasized the importance of environmental education in shaping sustainable consumption behaviors, indicating that increased efforts to provide students with relevant information could significantly increase their preference for green products.

6. Conclusions

This research extends the theory of planned behavior to understand the determinants influencing students' intention to consume green industrial products in Hanoi. By analyzing data from 282 students across six universities, this study validates the importance of attitudes toward green consumption, subjective norms, willingness to pay, perceived behavioral control, and environmental awareness in shaping these intentions. The results of this study demonstrate the positive impact of various factors on the intention to consume green industrial products among students in Hanoi, reflecting current trends in which students are concerned with and eager to contribute to environmental protection through their choices of green industrial products. Specifically, the intention to consume green industrial products among students in Hanoi is influenced by factors such as subjective norms, willingness to pay, attitudes toward behavior, perceived behavior control, and environmental awareness.

7. Implication

On the basis of the findings of this study, several actionable recommendations can be proposed to increase the consumption of green industrial products among students in Hanoi. First, raising awareness is crucial. Educational campaigns should be strategically designed to target students through various media channels, including social media platforms, television, and print media, ensuring that the message resonates with different student demographics. Universities can collaborate with businesses and environmental organizations to host workshops, seminars, and events that promote the benefits of green products, emphasizing both environmental and personal health benefits. Second, enhancing students' willingness to pay for green products requires creating a supportive environment that encourages sustainable purchasing decisions. This could involve offering financial incentives such as discounts, loyalty programs, or even subsidies for students who choose green products. Additionally, businesses should be encouraged to participate in these initiatives through government-supported programs that provide tax breaks or grants to companies committed to producing and selling green industrial products. Strict regulatory frameworks should also be implemented, focusing on product lifecycle management, including recycling, waste disposal, and overall environmental impact, with rigorous monitoring to ensure compliance. Third, fostering a social environment that supports green consumption is essential. Policies that reward both consumers and producers for engaging in green practices can create a culture of sustainability. For example, universities could incorporate sustainability modules into their curricula, fostering the generation of environmentally conscious graduates. Moreover, creating platforms for peer influence, such as student-led green clubs or social media campaigns, can increase the importance of green consumption within student communities. Finally, enhancing the branding and appeal of green industrial products is vital for their market success. Businesses should invest in branding strategies that emphasize the unique environmental and health benefits of their products. Collaborating with universities to organize targeted training sessions, awareness campaigns, and promotional events can help in this regard. Competitive pricing strategies, coupled with accessible distribution channels, further increase the attractiveness of these products to the student market.

8. Future Research Directions

Despite its contributions, this study has several limitations. This research focuses primarily on students in Hanoi, which may limit the generalizability of the findings to other regions or populations. Future studies should consider expanding the geographical scope to include other cities or rural areas in Vietnam, as consumer behavior might differ across regions due to varying socioeconomic conditions and levels of environmental awareness. Additionally, while the study integrates key factors such as attitudes, subjective norms, willingness to pay, perceived behavioral control, and environmental awareness, there may be other influential factors not considered in this model. For example, the role of peer influence, marketing effectiveness, and personal financial constraints could provide a more comprehensive understanding of students' intentions. Future research

should aim to include these variables, along with longitudinal studies that track changes in behavior over time, to capture the evolving nature of consumer intentions in response to environmental and market dynamics.

Acknowledgments

Thank you to lecturers from VNU University of Economics and Business, Vietnam National University, Hanoi, Vietnam, for supporting this research.

Ethical consideration

This study was performed in line with the principles of the Ethics Committee of Vietnam National University, Hanoi, Vietnam. Participants provided their consent to participate in the study as they responded to our interview. In the instructions, the participants were informed about the survey, including information that the collected data would be used in publication, the anonymity of the respondents, that only the researchers had access to and used the data, and that taking part in the survey was voluntary.

Conflicts of interest

The authors declare no conflicts of interest.

Funding

This research did not receive any funding.

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