Discover Sustainability

Research

Consumer transition: analyzing the impact of environmental and health consciousness on green food choices in Vietnam

Nguyen Van Phuong[1,3] · Marcus Mergenthaler[2] · Pham Ngoc Huong Quynh[1]

Received: 23 January 2025 / Accepted: 7 May 2025
Published online: 20 May 2025

Abstract
On the background of a growing global emphasis on sustainable consumption and the need to understand how environmental and health consciousness influence green food preferences, this research investigates the psychological factors influencing Vietnamese consumers' transition to green food choices. Building on the Theory of Planned Behavior (TPB), we extend the model by incorporating environmental and health consciousness two additional constructs to understand their impacts on green food purchase intention and behavior. Data was collected from 569 consumers in Hanoi in face-to-face interviews, and Partial Least Squares Structural Equation Modeling (PLS-SEM) was used for analysis. Key findings reveal that green food purchase intention is a strong predictor of actual purchase behavior. Perceived behavioral control and social influence significantly affect purchase intention, while positive attitudes towards green food also play a crucial role. Besides, environmental concern has a significant impact on attitudes and green food purchase intention, because it plays an essential role in promoting sustainable consumption. In addition, health consciousness directly affects the purchase intention of green food but does not change overall attitude, indicating that health-related motives are distinct drivers of green food purchases in the Vietnam market. Our study is a unique contribution to the literature by the integration of environmental and health consciousness into the TPB framework and its application in a developing country context. The findings offer practical implications for policymakers and businesses aiming to encourage sustainable consumption patterns in Vietnam.

Keywords Green food purchase behavior · Sustainable consumption · Psychological factors · Vietnamese consumers

1 Introduction

In recent years, the demand for green products has surged due to a growing necessity for environmental protection and sustainable development [20, 41]. Green consumption, which is related to environmentally responsible behavior is crucial for more environmentally friendly production methods and for a more sustainable food systems [5]. Green foods, which are produced using environmentally friendly methods, are commonly defined as environmentally sustainable food products, minimizing environmental impacts and often ensuring health benefits for consumers [45]. A concise definition of green foods that highlights their environmentally friendly production methods and health benefits is essential to understand the scope of this research [7, 10]. There is a significant impact of psychological factors on consumer behavior towards green foods [6, 49, 61]. A key component of realizing sustainable development goals is the shift towards

✉ Pham Ngoc Huong Quynh, quynhphamnh@vnu.edu.vn; Nguyen Van Phuong, vanphuong@vnu.edu.vn; Marcus Mergenthaler, mergenthaler.marcus@fh-swf.de | [1]VNU University of Economics and Business, Vietnam National University, Hanoi, Vietnam. [2]South Westphalia University of Applied Sciences, Soest, Germany. [3]O.P. Jindal Global University, Sonipat, India.

sustainable consumption, especially in developing nations facing increasing environmental and health concerns challenges [15, 24]. This transition is presented as a key motivation behind the study. Especially in developing countries like Vietnam, the trend of green food consumption has risen because rapid industrialization and urbanization have led to increasing environmental threats [18, 58], highlighting the need to study the factors driving sustainable consumption behavior. This study hypothesizes that psychological factors are driving the transition to sustainable consumption and that sustainable consumption is a vital goal in the context of global sustainable development.

To foster sustainable consumer behavior, a clear understanding of the psychological factors influencing consumers' green food purchase decisions is necessary [35]. Psychological factors including environmental concerns, health consciousness, and social influence have a great impact in shaping consumers' attitudes and promoting green food purchase behavior [13, 38]. According to the theory of planned behavior (TPB), attitude, perceived behavioral control, and subjective norms have important effects on intention and actual behavior [1]. In the field of green food consumption, attitudes toward green food reflect positive or negative evaluations of green food products. In addition, perceived behavioral control, which refers to the ease or difficulty of performing a behavior, is also a factor that influences consumers' green food purchase intention [33, 53]. Social influence refers to the impact of people around them such as family members, friends, and social norms on consumers' green food purchase intention and behavior [4, 59]. Consumers are more likely to purchase green food products when people around them support such behaviors [14, 54]. In addition, environmental concern refers to the extent to which consumers are aware of and concerned about environmental issues and their willingness to engage in consumption behaviors that reduce environmental impacts [28]. Furthermore, health consciousness represents the extent to which consumers are aware of and concerned about their health, thereby making healthier food choices to protect their health [30, 34]. While there is a substantial body of research on green consumption behavior, a gap remains in understanding the psychological determinants influencing green food purchasing decisions in Vietnam, a developing country undergoing rapid industrialization and urbanization.

In Vietnam, consumers are increasingly environmentally conscious and have begun to prioritize the use of green food products in the hope of bringing health benefits and limiting environmental impacts [15, 24]. It is the growing concerns about environmental degradation and food safety that have increased the demand for sustainable consumption [24]. The Vietnamese government has issued various policies and initiatives to promote sustainable agricultural production and green consumption, which indicates the country's commitment to sustainable development [45]. However, despite initial positive fundamental changes, consumer awareness of green products is still limited, and the green food market in Vietnam remains underdeveloped [43, 57]. Therefore, understanding the factors that encourage Vietnamese consumers to purchase green food is crucial for promoting green consumption.

This study aims to fill above research gap by investigating the psychological factors influencing Vietnamese consumers' transition to green food choices, focusing on environmental and health consciousness in shaping Vietnamese consumers' green food purchasing decisions. This study seeks to answer the following research questions: (1) How do environmental concerns, health consciousness, and social influence affect Vietnamese consumers' attitudes toward green food? (2) What is the impact of these attitudes, perceived behavioral control, and social influence on their intention to purchase green food? (3) How does purchase intention translate into actual green food purchasing behavior? Building on the Theory of Planned Behavior (TPB), which posits that attitude, perceived behavioral control, and subjective norms influence behavior through intention [1], this study extends the model by incorporating environmental concern and health consciousness. Partial least squares structural equation modeling (PLS-SEM) is used as an effective method to analyze the impact of factors on Vietnamese consumers' green food purchase intention and consumption behavior. This study employs a survey of 569 consumers in Hanoi and uses Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze the impact of psychological factors on green food purchase intention and behavior. The study contributes to the literature by extending TPB in the context of green food consumption in a developing country, providing practical implications for policymakers and businesses to promote sustainable consumption.

Previous studies on sustainable food consumption often focus on Western contexts, leaving a knowledge gap regarding consumer behavior in emerging economies such as Vietnam. Moreover, the existing literature provides limited insights into how combined environmental and health consciousness jointly influence purchase intentions for green food products. Therefore, our study addresses these gaps by examining the interplay between psychological factors within the Vietnamese consumer context, thereby contributing to a more comprehensive understanding of sustainable consumption behaviors across diverse cultural and economic settings. First, the paper will contribute theoretically by extending the application of the theory of planned behavior by incorporating additional psychological factors related to consumers' green food purchases. Second, the results of this paper contribute to providing a basis for designing effective strategies for policymakers and marketers to promote sustainable consumption activities of Vietnamese consumers. Third,

the paper provides empirical evidence in the context of developing countries, specifically Vietnam, thereby enhancing understanding in developed countries about consumers' green food consumption behavior. From this, policy recommendations and strategic business suggestions are proposed to encourage green food consumption behavior in Vietnam. So that, the study not only offers insights into sustainable consumption behavior, but also highlights unique opportunities and challenges in the context of developing nations, which aligns with the journal's goal of promoting understanding and action towards a more sustainable future.

2 Literature review

In recent years, the research trend on green consumption behavior has received significant attention, with many articles analyzing the influence of psychological factors on fostering sustainable consumption behavior [5, 30, 31, 58]. This section reviews the existing literature on important psychological factors that influence green food consumption behavior, including environmental concerns, health consciousness, social influences, attitudes towards green foods, and perceived behavioral control. This review will also explore the theoretical underpinnings of these factors, particularly the Theory of Planned Behavior (TPB), to provide a comprehensive framework for understanding their impact on green food purchasing decisions.

2.1 Environmental concerns

Environmental concern is understood as an individual's level of awareness and concern about environmental issues and their willingness to act to minimize negative impacts on the environment [31, 33]. Recent studies on consumer behavior have emphasized the important role of consumers' environmental concerns in shaping their green consumption behavior. Yadav and Pathak [58] utilized a survey with young consumers in India and found that those with higher environmental concern tended to have more positive attitudes towards green products. However, Moser [37] focused on German consumers and used a different approach, analyzing actual purchasing data. This study suggested that environmental concern does not always lead to green purchasing behavior, especially when price is a significant factor. Furthermore, Ogiemwonyi [40] pointed out that for consumers, environmental concerns are a factor that strongly influences their attitude and intention to purchase green products. Since more environmentally conscious consumers will tend to prioritize products perceived to be environmentally friendly, environmental concerns shape the intention to purchase green products [47]. Studies have explored the link between environmental concern and specific green behaviors. Results indicate that individuals with higher environmental concern are more likely to engage in recycling, energy conservation, and the purchase of eco-friendly products [48]. Therefore, the following hypotheses are proposed.

Hypothesis 1 (H1): Environmental concern positively impacts attitudes toward green foods.

Hypothesis 2 (H2): Environmental concern positively impacts green food purchase intention.

2.2 Health consciousness

Health consciousness is an important factor leading to the purchase of green food products [42, 44]. When consumers care about their health, they will take the time to search for products that provide allegedly health benefits, such as organic or natural foods. These foods are associated with being environmentally friendly and consumers believe them to be healthy [25, 36]. Hoang et al. [24] found that health consciousness had a significant impact on attitudes toward organic food in Vietnam. However, this study only focused on organic food and did not consider other types of green foods. Additionally, this study did not consider other factors that may influence attitudes toward green food, such as environmental concern. They have suggested that consumers who regularly consume organic foods are often highly motivated to purchase these products due to health concerns. Because consumers believe that green food products are safer and more beneficial for their health, health consciousness plays a key role in influencing their purchasing behavior for these green food products consumption [27]. It is also important to consider the role of information and trust in influencing the impact of health consciousness on green food purchases. Consumers may seek out information about the health benefits of green foods from various sources, and their trust in these sources can significantly affect their purchase decisions [34]. Therefore, this article proposes the following hypotheses.

Hypothesis 3 (H3): Health consciousness positively impacts attitudes towards green food.

Hypothesis 4 (H4): Health consciousness positively impacts green food purchase intentions.

2.3 Social influence

Social influence represents the impact of people around them such as family members, friends, and social norms on consumers' green food purchase intention and behavior. The Theory of Planned Behavior (TPB) has posited that subjective norms, or social influence, have a significant influence on behavioral intentions [1]. Thus, social influence significantly determines consumers' intentions. Many recent studies show that green food purchasing behavior is strongly influenced by social influences. For example, social influences, including peer pressure and social expectations, play an important role in promoting green product consumption [2]. According to De Medeiros and Ribeiro [16], advice and support from significant others in one's family and relationships can shape positive attitudes toward green products and increase the likelihood of purchase. It's also worth noting that social influence can be both direct (e.g., through family and friends) and indirect (e.g., through social media and cultural norms). Understanding these different types of influence is crucial for effective marketing and policy interventions [2]. Based on the preceding analysis, the following hypotheses are proposed.

Hypothesis 5 (H5): Social influence positively impacts attitudes towards green food.

Hypothesis 6 (H6): Social influence positively impacts perceived behavioral control.

Hypothesis 7 (H7): Social influence positively impacts green food purchase intentions.

2.4 Attitude towards green food

Attitude toward green food refers to consumers' positive or negative judgments toward green food products. According to the theory of planned behavior (TPB), attitude is the most important factor in making behavioral intention decisions [1]. Consumers often have positive attitudes toward green This is because green foods offer benefits such as improved health, a cleaner environment, sustainability, and ethical production. In a developing country, an increased green food purchase intention among young consumers can be expected because the number of young people with a favorable attitude toward green food is increasing [3, 51, 56]. Similarly, Qi and Ploeger [46] also showed that consumers are more likely to purchase organic foods when they have positive attitudes toward these products. The formation of attitudes toward green food is complex and influenced by a combination of beliefs, values, and experiences. Understanding the psychological processes behind attitude formation can provide valuable insights for promoting green food consumption [13, 38, 47]. From there, there is the following hypothesis.

Hypothesis 8 (H8): Attitude towards green food positively impacts green food purchase intention.

2.5 Perceived behavioral control

Perceived behavioral control reflects an individual's awareness of their ability to perform a specific behavior, used in TPB [1]. Perceived behavioral control includes the availability of resources, opportunities, and self-efficacy. In studies on green foods, perceived behavioral control often describes the ease or difficulty of finding and purchasing green food products, financial capacity, and an individual's belief in their ability to purchase green food products [19, 56]. According to Jia et al. [26], perceived behavioral control has an important impact not only on purchase intention but also on stated purchase behavior. Consumers are more likely to form green food purchase intentions and follow through on their purchasing behavior when they perceive that they have control over green food purchasing decisions, as well as the resources necessary to purchase your products [39]. It is also important to consider that perceived behavioral control can be influenced by external factors such as availability of green food products, their price, and the information available to consumers [19]. From the above analysis, the following hypotheses are proposed.

Hypothesis 9 (H9): Perceived behavioral control positively impacts green food purchase intention.

2.6 Green food purchase intention

TPB posits that an individual's behavior is predicted by their intention to perform the behavior, which in turn is influenced by their attitudes, social norms, and perceived behavioral control [1]. Individuals with positive attitudes toward green food, perceived social support, and confidence in their ability to purchase green food are more likely to express an intention to do so. Additionally, Stern's Value-Belief-Norm (VBN) theory explains that consumers' environmental behavior is driven by personal values and beliefs about the environmental consequences of their actions [52]. Consumers who value environmental sustainability and believe that their actions can mitigate environmental harm are more likely to

engage in green purchasing behaviors. Numerous empirical studies have demonstrated that green purchase intention is a strong predictor of stated green purchasing behavior, as shown in the research by [13, 55]. These studies provide robust evidence that consumers with strong green purchase intentions are more likely to follow through with stated green purchases. The link between intention and behavior is crucial because understanding what drives intentions to purchase green food can help develop strategies to translate these intentions into actual purchases [13]. Therefore, it can be concluded that green food purchase intention positively impacts green food purchasing behavior.

Hypothesis 10 (H10): Green food purchase intention positively impacts green food purchasing behavior.

2.7 Proposed research model

Thus, most of the literature reviews emphasize the importance of psychological factors in forming intentions and motivating green food purchasing decisions. Among them, environmental concern, health consciousness, social influence, attitude towards green food, and perceived behavioral control all play important roles in forming intentions and motivating consumers' green food purchasing behavior. However, there are still research gaps. While the interaction of psychological factors influencing green food purchases has been explored, research in developing countries like Vietnam remains limited. This study addresses this gap by investigating the specific interplay of environmental concern, health consciousness, social influence, attitude, and perceived behavioral control in shaping Vietnamese consumers' green food purchasing decisions (Fig. 1).

3 Research methods

3.1 Sampling procedure

Random sampling was used to ensure a representative sample of consumers in Hanoi. The sampling procedure for this article included the following steps. First, to ensure diversity in respondents' shopping habits and socio-economic conditions, five shopping centers and five traditional markets in Hanoi were randomly selected from the list of local markets and shopping centers provided by the Hanoi Department of Industry and Trade updated to February 2024. Then, to capture a variety of consumer behaviors and attitudes at different times and days during the data collection period from February to April 2024, the interview date was randomly selected. Random selections were conducted on the website https://www.random.org. Consumers at these locations were quasi-randomly approached on each interview date. Once these consumers agreed, the survey was conducted as face-to-face interview and collecting data. Before answering the questionnaire, participants were informed about the study's purpose and assured of the confidentiality of their responses. Informed consent was obtained from each participant before they proceeded with the survey. 09 interviewers were trained on survey implementation to ensure equal survey administration to respondents.

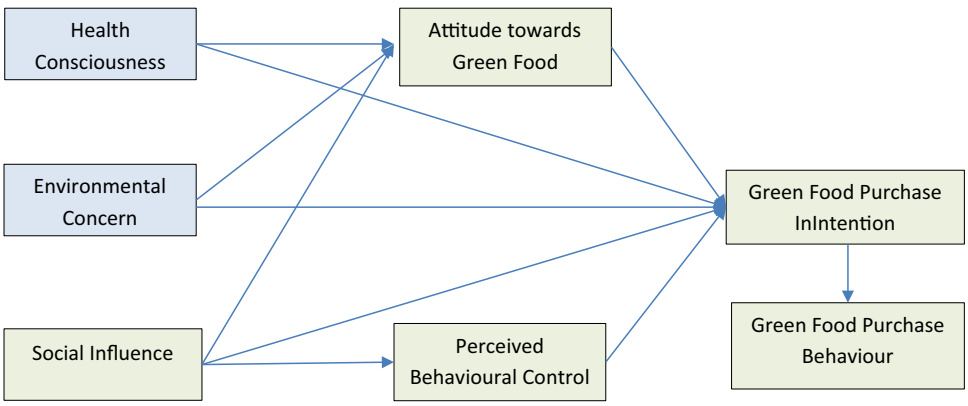

Fig. 1 Conceptual model with *green boxes* displaying original TPB-model and *blue boxes* proposed extension. Source: Author's proposed model

3.2 Questionnaire design

The questionnaire was designed to measure relevant variables identified in the literature review, including environmental concern, health consciousness, social influence, attitudes toward green foods, controlling cognitive behavior as well as green food purchasing intention and stated behavior. A Likert scale, from 1 to 5, was used for respondents to indicate their level of agreement with each statement.

The questionnaire included sections on demographic information such as age, gender, income, education level, and occupation; environmental concern with statements measuring respondents' awareness and concern about environmental issues; health consciousness with items assessing respondents' concern for health and their preference for health-related products; social influence with questions related to the impact of family, friends, and social norms on respondents' purchasing behavior; attitude towards green food with respondents' positive or negative evaluation statements towards green food products; perceived behavioral control with items measuring the perceived ease or difficulty of respondents in purchasing green foods; and green food purchasing intentions and behaviors with questions assessing respondents' stated behaviors related to purchasing green food products (Table 1). The questionnaire was initially drafted in English, then translated into Vietnamese by a professional translator, and back-translated to ensure accuracy. A pilot study with 30 respondents was conducted to test the clarity and validity of the questionnaire. The results of the pilot study were used to make revisions to the questionnaire before the main data collection phase.

Table 1 Measurement scales

Variable	Item	Explanation	Reference source
Environmental concern	ENV1	I am very concerned about the environment when buying green food	[12, 58]
	ENV2	I think it is important to buy green food to protect the environment	
	ENV3	I am willing to pay more for green food products	
	ENV4	I feel a personal responsibility to help solve environmental problems	
Health consciousness	HLC1	I am very conscious about my health	[30, 42, 44]
	HLC2	I make an effort to eat healthy foods	
	HLC3	I regularly check the nutritional content of food products before buying them	
	HLC4	Maintaining a healthy lifestyle is very important to me	
Social influence	SCI1	People who are important to me think that I should buy green food	[16, 17, 32, 54]
	SCI2	I feel social pressure to purchase environmentally friendly products	
	SCI3	My friends and family often discuss the importance of buying green food	
	SCI4	The green food choices of people around me influence me	
Attitude towards green food	ATT1	I have a positive attitude towards buying green food	[37, 53, 54]
	ATT2	I believe purchasing green food is a good idea	
	ATT3	I think buying green food is beneficial for the environment	
	ATT4	I feel good about purchasing green food products	
Perceived behavioral control	PBC1	I am confident that I can buy green food whenever I want	[26, 29, 30]
	PBC2	I have the resources necessary to purchase green food	
	PBC3	I find it easy to choose green food over conventional food	
	PBC4	I believe I have control over whether I buy green food or not	
Green food purchase intention	INT1	I intend to buy green food shortly	[15, 21, 50]
	INT2	I will make an effort to purchase green food	
	INT3	I plan to buy green food regularly	
	INT4	I am likely to buy green food products	
Green food purchasing behavior	BEH1	I frequently buy green food	[11, 33, 40]
	BEH2	I have bought green food in the past month	
	BEH3	I prefer green food over conventional food	
	BEH4	I recommend green food to others	

Source: Author, 2024

3.3 Data analysis method

This study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) for data analysis. PLS-SEM is a statistical technique well-suited for evaluating complex models involving multiple latent variables and their relationships. PLS-SEM was chosen because of its suitability for analyzing complex relationships involving multiple latent constructs, particularly in exploratory studies focused on predicting consumer behavior rather than confirming established theories. Unlike covariance-based SEM (CB-SEM), PLS-SEM does not require data to strictly meet normal distribution assumptions, making it especially appropriate for studies using survey data, which often violate these assumptions [22]. Additionally, PLS-SEM effectively handles smaller sample sizes and provides greater flexibility in model specification, which is advantageous in exploring emerging theoretical relationships within the context of sustainable consumption behavior in Vietnam. Unlike other methods such as linear regression analysis or analysis of variance, PLS-SEM offers the advantage of simultaneously assessing both direct and indirect relationships between variables, while efficiently handling latent variables. Furthermore, PLS-SEM focuses on explaining the variance in the dependent variables, aligning with the study's objective to identify the psychological factors influencing green food purchasing behavior [22]. The analytical process includes evaluation of the measurement model, including assessment of the reliability and validity of the measurement instruments, testing composite reliability and Cronbach's alpha coefficients for internal consistency as well as assessing convergent validity and discriminant validity. It also involves evaluating the structural model, examining relationships between latent variables by testing proposed hypotheses, and evaluating path coefficients and the significance of relationships, and evaluate the overall model fit using R-squared and other fit indices. Before running the PLS-SEM analysis, data was screened for missing values and outliers. Missing values were handled using the mean imputation method. Outliers were identified and removed by examining z-scores and box plots.

4 Results

4.1 Descriptive statistics

Table 2 shows the descriptive statistics of the samples. The survey data of 569 participants revealed that the largest age group is 22–34 years old, comprising 36.9% of respondents. Females represent a majority at 61.2%, this is due to more females going to the market to buy food for their family's consumption in Vietnam. The highest income group earns below 5 million per person, representing 31.8%. University graduates make up the largest educational group at 23.7%. The most common occupation among respondents is office staff, representing 23.9% of the sample. The sample, therefore, is younger, more female, wealthier, better educated, and has a higher share of office staff than the average population of Hanoi [23]. This sample may not be fully representative of the general population of Hanoi, potentially limiting the generalizability of the findings. Future research should employ stratified sampling techniques to ensure a more representative sample across different demographic groups.

4.2 Results of model

Two latent variables, ENC4 and SOC2, were removed from the analysis because their outer loadings were below the acceptable threshold of 0.7. The model has been run a second time and Table 3 presents the results. The table of factor loadings from the structural equation model is more than 0.7, which shows strong associations between latent constructs and VIF values were below 5, indicating no multicollinearity issues [22]. Accordingly, the structural equation model results indicate strong associations between latent constructs, with attitude, behavior, and intentions demonstrating high reliability. Environmental and health concerns, perceived behavioral control, and social norms significantly influence behavioral intentions and actions. Items ENC4 and SOC2 were removed because their outer loadings were below 0.7, a standard practice in PLS-SEM to ensure construct validity, and their removal did not alter the constructs' meaning [22]. Retaining items with lower loadings could weaken the internal consistency and construct validity, potentially compromising the interpretability and accuracy of the results. By removing these items, the model's reliability, discriminant validity, and overall robustness were improved, ensuring that the remaining measures more accurately reflect the underlying

Table 2 Characteristics of samples

Characteristics	Responses	Percent (%)
Age		
Below 22	121	21.3
22–34	210	36.9
35–55	134	23.6
56 and above	104	18.3
Gender		
Male	221	38.8
Female	348	61.2
Family income per person		
Below 5	181	31.8
5–10	142	25.0
10–20	129	22.7
Higher 20	117	20.6
Education level		
Below high school	98	17.2
High school	128	22.5
Vocational school	117	20.6
University	135	23.7
Postgraduate	91	16.0
Occupation		
Students	94	16.5
Office staff	136	23.9
Workers	84	14.8
Business owners	101	17.8
Retired	75	13.2
Other	79	13.9
Total	569	100

Source: Own survey, 2024

constructs without altering their conceptual essence. This adjustment enhances confidence in the relationships and conclusions derived from the analysis, thus strengthening the overall validity of the findings Table 3).

Table 4 presents the R-square and adjusted R-square values of a linear regression model with independent variables ATT, BEH, INT, and PBC. INT (Intention) has the highest R-square of 0.624, indicating its significant role in explaining the variance of the dependent variable. ATT (Attitude), BEH (Behavior), and PBC (Perceived Behavioral Control) exhibit lower R-square values ranging from 0.265 to 0.342, suggesting their comparatively weaker influences on the dependent variable in this model. These R-squared values indicate the proportion of variance in the dependent variables that is explained by the independent variables. A higher R-squared value indicates a better fit of the model. The values suggest that intention is very well predicted by the model while other variables are less well predicted.

Table 5 provides several reliability and validity measures for constructs in a research context. Cronbach's alpha values range from 0.645 to 0.801, indicating good internal consistency for the constructs. Cronbach's alpha equals 0.645, below 0.7, it can be accepted. Composite reliability (rho_a and rho_c) values range from 0.648 to 0.905, suggesting strong reliability of the measurement scales. Average variance extracted (AVE) values range from 0.579 to 0.713, indicating that the constructs explain a substantial amount of variance in their respective items. Overall, these measures affirm the reliability and validity of the constructs ATT, BEH, ENC, HEC, INT, PBC, and SOC in the study. The acceptable level for Cronbach's alpha is generally 0.7, but in some cases, values above 0.6 can be considered acceptable, especially for exploratory studies. Composite reliability and AVE values indicate good reliability and validity of the constructs. The constructs are therefore reliable and valid for further use in the analysis.

The correlation matrix (Table 6) reveals key relationships in green food purchase behavior. Attitude toward green food (ATT) strongly correlates with purchase intention (INT) at 0.539, supporting Ajzen [1]. Purchase intention (INT) is highly predictive of stated purchasing behavior (BEH) with a correlation of 0.515. Environmental concern (ENC) and

Table 3 Factor loadings for constructs in the structural equation model

Items	ATT	BEH	ENC	HEC	INT	PBC	SOC	VIF
ATT1	0.796							1.310
ATT2	0.726							1.212
ATT3	0.771							1.284
BEH1		0.794						1.491
BEH2		0.809						1.478
BEH3		0.828						1.438
ENC1			0.832					1.814
ENC2			0.717					1.346
ENC3			0.905					1.785
HEC1				0.770				1.551
HEC2				0.779				1.422
HEC3				0.774				1.506
HEC4				0.748				1.468
INT1					0.840			1.684
INT2					0.838			1.693
INT3					0.839			1.614
PBC1						0.763		1.365
PBC2						0.729		1.405
PBC3						0.770		1.498
PBC4						0.781		1.602
SOC1							0.757	1.528
SOC3							0.932	2.248
SOC4							0.835	1.884

Source: Own survey, 2024

Table 4 R-square and adjusted R-square values for latent constructs

	R-square	R-square adjusted
ATT	0.342	0.339
BEH	0.265	0.263
INT	0.624	0.621
PBC	0.296	0.295

Source: Own survey, 2024

Table 5 Evaluation of measurement model

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
ATT	0.645	0.648	0.809	0.585
BEH	0.74	0.746	0.851	0.656
ENC	0.764	0.860	0.861	0.675
HEC	0.769	0.774	0.852	0.589
INT	0.79	0.791	0.877	0.704
PBC	0.759	0.762	0.846	0.579
SOC	0.801	0.905	0.881	0.713

Source: Own survey, 2024

Table 6 Correlation matrix of variables

	ATT	BEH	ENC	HEC	INT	PBC	SOC
ATT	0.765						
BEH	0.334	0.810					
ENC	0.567	0.369	0.822				
HEC	0.247	0.313	0.273	0.768			
INT	0.539	0.515	0.636	0.522	0.839		
PBC	0.351	0.256	0.334	0.318	0.506	0.761	
SOC	0.336	0.335	0.379	0.361	0.539	0.544	0.845

Source: Own survey, 2024

health consciousness (HEC) both significantly correlate with purchase intention (INT) at 0.636 and 0.522, respectively. Social influence (SOC) shows a strong correlation with perceived behavioral control (PBC) at 0.544, indicating the impact of social factors on perceived control over purchasing behavior. These correlations emphasize the interconnectedness of attitudes, intentions, and social influences in predicting green food purchasing behavior. The findings underscore the importance of these factors in shaping consumer behavior towards environmentally friendly products. The correlation coefficients indicate the strength and direction of the relationships between variables. Values above 0.5 are considered strong, supporting the hypotheses made in the study.

The data analysis reveals several significant relationships in the green food purchase behavior (Table 7). Attitude (ATT) influences purchase intention (INT) ($t = 5.25$, $p < 0.001$), supporting Ajzen's [1] Theory of Planned Behavior (TPB); therefore, hypothesis H8 is accepted. Environmental concern (ENC) impacts both ATT and INT strongly ($t = 15.577$ and 10.855, $p < 0.001$), thus hypotheses H1 and H2 are accepted, while health consciousness (HEC) affects INT ($t = 10$, $p < 0.001$) but does not significantly influence attitude (ATT) ($t = 1.512$, $p = 0.131$), therefore hypothesis H4 is accepted and H3 is rejected. Intention (INT) is a strong predictor of stated behavior (BEH) ($t = 15.836$, $p < 0.001$), aligning with Kim and Park (2020), hence hypothesis H10 is accepted. Perceived behavioral control (PBC) and social influence (SOC) also significantly impact INT ($t = 4.316$ and 4.244, $p < 0.001$), thus hypotheses H9 and H7 are accepted, and SOC influences PBC ($t = 20.139$, $p < 0.001$), highlighting the importance of social factors (Smith and Paladino, 2010), and hypothesis H6 is accepted. The t-statistics and *p*-values indicate the statistical significance of the relationships between the variables. A *p*-value less than 0.05 is generally considered statistically significant, meaning that the results are not likely due to chance. The t-values are the ratio of the coefficient to its standard error, which measures how much the coefficient varies around its mean. Higher t values mean higher significance for the influence of one variable on another.

Table 7 Path coefficient and total indirect effect of the structural model

	Original sample (O)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	*p* values	Hypothesis (Accepted/Rejected)
ATT→INT	0.159	0.030	5.250	<0.001	Accepted
ENC→ATT	0.503	0.032	15.577	<0.001	Accepted
ENC→INT	0.356	0.033	10.855	<0.001	Accepted
HEC→ATT	0.065	0.043	1.512	0.131	Rejected
HEC→INT	0.276	0.028	10.000	<0.001	Accepted
INT→BEH	0.515	0.032	15.836	<0.001	Accepted
PBC→INT	0.152	0.035	4.316	<0.001	Accepted
SOC→ATT	0.122	0.043	2.802	0.005	Accepted
SOC→INT	0.168	0.040	4.244	<0.001	Accepted
SOC→PBC	0.544	0.027	20.139	<0.001	Accepted

Source: Own survey, 2024

5 Discussion and implication

Our study investigated the psychological factors influencing Vietnamese consumers' attitudes and purchase intentions towards green food, utilizing an extended Theory of Planned Behavior (TPB) framework. The findings highlight the significant roles of environmental concern, health consciousness, social influence, attitude, and perceived behavioral control as determinants of consumers' intentions to purchase green food products. Overall, the results underline the central importance of environmental consciousness in shaping both attitudes and intentions, while also revealing a noteworthy differentiation between health consciousness and general environmental attitudes, providing new insights into consumer behavior regarding sustainable food choices in Vietnam.

5.1 Discussion of the psychological factors influencing green food purchase behavior in Vietnam

The study's finding that attitude (ATT) strongly influences purchase intention (INT) ($t = 5.25$, $p < 0.001$) aligns with the Theory of Planned Behavior (TPB) as posited by Ajzen [1]. This theory posits that an individual's attitude significantly shapes their intention to act. This study confirms this relationship, underscoring the importance of fostering positive attitudes toward green food to enhance purchase intentions. Previous studies, such as Zaremohzzabieh et al. [62] and Armutcu et al. [9] also support this relationship, finding that positive attitudes towards green products are significant predictors of purchase intention. This suggests that interventions aimed at shifting consumer attitudes towards greater favorability of green food products will likely yield a positive change in consumer behavior. In addition, our study extends the TPB by explicitly incorporating both environmental awareness and health consciousness, providing empirical evidence of their differentiated effects on consumer intentions toward green food in an emerging market context. Thus, it contributes to the broader field of sustainable consumption by highlighting the importance of integrating multiple psychological drivers to better understand and predict consumer behavior in sustainability transitions.

The significant impact of environmental concern (ENC) on both attitude ($t = 15.577$, $p < 0.001$) and intention ($t = 10.855$, $p < 0.001$) highlights its crucial role in shaping green consumer behavior in Vietnam's capital market. This result is consistent with Phuong et al. [45] and Yanyan et al. [60], who emphasize that environmental concerns are drivers of both attitude and intention toward sustainable products. The significant effect of ENC on both attitude and intention emphasizes the importance of environmental consciousness as an antecedent to green food purchasing. The current study thus supports the idea that increasing environmental awareness among consumers can increase positive attitudes and intentions towards green food consumption. This is consistent with the previous literature linking environmental awareness with green consumption in Asian countries [37, 51].

Interestingly, health consciousness (HEC) significantly impacts purchase intention ($t = 10$, $p < 0.001$) but does not significantly influence attitude ($t = 1.512$, $p = 0.131$). This might be connected to attitude's strong connection to the environment but a lack of reference to health. Still. this distinction is an important contribution to the existing literature, suggesting that while health concerns are a direct motivator for purchase intention, they don't necessarily affect consumers' overall attitude towards green food. This result is consistent with studies such as Pandey et al., [42] and Parashar et al., [44] which also identify health-related factors influencing purchase intentions independently of general attitudes. This indicates that health-related messaging should target the desire to purchase, rather than attempting to create a positive attitude. This result shows that the difference between environmental concern and health consciousness.

However, the observed distinction between environmental and health consciousness also highlights a notable gap in understanding their precise relationship and potential interactions within consumer decision-making processes. Further empirical investigations should explicitly examine whether consumers perceive green food primarily as environmentally friendly, inherently healthy, or both simultaneously. Such research could explore whether environmental and health consciousness operate as distinct and separate motivators, or whether they mutually reinforce each other to shape consumer intentions and attitudes toward green food purchases. For instance, future studies might investigate potential moderation or mediation effects between these constructs, assessing if heightened environmental awareness amplifies the impact of health concerns, or vice versa. Clarifying the interplay and possible overlap between these dimensions will provide deeper insights into consumer cognition and enable policymakers and businesses to develop precisely tailored marketing messages. Specifically, it will allow stakeholders to better align their communication strategies with consumer perceptions, addressing environmental and health benefits either jointly or individually to effectively enhance green food consumption in Vietnam.

The study also confirms that green food purchase intention (INT) is a strong predictor of stated purchase behavior (BEH) (t = 15.836, $p < 0.001$). This finding aligns with previous research, including Tan et al. [53], Tran et al. [57] which demonstrated that purchase intentions reliably predict actual purchasing behavior. Our results are also consistent with Mancha and Yoder [33] who showed that intention is a powerful predictor of behavior across a variety of markets. This suggests that interventions which can effectively foster purchase intentions will therefore be effective in fostering actual purchasing behavior. These findings imply that policymakers and businesses can confidently use measures aimed at enhancing consumers' intentions, such as targeted marketing and educational campaigns, to effectively stimulate actual green food purchases. Given the robust link between intention and behavior, investments in shaping consumer intentions are likely to translate into tangible shifts toward sustainable consumption practices in Vietnam.

Furthermore, perceived behavioral control (PBC) (t = 4.316, $p < 0.001$) and social influence (SOC) (t = 4.244, $p < 0.001$) significantly affect green food purchase intention (INT). These results are consistent with prior research by Tan et al., [53] researched in Malaysia. This result highlights the complex interplay of both external (social) and internal (personal agency) factors in shaping consumer behavior. The additional finding that social influence impacts PBC (t = 20.139, $p < 0.001$) underscores the complex interactions between social norms and an individual's sense of control. Previous research by Chen and Tung [12] has similarly highlighted how social influences can impact PBC and subsequently affect the intentions of consumers in Taiwan, while Armutcu et al. [8] demonstrated the effect of PBC on intentions to buy green food in Türkiye. This indicates that marketing strategies should also consider how social pressures and an individual's sense of their own purchasing agency interact. Marketing strategies aimed at promoting green food consumption should account for the interplay between social norms and individual perceptions of purchasing capability. Specifically, leveraging social influences, such as peer endorsements or community-driven campaigns, can enhance consumers' sense of control, thereby boosting their intentions toward sustainable purchasing behaviors.

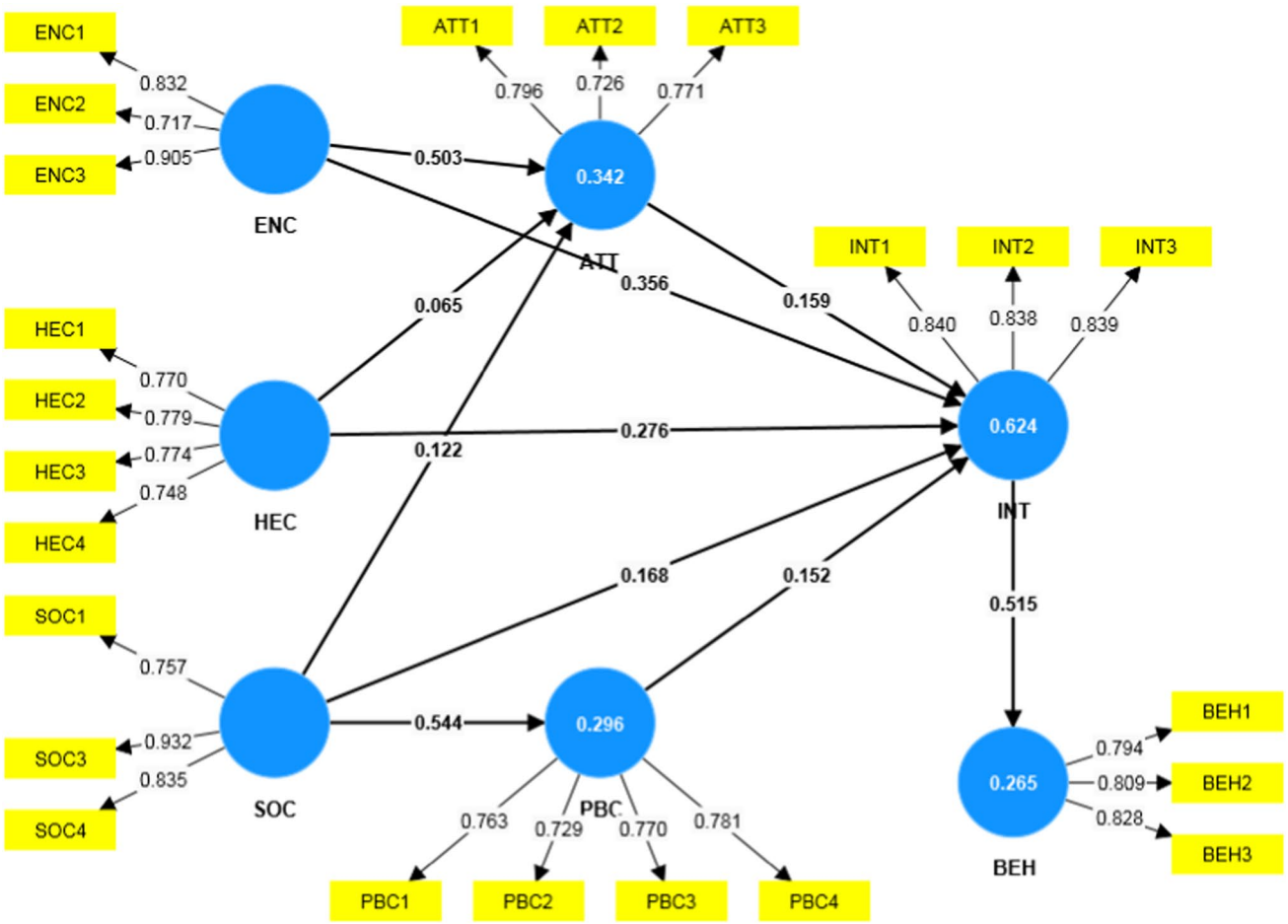

Fig. 2 Structural model. Source: Modelling results, 2024

In summary, our study underscores the multifaceted nature of green food purchasing behavior in Vietnam. This behavior is shaped by a dynamic interplay between environmental concerns, health consciousness, attitudes, social norms, perceived control and behavioral intention. These factors operate in a complex, interrelated system, and interventions aimed at increasing green food purchasing should therefore take these complexities into consideration (Fig. 2).

5.2 Implication for government and businesses

The findings of this research have important implications for both governmental policy and business strategy in Vietnam.

Given the significant role of attitude (ATT) in shaping purchase intention (INT), governmental policies should prioritize public awareness campaigns that foster positive attitudes toward green food products. This may be accomplished by providing clear information on the concrete benefits associated with green food, while also clearly addressing and dismantling any negative preconceptions consumers may have. These initiatives should emphasize environmental concerns, as these directly impact attitudes toward green food, while separately targeting health consciousness to influence purchase intentions. These should be evidence-based, tailored and targeted, to specific consumer needs.

Moreover, given the significant impact of environmental concern (ENC) on both attitude and intention, governmental policies should actively promote environmental sustainability through educational programs and support for green food labeling and certifications. These actions would help consumers to make informed decisions and reinforce the importance of sustainability in the purchasing process.

For businesses in the green food sector, marketing strategies should be carefully aligned to address consumer's environmental and health concerns. This means marketing should not only highlight the environmental advantages of green food but also emphasize the health benefits. In addition, businesses should be aware of the interaction of perceived behavioral control and social factors in consumer purchasing. To enhance perceived behavioral control (PBC), green food enterprises should improve product accessibility, offer various price points, and generally reduce any barriers to purchasing. Additionally, leveraging social influence (SOC) through community-based marketing and partnerships with local influencers can promote the social acceptability of green food consumption.

In conclusion, the implications of these findings support a multi-pronged approach toward increasing green food purchasing, with governmental and business strategies targeting not only consumer attitudes and intentions, but also structural factors such as product availability and social norms.

6 Conclusion and further research

This study provides a comprehensive analysis of the psychological determinants shaping green food purchasing behavior among Vietnamese consumers, offering novel insights into the distinct roles of environmental concern and health consciousness in this context. However, it is important to acknowledge that the sample may not be fully representative of the broader Vietnamese population, as it is skewed towards younger, more educated, and wealthier individuals. The findings contribute to the existing literature by highlighting the importance of tailoring strategies to address both attitudinal and motivational factors in promoting sustainable consumption. The findings also corroborate that positive attitudes significantly propel consumers' intentions to procure green food products. Furthermore, the research underscores the crucial role of environmental awareness, demonstrating that heightened environmental concerns substantially impact both the attitudes and intentions of Vietnamese consumers towards green food. This underscores the importance of integrating environmental considerations into strategies for sustainable consumption. The study also validates that purchase intentions are robust predictors of actual purchasing behavior, reinforcing the necessity of fostering strong consumer intentions. The results make a significant theoretical contribution by extending the application of the Theory of Planned Behavior (TPB). Specifically, it integrates additional psychological factors—namely, environmental concern and health consciousness—into the TPB framework. Furthermore, the research provides valuable empirical evidence by testing this expanded model within the unique context of a developing country, Vietnam. This approach addresses existing research gaps and enhances the generalizability of the TPB in understanding sustainable consumption behaviors in diverse cultural and economic settings.

Moreover, health-related motivations are identified as specific drivers, as health consciousness directly influences green food purchase intentions, yet it does not alter overall attitudes towards green food. This suggests that health concerns represent a distinct motivating factor for consumers in this market. Finally, the study reveals that both perceived behavioral control and social influence significantly shape the intention to purchase green food, while social factors also

influence perceived control, underscoring the complex interplay between internal and external factors in consumer decision-making.

In summary, these findings align with existing theories and provide a deeper understanding of the multifaceted nature of green food consumption in Vietnam. Notably, this research elucidates the consumer transition by analyzing the impact of environmental and health consciousness on green food choices, offering valuable insights for both governmental bodies and businesses seeking to promote sustainable practices. The study highlights the necessity of targeted interventions that address environmental concerns and promote the health benefits of green food products to encourage sustainable consumption patterns among Vietnamese consumers. Policymakers should implement targeted public-awareness campaigns emphasizing the personal health benefits and environmental advantages of green food, leveraging influential media channels to shape consumer perceptions positively. Policymakers should implement targeted public awareness campaigns emphasizing the environmental and health benefits associated with green food consumption, tailored specifically to consumer segments identified in this study. Additionally, government support in the form of financial incentives or tax reductions for green food producers can stimulate market growth and enhance the availability and affordability of sustainable food options in Vietnam. These targeted actions could significantly accelerate the shift toward sustainable dietary practices at the consumer and producer levels. Businesses could adopt more transparent labeling practices and strategic pricing incentives, making green food products more accessible and attractive to Vietnamese consumers. Additionally, collaborative efforts between policymakers and businesses, such as subsidizing sustainable agricultural practices, could further accelerate consumer transition toward green consumption.

This study acknowledges several limitations that warrant consideration. First, the geographical scope, confined to Hanoi, inherently restricts the generalizability of findings, as consumer behaviors are likely to vary across different regions. Second, the sample composition, characterized by a disproportionately high representation of young, female, and educated individuals, may introduce bias and limit the accurate reflection of green food consumption patterns across the broader population. To address these limitations, future research endeavors should broaden the geographical scope to encompass diverse regions, while also accounting for factors such as price and product availability. Future research should conduct longitudinal studies to track changes in consumer attitudes and purchase behaviors over time, allowing for a deeper understanding of how sustainability trends evolve in Vietnam. Additionally, exploring the role of cultural factors, such as traditional dietary preferences and social norms, could provide valuable insights into the underlying motivations and barriers to green food consumption. These investigations would further enrich the literature by contextualizing sustainability practices within the unique cultural landscape of Vietnam. Notably, further investigations are warranted to elucidate whether consumers tend to equate green food with healthy food, and whether these constructs exert independent influences on purchasing decisions. In addition, future studies should examine the role of specific demographic variables such as age, income, and education in green food purchasing, compare findings across diverse cultural contexts to identify cross-cultural differences, incorporate qualitative methods like interviews or focus groups to gain deeper insights into consumer motivations, and apply advanced modeling techniques like moderated mediation or multi-group analyses to reveal more nuanced relationships.

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

Author contributions All the authors contributed to the study's conception and design. Material preparation, data collection, and analysis were performed by Dr. Pham Ngoc Huong Quynh and Dr. Nguyen Van Phuong. The first draft of the manuscript was written by Dr. Pham Ngoc Huong Quynh and Dr. Nguyen Van Phuong. Prof. Dr. Marcus Mergenthaler revised and gave comments for manuscript. All the authors read and approved the final manuscript.

Funding This research did not receive any funding.

Data availability Data are available upon request from the corresponding author.

Declarations

Ethics approval and consent to participate The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of VNU University of Economics and Business (Ref. No. 2428/QD-DHKT). 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.

Consent for publication Not applicable.

Competing interests The authors declare no competing interests.

References

1. Ajzen I. The theory of planned behavior. Organ Behav Hum Decis Process. 1991;50:179–211. https://doi.org/10.1016/0749-5978(91)90020-T.
2. Alam MN, Ogiemwonyi O, Alshareef R, Alsolamy M, Mat N, Azizan NA. Do social media influence altruistic and egoistic motivation and green purchase intention towards green products? An experimental investigation. Cleaner Eng Technol. 2023;15: 100669. https://doi.org/10.1016/j.clet.2023.100669.
3. Alhamdi FM, Al-Kahtani SM, Abdullah EAMF. Saudi women's attitude towards environmental marketing and its relationship to purchasing behavior. Discov Sustain. 2024;5:514. https://doi.org/10.1007/s43621-024-00784-4.
4. Aminizadeh M, Mohammadi H, Karbasi A, Rafiee H. Predicting consumers' intention towards seafood products: an extended theory of planned behavior. Food Qual Prefer. 2024;113: 105061. https://doi.org/10.1016/j.foodqual.2023.105061.
5. Amiri B, Jafarian A, Abdi Z. Nudging towards sustainability: a comprehensive review of behavioral approaches to eco-friendly choice. Discov Sustain. 2024;5:444. https://doi.org/10.1007/s43621-024-00618-3.
6. Amit Kumar G. Framing a model for green buying behavior of Indian consumers: from the lenses of the theory of planned behavior. J Clean Prod. 2021;295: 126487. https://doi.org/10.1016/j.jclepro.2021.126487.
7. Apaza-Panca CM, Flores Quevedo LA, Reyes LMC. Green marketing to promote the natural protected area. Sustainable Technol Entrepreneurship. 2024;3: 100067. https://doi.org/10.1016/j.stae.2023.100067.
8. Armutcu B, Ramadani V, Zeqiri J, Dana L-P. The role of social media in consumers' intentions to buy green food: evidence from Türkiye. British Food J. 2023;126:1923–40. https://doi.org/10.1108/BFJ-11-2022-0988.
9. Armutcu B, Zuferi R, Tan A. Green product consumption behaviour, green economic growth and sustainable development: unveiling the main determinants. J Enterp Communities. 2023;18:798–819. https://doi.org/10.1108/JEC-05-2023-0074.
10. Ashaolu TJ, Ashaolu JO. Perspectives on the trends, challenges and benefits of green, smart and organic (GSO) foods. Int J Gastronomy Food Sci. 2020;22: 100273. https://doi.org/10.1016/j.ijgfs.2020.100273.
11. Boccia F, Tohidi A. Analysis of green word-of-mouth advertising behavior of organic food consumers. Appetite. 2024;198: 107324. https://doi.org/10.1016/j.appet.2024.107324.
12. Chen M-F, Tung P-J. Developing an extended Theory of Planned Behavior model to predict consumers' intention to visit green hotels. Int J Hosp Manag. 2014;36:221–30. https://doi.org/10.1016/j.ijhm.2013.09.006.
13. Chen S-C, Hung C-W. Elucidating the factors influencing the acceptance of green products: an extension of theory of planned behavior. Technol Forecast Soc Chang. 2016;112:155–63. https://doi.org/10.1016/j.techfore.2016.08.022.
14. Chou S-F, Horng J-S, Sam Liu C-H, Lin J-Y. Identifying the critical factors of customer behavior: an integration perspective of marketing strategy and components of attitudes. J Retail Consum Serv. 2020;55: 102113. https://doi.org/10.1016/j.jretconser.2020.102113.
15. Cong Doanh D, Gadomska-Lila K, Thi Loan L. Antecedents of green purchase intention: a cross-cultural empirical evidence from Vietnam and Poland. OC. 2021;12:935–71. https://doi.org/10.24136/oc.2021.031.
16. De Medeiros JF, Ribeiro JLD. Environmentally sustainable innovation: expected attributes in the purchase of green products. J Clean Prod. 2017;142:240–8. https://doi.org/10.1016/j.jclepro.2016.07.191.
17. Deo K, Prasad A. Factors influencing green energy consumer behaviour in Australia. J Clean Prod. 2024;460: 142609. https://doi.org/10.1016/j.jclepro.2024.142609.
18. Dhir A, Sadiq M, Talwar S, Sakashita M, Kaur P. Why do retail consumers buy green apparel? A knowledge-attitude-behaviour-context perspective. J Retail Consum Serv. 2021;59: 102398. https://doi.org/10.1016/j.jretconser.2020.102398.
19. Diddi S, Yan R-N, Bloodhart B, Bajtelsmit V, McShane K. Exploring young adult consumers' sustainable clothing consumption intention-behavior gap: a Behavioral Reasoning Theory perspective. Sustain Prod Consum. 2019;18:200–9. https://doi.org/10.1016/j.spc.2019.02.009.
20. Garbyal S, Gupta RM. Green consumption behaviour for sustainable development. In: Sheraz Mahdi S, Singh R, Dhekale B, editors. Adapting to climate change in agriculture-theories and practices: approaches for adapting to climate change in agriculture in India. Cham: Springer Nature Switzerland; 2024. p. 321–339. https://doi.org/10.1007/978-3-031-28142-6_15.
21. Govindharaj G-P-P, Gowda B, Sendhil R, Adak T, Raghu S, Patil N, Mahendiran A, Rath PC, Kumar GAK, Damalas CA. Determinants of rice farmers' intention to use pesticides in eastern India: application of an extended version of the planned behavior theory. Sustain Prod Consum. 2021;26:814–23. https://doi.org/10.1016/j.spc.2020.12.036.
22. Hair J, Hult GTM, Ringle C, Sarstedt M. A primer on partial least squares structural equation modeling (PLS-SEM). 2022.
23. Hanoi Statistics Office. Hanoi statiscal yearbook 2023. Statiscal publishing house; 2024.

24. Hoang V, Saviolidis NM, Olafsdottir G, Bogason S, Hubbard C, Samoggia A, Nguyen V, Nguyen D. Investigating and stimulating sustainable dairy consumption behavior: an exploratory study in Vietnam. Sustain Prod Consum. 2023;42:183–95. https://doi.org/10.1016/j.spc.2023.09.016.
25. Hurtado-Barroso S, Tresserra-Rimbau A, Vallverdú-Queralt A, Lamuela-Raventós RM. Organic food and the impact on human health. Crit Rev Food Sci Nutr. 2019;59:704–14. https://doi.org/10.1080/10408398.2017.1394815.
26. Jia Y, Nadeem M, Hameed I, Waris I, Akram U. Towards sustainable consumption: factors influencing energy-efficient appliance adoption in haze-affected environments. Energ Strat Rev. 2024;53: 101416. https://doi.org/10.1016/j.esr.2024.101416.
27. Joshi Y, Uniyal DP, Sangroya D. Investigating consumers' green purchase intention: examining the role of economic value, emotional value and perceived marketplace influence. J Clean Prod. 2021;328: 129638. https://doi.org/10.1016/j.jclepro.2021.129638.
28. Junior SSB, Da Silva D, Gabriel MLDS, Braga WRDO. The effects of environmental concern on purchase of green products in retail. Procedia Soc Behav Sci. 2015;170:99–108. https://doi.org/10.1016/j.sbspro.2015.01.019.
29. Lavuri R. Organic green purchasing: moderation of environmental protection emotion and price sensitivity. J Clean Prod. 2022;368: 133113. https://doi.org/10.1016/j.jclepro.2022.133113.
30. Liang H, Wu Z, Du S. Study on the impact of environmental awareness, health consciousness, and individual basic conditions on the consumption intention of green furniture. Sustainable Futures. 2024;8: 100245. https://doi.org/10.1016/j.sftr.2024.100245.
31. Lopes JM, Gomes S, Suchek N, Nogueira S. The hidden reasons behind generation Z's green choices. Discov Sustain. 2024;5:520. https://doi.org/10.1007/s43621-024-00764-8.
32. Mahmud A. How and when consumer corporate social responsibility knowledge influences green purchase behavior: a moderated-mediated model. Heliyon. 2024;10: e24680. https://doi.org/10.1016/j.heliyon.2024.e24680.
33. Mancha RM, Yoder CY. Cultural antecedents of green behavioral intent: an environmental theory of planned behavior. J Environ Psychol. 2015;43:145–54. https://doi.org/10.1016/j.jenvp.2015.06.005.
34. Maniatis P. Investigating factors influencing consumer decision-making while choosing green products. J Clean Prod. 2016;132:215–28. https://doi.org/10.1016/j.jclepro.2015.02.067.
35. Mergenthaler M, Weinberger K, Qaim M. Consumer valuation of food quality and food safety attributes in Vietnam. Rev Agric Econ. 2009;31:266–83. https://doi.org/10.2307/30224861.
36. Mie A, Andersen HR, Gunnarsson S, Kahl J, Kesse-Guyot E, Rembiałkowska E, Quaglio G, Grandjean P. Human health implications of organic food and organic agriculture: a comprehensive review. Environ Health. 2017;16:111. https://doi.org/10.1186/s12940-017-0315-4.
37. Moser AK. Consumers' purchasing decisions regarding environmentally friendly products: an empirical analysis of German consumers. J Retail Consum Serv. 2016;31:389–97. https://doi.org/10.1016/j.jretconser.2016.05.006.
38. Nascimento J, Loureiro SMC. Understanding the desire for green consumption: norms, emotions, and attitudes. J Bus Res. 2024;178: 114675. https://doi.org/10.1016/j.jbusres.2024.114675.
39. Nguyen-Viet B, Nguyen ATL. Vietnamese consumer's perspective on green beauty care products: exploring the impact of animal welfare concerns and skepticism toward green advertising. Acta Physiol (Oxf). 2024;244: 104210. https://doi.org/10.1016/j.actpsy.2024.104210.
40. Ogiemwonyi O. Determinants of green behavior (Revisited): a comparative study. Resour Conserv Recycl Advances. 2024;22: 200214. https://doi.org/10.1016/j.rcradv.2024.200214.
41. Pai C-J, LePage BA, Ng E, Fang W. Using the theory of planned behavior to examine the environmental behavior of roadrunners in Taiwan. Discov Sustain. 2024;5:535. https://doi.org/10.1007/s43621-024-00731-3.
42. Pandey S, Budhathoki M, Perez-Cueto FJA, Thomsen M. Factors influencing consumers' food waste reduction behaviour at university canteens. Food Qual Prefer. 2023;111: 104991. https://doi.org/10.1016/j.foodqual.2023.104991.
43. Pannier E, Duteurtre G. 2022. The hybrid nature of the vietnamese market economy: personal relationships and debt in the dairy and maize sectors. In: Tran TA-D, editor. Rethinking Asian capitalism. Cham: Springer International Publishing; 2022. p. 59–91. https://doi.org/10.1007/978-3-030-98104-4_3
44. Parashar S, Singh S, Sood G. Examining the role of health consciousness, environmental awareness and intention on purchase of organic food: a moderated model of attitude. J Clean Prod. 2023;386: 135553. https://doi.org/10.1016/j.jclepro.2022.135553.
45. Phuong NV, Mai NTN, Mergenthaler M, Cuc LT, Quynh PNH. The role of social media on green food consumption intention in Hanoi. Vietnam AOL. 2024;16:107–20. https://doi.org/10.7160/aol.2024.160208.
46. Qi X, Ploeger A. Explaining consumers' intentions towards purchasing green food in Qingdao, China: the amendment and extension of the theory of planned behavior. Appetite. 2019;133:414–22. https://doi.org/10.1016/j.appet.2018.12.004.
47. Quynh PNH, My DTT, Nguyen TT, Hoai PTT, Phuong NV. The influence of cultural values on consumers' green purchase intention in South Korea. J ISVAAS. 2023;29:75–89.
48. Ritter ÁM, Borchardt M, Vaccaro GLR, Pereira GM, Almeida F. Motivations for promoting the consumption of green products in an emerging country: exploring attitudes of Brazilian consumers. J Clean Prod. 2015;106:507–20. https://doi.org/10.1016/j.jclepro.2014.11.066.
49. Santhoshkumar DB. Impact of premium price mediates the consumer awareness and green purchase intention about organic food in Coimbatore. Int J Creative Res Thoughts. 2022;10:494–503.
50. Shehawy YM, Ali Khan SMF. Consumer readiness for green consumption: the role of green awareness as a moderator of the relationship between green attitudes and purchase intentions. J Retail Consum Serv. 2024;78: 103739. https://doi.org/10.1016/j.jretconser.2024.103739.
51. Simanjuntak M, Nafila NL, Yuliati LN, Johan IR, Najib M, Sabri MF. Environmental care attitudes and intention to purchase green products: impact of environmental knowledge, word of mouth, and green marketing. Sustainability. 2023;15:5445. https://doi.org/10.3390/su15065445.
52. Stern PC. New environmental theories: toward a coherent theory of environmentally significant behavior. J Soc Issues. 2000;56:407–24. https://doi.org/10.1111/0022-4537.00175.
53. Tan C-S, Ooi H-Y, Goh Y-N. A moral extension of the theory of planned behavior to predict consumers' purchase intention for energy-efficient household appliances in Malaysia. Energy Policy. 2017;107:459–71. https://doi.org/10.1016/j.enpol.2017.05.027.
54. Taufique KMdR, Vaithianathan S. A fresh look at understanding Green consumer behavior among young urban Indian consumers through the lens of Theory of Planned Behavior. J Clean Prod. 2018;183:46–55. https://doi.org/10.1016/j.jclepro.2018.02.097.

55. Teng Y-M, Wu K-S, Liu H-H. Integrating altruism and the theory of planned behavior to predict patronage intention of a green hotel. J Hospitality Tourism Res. 2013;39(3):299–315. https://doi.org/10.1177/1096348012471383.
56. Tewari A, Mathur S, Srivastava S, Gangwar D. Examining the role of receptivity to green communication, altruism and openness to change on young consumers' intention to purchase green apparel: a multi-analytical approach. J Retail Consum Serv. 2022;66: 102938. https://doi.org/10.1016/j.jretconser.2022.102938.
57. Tran L-H, Nguyen N-A, Tran T-D, Nguyen T-P-L. A dataset of factors affecting sustainable consumption intention in Vietnam. Data Brief. 2022;42: 108127. https://doi.org/10.1016/j.dib.2022.108127.
58. Yadav R, Pathak GS. Young consumers' intention towards buying green products in a developing nation: extending the theory of planned behavior. J Clean Prod. 2016;135:732–9. https://doi.org/10.1016/j.jclepro.2016.06.120.
59. Yang J, Al Mamun A, Reza MNH, Yang M, Aziz NA. Predicting the significance of consumer environmental values, beliefs, and norms for sustainable fashion behaviors: the case of second-hand clothing. Asia Pac Manag Rev. 2024;29:179–94. https://doi.org/10.1016/j.apmrv.2024.01.001.
60. Yanyan Z, Pek C-K, Cham T-H. The effect of social media exposure, environmental concern and consumer habits in green consumption intention. J Strateg Manag. 2023;16:747–66. https://doi.org/10.1108/JSMA-01-2023-0006.
61. Zameer H, Yasmeen H. Green innovation and environmental awareness driven green purchase intentions. MIP. 2022;40:624–38. https://doi.org/10.1108/MIP-12-2021-0457.
62. Zaremohzzabieh Z, Ismail N, Ahrari S, Abu Samah A. The effects of consumer attitude on green purchase intention: a meta-analytic path analysis. J Bus Res. 2021;132:732–43. https://doi.org/10.1016/j.jbusres.2020.10.053.