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## The Role of Green Brand Identity Systems and Traceability in Shaping Sustainable Food Consumption Behavior

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### Abstract

This research develops and assesses a Green Brand Identity System (GBIS) to examine consumers' intentions to purchase green food, particularly fresh fruits and vegetables, in emerging markets. It analyzes how green practice identity, corporate identity, and distributive identity influence perceived green value and also examines how green food traceability affects these relationships. A quantitative study gathered survey data from 562 green food consumers in an emerging market and analyzed it using Partial Least Squares Structural Equation Modelling (PLS-SEM). The model integrates the S–O–R framework, Brand Identity System theory, and Signalling Theory to explore mediation and moderation effects. All three dimensions of GBIS enhance the perceived value of green food, with green distributive identity having the greatest impact, exceeding production and corporate identities. This underscores the importance of visible sustainability at the point of purchase. While green traceability doesn't directly increase perceived value, it enhances the effectiveness of green distributive identity, acting as a credibility enhancer rather than a standalone factor. The findings emphasize that companies need to focus on sustainable retail practices, transparent distribution channels, and consumer traceability tools. Policymakers should support certified green distribution to build trust and promote sustainable food consumption in developing markets.

*Keywords:* Green Identity System; Green Perceived Value; Green Traceability; Green Food Purchase Intention; Emerging Markets.

### 1. Introduction

Over the last ten years, consumers worldwide have shown growing concern about food safety, environmental issues, and ethical production practices [1]. This trend has boosted demand for green food products—defined as foods produced using environmentally friendly methods, with lower chemical use and higher safety standards [2]. In emerging markets, where oversight and regulation might be less strict, these consumer concerns are especially significant [3]. Fresh fruits and vegetables (FFV) are vital for food security and nutrition, but they are naturally susceptible to contamination, spoilage, and quality loss after harvest [4]. Since fresh foods are usually unprocessed and lack extensive packaging, consumers face greater uncertainty about their quality compared to packaged foods [5]. This information gap heightens perceived risks and increases reliance on external assurances, such as eco-labels and traceability systems [6]. In emerging markets like Vietnam, where consumer confidence has been damaged by past food safety scandals, credible sustainability indicators are essential for sustained market growth [7]. In this context, green identification tools—such as eco-labels, corporate sustainability claims, and green brand cues—have become strategic means to showcase environmental responsibility [8, 9]. At the same time, green traceability systems—using QR codes, blockchain, and digital transparency platforms—seek to reduce information gaps by enabling consumers to verify product origin and manufacturing details [10, 11]. Although both serve as signals of sustainability, they influence consumer cognition and behavior differently.

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Existing research predominantly explores green consumption using theoretical frameworks like the Stimulus–Organism–Response (S–O–R) model, Value–Belief–Norm theory, and Signaling Theory [12, 13]. Consistent findings indicate that green perceived value acts as a mediator between sustainability cues and purchase intent [14]. Most prior research has concentrated on organic packaged foods or certified processed products, where labeling and branding signals are standardized and easier to verify [8, 15]. In such cases, green identification methods, like eco-labels and CSR communication, often directly boost trust and consumers' willingness to pay [11]. Conversely, traceability studies tend to view transparency technologies mainly as trust-enhancing tools [10, 16]. While blockchain and digital traceability systems show promise in improving signal credibility, empirical results on their impact on perceived value are mixed [11]. Notably, few studies explore how traceability interacts with broader green identity systems, especially in fresh food markets where uncertainty is higher and institutional assurance is weaker [17–19].

Despite notable progress, the current research reveals at least three significant gaps: First, most existing studies focus on packaged organic products with stable, recognizable eco-labels and packaging cues [20, 21]. Conversely, fresh food markets lack consistent packaging and quality information, making green identification and traceability more complex and context-dependent [22, 23]. Therefore, insights from packaged goods may not fully apply to fresh foods. Second, while research often examines individual sustainability cues such as labels and certifications [17, 22, 23], there is limited empirical work on combining them within a comprehensive Brand Identity System (BIS) that collectively influences consumer perceived value and behavior. Third, although traceability systems are recognized for quality assurance, they are often studied in isolation, without clear integration into broader frameworks [16, 24]. Empirical evidence on how traceability interacts with identity cues, especially in high-uncertainty, emerging markets, is limited [10, 19]. Fourth, few studies differentiate between packaged and fresh food sectors when analyzing green identification and traceability [25]. In fresh markets, real-time traceability systems, such as digital QR codes and origin tracking, may be more crucial for establishing credibility at the point of sale [10, 26]. This key distinction warrants further theoretical and empirical exploration and validation.

This study presents a comprehensive framework for examining the factors influencing consumers' intentions to purchase green vegetables and fruits, as well as the outcomes of these factors. The main objectives are (1) to investigate how green practice identity, green company identity, and green distributive identity influence consumers' green perceived value; (2) to assess the moderating role of green food traceability on the relationship between green identity signals and perceived value; and (3) to analyze how perceived green value influences consumers' purchase intentions for green vegetables and fruits. By focusing on these objectives, the study aims to contribute to the existing literature on sustainable food consumption and to offer practical recommendations to help policymakers, food producers, and retailers promote safe and sustainable food practices.

## 2. Literature Review and Hypotheses

### 2.1. Theoretical Background

This study employs three interconnected theoretical perspectives: The Stimulus–Organism–Response (S–O–R) framework, Brand Identity System theory, and Signaling Theory to elucidate how cues of green brand identity affect consumers' intentions to purchase green food via value-driven psychological processes.

The Stimulus–Organism–Response (S–O–R) framework, proposed by Mehrabian & Russell [27], suggests that external stimuli influence individuals' internal cognitive and emotional states, leading to behavioral responses. Recent studies in sustainability and consumer behavior have expanded this to an S–O–R model, which identifies post-evaluative psychological states (like perceived value and trust) as important factors that further shape behavioral intentions, particularly in complex decision-making contexts like food consumption [8, 12]. In green food consumption, green brand identity cues—such as eco-friendly production, sustainability commitments, and sustainable distribution—serve as external triggers. These triggers shape consumers' internal judgments, especially the green perceived value, which considers functional benefits (such as food safety and quality), emotional benefits (such as peace of mind), and moral benefits (such as environmental responsibility) associated with green food products [13, 28]. Research indicates that green perceived value is a crucial psychological factor shaping sustainable behavior, as it more effectively predicts intentions such as purchasing green food and willingness to pay a premium than environmental concern [14, 29].

The Brand Identity System theory, proposed by Aaker [30], comprises key interconnected components: product identity, corporate identity, human identity, and symbol identity. Together, these components create a cohesive and unique brand image that appeals to consumers [31]. Incorporating sustainability by embedding green values into each element of brand identity can enhance consumer perceptions, foster emotional connections, and influence buying decisions [32]. Recent studies highlight that eco-friendly practices (green practice identity), corporate environmental responsibility (green corporate identity), humanized brand personalities (human identity), sustainable retail experiences (green distribution identity), and symbols like green logos and certifications (symbol identity) are vital for building green brand trust and guiding consumer behavior [33].

Signaling Theory [34] offers an additional perspective by emphasizing how companies convey credible information to minimize information asymmetry between producers and consumers. This is especially relevant to green food

markets, where consumers cannot directly verify sustainability claims or production methods before making a purchase, thereby heightening the risk of greenwashing perceptions [9].

This study uses the S–O–R framework, Brand Identity System theory, and Signaling Theory to explain green food purchase intentions thoroughly. Brand Identity System theory describes the sustainability-related identity features that firms communicate; Signalling Theory explains why these features effectively reduce information gaps and build credibility; and the S–O–R framework illustrates how green identity signals are mentally transformed into perceived green value and, ultimately, the intention to purchase.

**2.1.1. Green Food Purchasing Intention**

Green food purchasing behaviors encompass two related elements: the intention to buy, which reflects consumers’ readiness to choose green food over conventional options because of environmental or health advantages [35, 36]. As highlighted by Konuk [37], purchase intentions, such as complaint behavior, purchase intent, and willingness to pay, can be shaped by price sensitivity. The perceived value of green food—which encompasses functional, emotional, and environmental benefits, such as reduced chemical residues, the absence of antibiotics, and higher nutritional content—remains a crucial factor influencing purchase intention and the willingness to pay a premium [13, 14]. When perceived value surpasses cost concerns, consumers are more likely to buy and accept higher prices [8]. Nonetheless, in settings where greenwashing is a concern, brand reputation alone may not be sufficient without tangible evidence of green performance [9, 38]. Practices such as smart farming, eco-friendly production, and green retail initiatives can boost perceived value and drive purchase intention [16].

**Table 1. Summary of recent research on green food purchasing behaviors**

Authors	Key Antecedents (Direct)	Indirect Factors / Mediators / Moderators	Outcomes (Behavioral Responses)	Theory / Framework	Context	Country
Adamashvili et al. [17]	Digital traceability solutions	Perceived value, trust, buying behavior	Indirect	Resource-Based View; Signaling Theory	Food supply chains	Multi-country (Europe)
Anastasiadis et al. [24]	Supply chain traceability capability	Consumer confidence, purchasing intention	Indirect	Supply Chain Transparency Theory	Agri-food sector	Greece
Bazhan et al. [14]	Environmental concern	Green perceived value (mediator)	WTP & intention	S-O-R	Organic & eco food	Multi-country
Duong et al. [10]	Traceability tech	Trust; perceived risk	Intention; loyalty	Signaling theory	Green food retail	Vietnam
Fauzi et al. [39]	Attitude, subjective norms, perceived behavioral control	Organic food purchase intention	Direct	Theory of Planned Behavior (TPB)	Organic food consumption	Malaysia
Fu et al. [11]	Traceability strength	Signal credibility (moderator)	Value → intention	Signaling theory	Green agricultural products	China
García-Salirrosas et al. [16]	Traceability indicators	Trust & credibility	Purchase intention	Signaling theory	Green products	Peru
Gomes et al. [13]	Eco-labels; product attributes	Emotional & moral value (mediator)	Intentions	S-O-R	Green products	Portugal
Hu et al. [40]	Green benefits	Perceived quality	Behavior	Value–Belief–Norm (VBN)	Eco food	China
Li & Shan [8]	Green corporate image	Perceived value (mediator)	Purchase intention	Brand Identity System	Organic foods	China
Madududu et al. [1]	Food safety risk perception	Attitude	Purchase intention	TPB	Green food	South Africa
Monfort et al. [29]	Sustainability awareness	Perceived value & trust	Intentions	Extended S-O-R	Sustainable products	Spain
Nguyen et al. [26]	Store innovativeness, perceived store sustainability	Organic food purchase intention	Indirect (via perceived value & trust)	Signaling Theory; S-O-R	Organic food retail	Vietnam
Patiño-Toro et al. [28]	Ethical production	Moral satisfaction	Intention	VBN model	Green product	Colombia
Sharma et al. [23]	Green supply chain enablers (resilience, agility, sustainability)	Sustainable food purchasing	Indirect	Dynamic Capability Theory	Fresh food supply chain	India
Tasic et al. [41]	Blockchain traceability, transparency	Consumer trust, purchase decision	Indirect (via trust)	Information Asymmetry; Signaling Theory	Fresh vegetable products	EU
Watson et al. [9]	Green brand claims	Greenwashing scepticism	Purchase intention	Signaling theory	Fast food	UK

Many studies have examined consumers' willingness to pay more for organic foods (Table 1), but few have examined the factors influencing the purchase [1, 35, 42]. Poor communication about environmental practices limits consumer awareness and influences purchasing decisions, underscoring the urgency of green traceability tools [43]. Although technologies like QR codes for traceability and blockchain have the potential to improve trust and perceived value, their adoption for recognizing sustainability aspects in consumer purchasing behavior remains limited in the food industry [16]. Most research focuses on Western contexts, emphasizing the need for tailored approaches in developing countries that consider different regulations and consumer attitudes towards culture and sustainability [12]. Overcoming these gaps can help food companies and policymakers foster sustainable consumption.

### 2.1.2. Green Brand Identity System (GBIS)

The green brand identity system (GBIS) is based on traditional brand identity frameworks and integrates environmental values [44]. The system encompasses elements such as green product features, sustainable company values, and environmentally responsible distribution channels, all designed to create a cohesive and credible green image in consumers' minds [45]. In the realm of green food, green food brand identity systems are akin to GBIS, integrating environmental sustainability into the core of brand identity, aiming to enhance consumer trust and distinguish the brand in increasingly environmentally conscious markets [46]. GBIS emphasizes that a strong brand identity is created through consistent signals communicated across various brand touchpoints: green practice identity, green company identity [44].

Green practice identity (GPI) involves embedding genuine sustainable operational practices—such as environmentally friendly production, resource-efficient processing, and strict safety measures—into a brand's core identity, making these practices visible to consumers. Unlike generic green branding or symbolic eco-labels, GPI focuses on tangible, practice-based attributes that directly impact environmental and health outcomes [9]. In the food industry, where perceptions of risk and product quality are critical, GPI serves as a credible indicator of sustainability efforts, helping to bridge the information gap between producers and consumers [16].

A green corporate identity reflects a company's commitment to sustainability, boosting consumer confidence [44]. It encompasses corporate sustainability initiatives, social responsibility, and transparent governance [47]. For green companies, this identity focuses on serving the community by providing safe food products and promoting a healthier living environment [48].

The green distribution identity is rooted in sustainable practices that are integrated into the logistics and distribution processes of the organization [49]. This aspect underscores the environmental sustainability of distribution and retail operations, which may include the use of low-emission logistics, the creation of eco-friendly retail environments, and the provision of digital delivery options [50].

## 2.2. Research Hypothesis Development and Research Model

### 2.2.1. The Relationship Between Green Practice Identity with Green Perceived Value

As consumer concerns about food safety grow and the world shifts towards sustainable agriculture, food producers are increasingly adopting eco-friendly methods to meet these expectations [51]. The study also found that consumers trust eco-labelled green products more, viewing them as safer and more reliable, thereby increasing their perceived value and reinforcing the brands' green identity [52]. Additionally, research on consumer behavior toward sustainably produced organic food shows strong links to ethical sourcing and perceived health benefits, leading consumers to be willing to pay more for such brands [53]. Using digital traceability tools and safety certifications—such as QR codes or signage that shares the product's journey from farm to store—demonstrates transparency, further boosting perceived value and environmental friendliness [54]. Based on this, the following hypothesis is proposed:

**H1:** Green practice identity positively influences green perceived value.

### 2.2.2. The Relationship Between Green Corporate Identity and Green Perceived Value

The rising prominence of green corporate identity is a key trend linking business objectives with social and environmental responsibilities [1]. The identity of green companies supports sustainable farming practices and environmentally friendly supplies, thereby enhancing consumers' green perceived value [8]. Activities related to green labeling, certification, and supply chain transparency help boost customer perceptions of green brands [55]. Recognizing green companies through eco-signals and transparency about their origin allows them to communicate their environmental efforts to the green food community, thereby fostering a green perceived value [48]. Companies that commit to community benefits when producing green foods help consumers develop positive feelings, reduce perceived risks, and increase their perceived value [9]. Based on these points, the following hypothesis is formulated.

**H2:** Green corporate identity positively affects green perceived value.

### 2.2.3. Relationships Between the Green Distributive Identity and Green Perceived Value

The green distribution identity influences consumer perceptions of the green food supply chain, creating a competitive advantage and attracting health-conscious consumers [50]. Yadav et al. [56] demonstrated that a friendly, ethical, and eco-conscious distribution system identity positively differentiates and impacts key components of green brand equity, including green perceived value. The extent of distribution channel expansion (coverage, product size, etc.) has a positive impact on green perceived value because it makes it easier for consumers to access and recognize [57]. Distribution channels that sell sustainable, customer-benefit-based green products will help consumers perceive greater value in green products and support their responsibility to the community [49]. Based on the above evidence, the following hypothesis is proposed:

**H3:** Green distributive identity has a positive effect on green perceived value.

### 2.2.4. The Relationship Between Green Perceived Value and Green Food Purchase Intention

Green perceived value refers to consumers' knowledge of environmental issues, which plays a vital role in shaping purchasing behavior, especially in the food industry [58]. Companies demonstrating transparency in their manufacturing and sustainable practices can enhance perceived green value and promote green brand purchase behavior [8]. Consumers tend to perceive higher quality in green brands that are committed to community development, which also increases their purchase intentions [59]. In the context of the green food market, perceived value is closely linked to sustainable cues, which leads consumers to develop positive attitudes and higher purchasing intentions for green food [9]. Based on this, a hypothesis is proposed:

**H4:** Green perceived value has a positive influence on green food purchase intention.

### 2.2.5. Green Traceability

Green food traceability involves systematically tracking and verifying details about a green food product's origin, manufacturing processes, logistics, and distribution throughout the supply chain [10]. When traceability systems enable consumers to access detailed information about farming methods, production inputs, and environmental certifications, the perceived functional, health, and moral value of green food products rises [54]. Conversely, in low-traceability settings, green practices may be perceived as merely symbolic or unverified, thereby reducing their influence on perceived value [11]. García-Salirrosas et al. [16] demonstrated that traceable green production methods are perceived as more valuable than non-traceable ones. Meanwhile, Giacone et al. [12] found that transparency improves the valuation of sustainability features in food practices. High green traceability levels allow consumers to connect corporate sustainability stories with real sourcing, processing, and distribution methods, boosting perceived value [12]. In contrast, weak or missing traceability systems can make a company's green identity seem vague or rhetorical, reducing its influence on perceived value. Studies also show that transparency and traceability greatly improve the credibility and value of CSR-focused food brands [10]. When this information is accessible, consumers can better recognize the environmental and safety advantages of distribution processes, which enhances the perceived value of green practices [50]. In environments with low traceability, these benefits often go unnoticed, reducing the impact of green distributive identity on green perceived value [60]. Research indicates that transparent logistics and retail systems significantly enhance consumers' assessments of sustainability and perceived green value, particularly in emerging markets [61]. The hypotheses are proposed as follows:

**H5a:** Green traceability moderates the relationship between green practice identity and green perceived value.

**H5b:** Green traceability moderates the relationship between green corporate identity and green perceived value.

**H5c:** Green traceability moderates the relationship between green distributive identity and green perceived value.

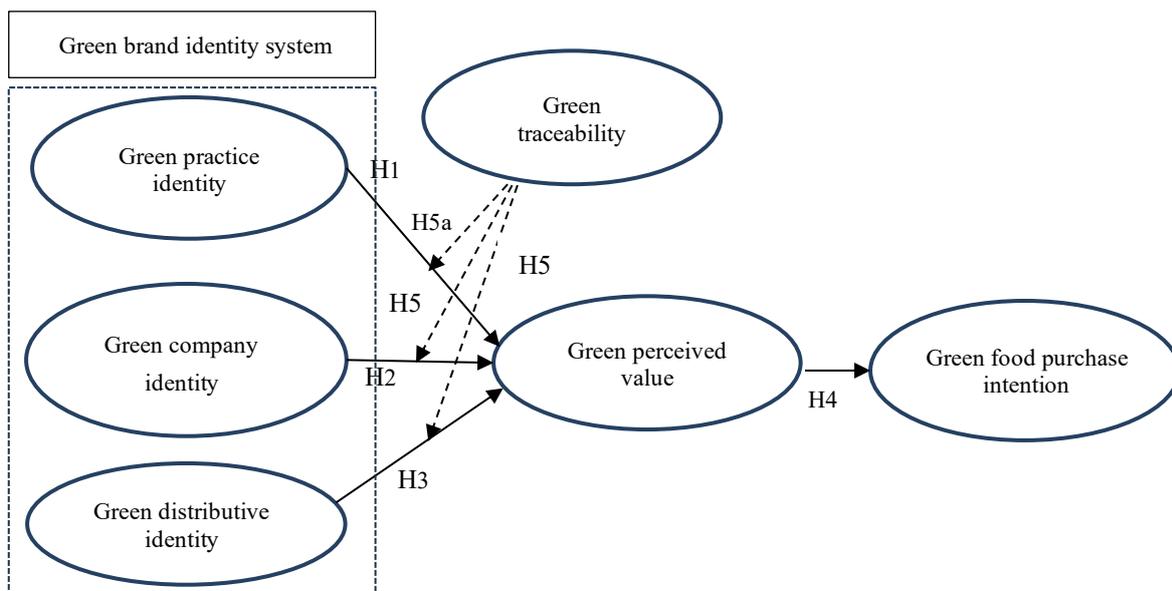


Figure 1. Proposed conceptual framework.

This model was developed based on the proposed hypotheses linking green practice identity, green corporate identity, and green distributive identity, with the moderating role of green traceability affecting green perceived value, which, in turn, collectively influence green food purchase intention (Figure 1).

### 3. Methodology

#### 3.1. Measurement of Constructs

This study employs a quantitative, explanatory research design to investigate the relationships among the green brand identity system (GBIS), perceived green value, and green food purchase intention in an emerging market (Figure 1). A quantitative approach helps validate causal relationships, estimate effect sizes, and evaluate mediation and moderation within a structural model [62]. The structured questionnaire was divided into two sections: the first collected demographic details (like age, gender, education level, and average monthly income), and the second included core construct questions rated on a five-point Likert scale from 1 "strongly disagree" to 5 "strongly agree." Content validity was maintained through adaptation from previous research.

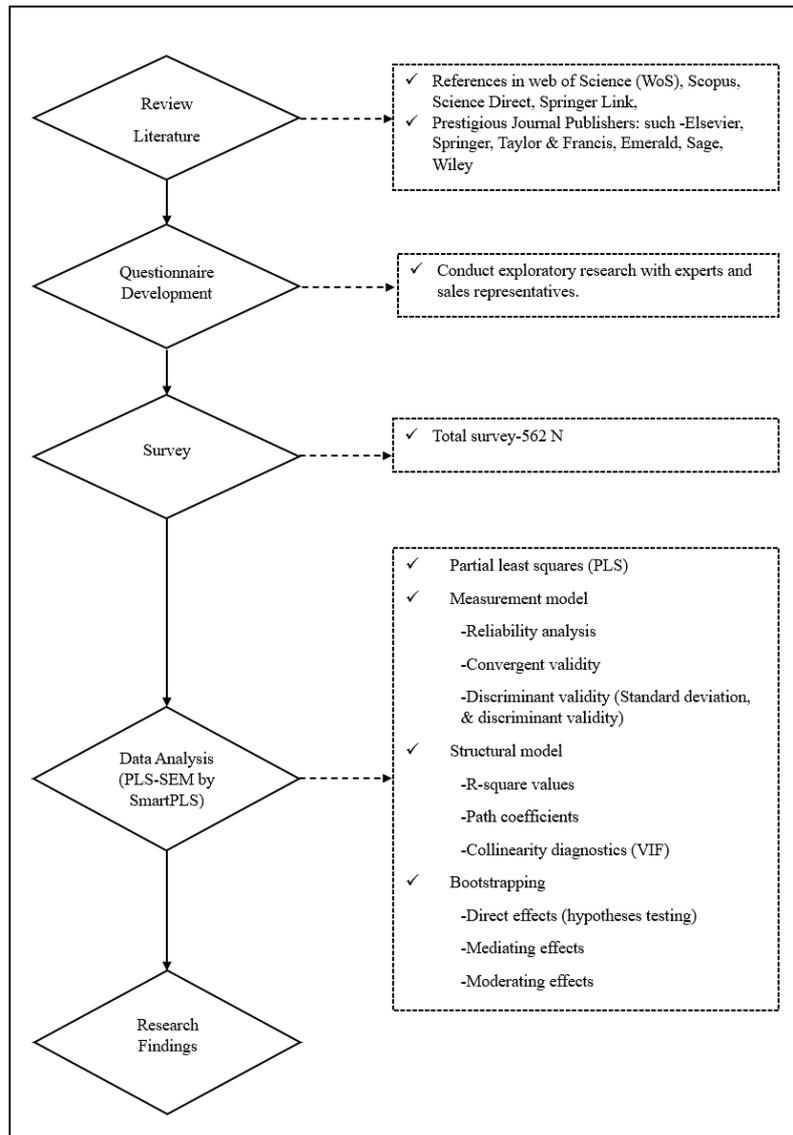


Figure 2. The flow chart of research methodology

Green practice identity was operationalized using four specific items from Chang et al. [63]. The green corporate identity has five observed variables referenced from Davari & Strutton [64] and Thi & Le Van [65]. Five observed variables of green distributive identity were collected and developed from studies by Davari & Strutton [64] and Jiang et al. [66]. Green traceability with five observed variables was collected from studies by Duong et al. [10]. Green perceived value, with four observed variables, was referenced from Cui et al. [55]. Green food purchase intention, based on five observed variables, was developed by Konuk [37] and Madududu et al. [1].

To enhance contextualization and measurement relevance, the quantitative design was guided by qualitative inputs from focus group discussions with industry experts, retailers, and consumers. Integrating these insights before conducting large-scale hypothesis testing is recommended in sustainability and branding research, particularly in emerging markets where conditions and consumer perceptions differ from those in developed economies [67].

A pilot study involving approximately 52 respondents assessed the clarity, reliability, and dimensionality of the items. Exploratory factor analysis (EFA) and Cronbach's alpha were used to assess internal consistency. Ultimately, observed items were selected to create the official survey questionnaire for data collection. Items with low factor loadings or unclear wording were removed or refined to ensure the final questionnaire had adequate reliability and construct validity before full-scale data collection.

### 3.2. Data Collection and Sample

Primary data were gathered through a cross-sectional survey that included in-store structured interviews and online self-administered questionnaires. This mixed-method approach enhances sample diversity, minimizes bias from a single source, and broadens reach to environmentally conscious consumers [68]. The research focused on Ho Chi Minh City, Vietnam's most significant urban market, with approximately 14 million residents, formed by the merger of three provinces: Ho Chi Minh City, Binh Duong, and Ba Ria-Vung Tau [69]. Residents in these cities enjoy higher incomes, easier access to certified green products, and greater exposure to sustainability messaging. Consequently, they serve as an ideal group for examining theories related to green branding and sustainable consumption [12].

Respondents needed to be at least 18 years old, have purchased green or certified safe food products meeting standards like VietGAP, GlobalGAP, Organic, or HACCP within the past three months, and not be employed in food marketing, advertising, or related market research. A convenience sampling method was used because there are no complete sampling frames for green food consumers in emerging markets. The participants consisted of visitors to retail outlets specializing in safe foods, as well as members of online communities dedicated to healthy living. The in-store survey took place at prominent retail locations and safe food chains, including Co-opmart Green Stores, AEON Eco Zones, WinMart, Safe Food Chain, and Orfarm outlets. Although non-probabilistic, this method is generally accepted in theory-testing studies focused on exploring structural relationships rather than estimating population parameters [70]. The online survey, created with Google Forms, aimed to reach a wider audience. The link was shared across various social media groups and platforms, including Facebook groups like "Eat Clean Live Healthy" and "Vietnam Organic Community" as well as Zalo groups such as "Mẹ Bim, Celadon market".

Regarding the sample size, 613 questionnaires were completed, and 594 surveys were collected. After removing 32 incomplete questionnaires, we collected 562 completed questionnaires for further analysis. The survey was conducted from September to October 2025. The detailed profile is shown in Table 2.

**Table 2. Demographic profile of the respondents**

Demographic Characteristic	N (562)	%
Gender		
Male	152	27.1
Female	410	72.9
<b>Total</b>	<b>562</b>	<b>100</b>
Age		
18–25	87	15.4
26–35	161	28.6
36–45	143	25.6
46–55	108	19.2
Above 55	63	11.2
<b>Total</b>	<b>562</b>	<b>100</b>
Educational level		
High school or below	154	27.4
Associate degree	96	17.1
Bachelor's degree	248	44.1
Postgraduate degree	64	11.4
<b>Total</b>	<b>562</b>	<b>100</b>
Monthly income (VND)		
5–10 million	52	9.3
10–15 million	91	16.2
15–25 million	220	39.2
>25 million	199	35.3
<b>Total</b>	<b>562</b>	<b>100</b>

Note: US\$1 = Vietnamese Dong (VND) 25,097 at the time of the survey.

The sample represents urban green food consumers in emerging markets, such as Vietnam, where factors like income growth, education, and environmental awareness influence sustainable consumption habits. The sample was predominantly female (72.9%), with males making up 27.1%. Most respondents fell within the economically active and consumption-focused age groups, with the largest segment being those aged 26–35 years (28.6%), followed by those aged 36–45 years (25.6%) and those aged 46–55 years (19.2%). Approximately 44.1% of respondents held at least a bachelor's degree, 11.4% had postgraduate qualifications, 17.1% had an associate degree, and 27.4% had a high school education or less. Regarding monthly income, 39.2% earned 15–25 million VND, and 39.2% earned over 25 million VND. Fewer respondents earned 10–15 million VND (9.3%) or 5–10 million VND (9.3%). Overall, the demographic profile reveals an urban, educated, and financially capable group, key factors that influence green food consumption in emerging economies.

### 3.3. Analysis

The data were analyzed with SmartPLS software using Partial Least Squares Structural Equation Modelling (PLS-SEM). This method is especially appropriate for complex research models that include multiple latent constructs, mediation and moderation effects, and non-normal data distributions, which are common in sustainability and consumer behavior studies [62].

The measurement model was assessed through several criteria: indicator reliability with outer loadings of at least 0.70, internal consistency indicated by Cronbach's alpha and composite reliability both above 0.70, convergent validity confirmed by an average variance extracted of at least 0.50, and discriminant validity evaluated using the Fornell–Larcker criterion and HTMT ratios [71].

The structural model was assessed using path coefficients, bootstrapped t-values, coefficients of determination ( $R^2$ ), and variance inflation factors (VIF) to detect multicollinearity. Mediation effects were tested using bootstrapped indirect effects, following contemporary recommendations for examining causal mechanisms in behavioral and marketing research [72].

## 4. Results

### 4.1. Measurement Model

The measurement model must verify reliability and validity. The loadings for each indicator were checked to ensure they met the required standards, with a minimum acceptable loading of 0.7. Items (GPI3=0.246; GCI5=0.332; GT5 =0.674; GFPI5=0.672) were eliminated. The remaining loadings of the item were all above 0.7, ranging from 0.721 to 0.886, which are considered adequate. According to Fornell & Larcker [71], an AVE of 0.50 or higher is considered acceptable. In this case, the AVE values ranged from 0.556 to 0.722; therefore, they are deemed acceptable (Table 3).

**Table 3. Outer loadings and internal consistency results**

Constructs	Outer loadings	CR	Rho_A	AVE	VIF
<b>GPI (Green practice identity)</b>					
GPI1	0.780				1.491
GPI2	0.870	0.735	0.844	0.644	1.405
GPI4	0.753				1.476
<b>GCI (Green corporate identity)</b>					
GCI1	0.768				1.687
GCI2	0.808				1.913
GCI3	0.834	0.807	0.874	0.634	2.137
GCI4	0.774				1.793
<b>GDI (Green distributive identity)</b>					
GDI1	0.721				1.519
GDI2	0.723				1.477
GDI3	0.778	0.737	0.834	0.556	1.553
GDI4	0.761				1.391
<b>GPV (Green perceived value)</b>					
GPV1	0.840				2.465
GPV2	0.876				2.908
GPV3	0.818	0.848	0.897	0.687	1.932
GPV4	0.778				1.505

GT (Green traceability)						
GT1	0.886					3.074
GT2	0.844					2.118
GT3	0.831	0.871	0.912	0.722		1.908
GT4	0.835					2.512
GFPI (Green food purchase intention)						
GFPI1	0.863					2.524
GFPI2	0.834					2.454
GFPI3	0.857	0.885	0.916	0.685		2.933
GFPI4	0.793					2.248
GFPI6	0.788					1.997

Note: CR: Composite Reliability; AVE: Average Variance Extracted; VIF: Variance Inflation Factor.

Discriminant validity indicates that each variable is distinct from the others. As shown in Table 4, the square root of the AVE for each variable (0.746-0.850) was greater than its correlations with the other variables examined in the research model. Discriminant validity indicates that each variable is distinct from the others. This confirmed the discriminant validity of the constructs as suggested by Sarstedt et al. [62]. HTMT < 0.9, and the HTMT value does not contain 1. Moreover, all correlation coefficients among the constructs were below 0.6, eliminating the possibility of multicollinearity.

**Table 4. The findings of discriminant validity, Fornell-Lacker, and HTMT criterion**

	GCI	GDI	GFPI	GPI	GPV	GT
Fornell-Larcker Criterion (FLC)						
GCI	0.796					
GDI	0.471	0.746				
GFPI	0.681	0.478	0.828			
GPI	0.144	0.332	0.156	0.803		
GPV	0.503	0.585	0.445	0.410	0.829	
GT	0.185	0.308	0.153	0.600	0.361	0.850
Heterotrait Monotrait Ratio (HTMT)						
	GCI	GDI	GFPI	GPI	GPV	GT
GCI						
GDI	0.613					
GFPI	0.805	0.601				
GPI	0.188	0.438	0.188			
GPV	0.599	0.716	0.502	0.482		
GT	0.221	0.372	0.173	0.730	0.413	

Note: GPI: Green Practice Identity; GCI: Green Corporate Identity; GDI: Green Distributive Identity; GPV: Green Perceived Value; GT: Green Traceability; GFPI: Green Food Purchase Intention.

#### 4.2. Assessment of the Structural Model

According to the source, the Variance Inflation Factor (VIF) is used to assess multicollinearity. The results show all VIF values are below 5, ranging from 1.391 to 3.074. This indicates that the structural model does not exhibit multicollinearity. The study further demonstrates good model fit, with SRMR = 0.076 (below 0.08), d\_ ULS = 1.731, and d\_ G = 0.679. Additionally, NFI is 0.707, which equals 0.679. NFI = 0.707.

PLS uses nonparametric bootstrapping to estimate coefficient significance. Subsequently, t-values were computed to assess whether the coefficients differed significantly from zero. Non-parametric bootstrapping was applied to all cases with a sign change (562 cases) using 1,000 micro-samples.

The coefficient of determination (R<sup>2</sup>) is a standard metric for evaluating how well the independent variables predict the outcome. In Table 5, the R<sup>2</sup> values are 0.476 for GPV and 0.198 for GFPI. These values suggest moderate to strong explanatory power in behavioral research. Moreover, the positive Stone–Geisser Q<sup>2</sup> values for both constructs verify the model’s predictive relevance.

**Table 5. The path coefficients and significance level**

Hypo-thesis	Relationships	Path Coefficients	SD (STDEV)	T-Value	P Values	Decision
H1	GPI → GPV	0.215	0.049	4.403	0.000	Accepted
H2	GCI → GPV	0.302	0.039	7.712	0.000	Accepted
H3	GDI → GPV	0.331	0.042	7.940	0.000	Accepted
H4	GPV → GFPI	0.445	0.047	9.386	0.000	Accepted
	GT → GPV	0.059	0.043	1.378	0.169	Rejected
H5a	GT × GPI → GPV	0.017	0.030	0.562	0.574	Rejected
H5b	GT × GCI → GPV	0.051	0.042	1.217	0.224	Rejected
H5c	GT × GDI → GPV	0.108	0.045	2.402	0.016	Accepted
		<b>R<sup>2</sup></b>	<b>SSO</b>	<b>SSE</b>	<b>Q<sup>2</sup> (=1-SSE/SSO)</b>	
	Green perceived value	0.476	2810.000	2442.730	0.131	
	Green food purchase intention	0.198	2248.000	1555.749	0.308	

Note: GPI: Green Practice Identity; GCI: Green Corporate Identity; GDI: Green Distributive Identity; GPV: Green Perceived Value; GT: Green Traceability; GFPI: Green Food Purchase Intention.

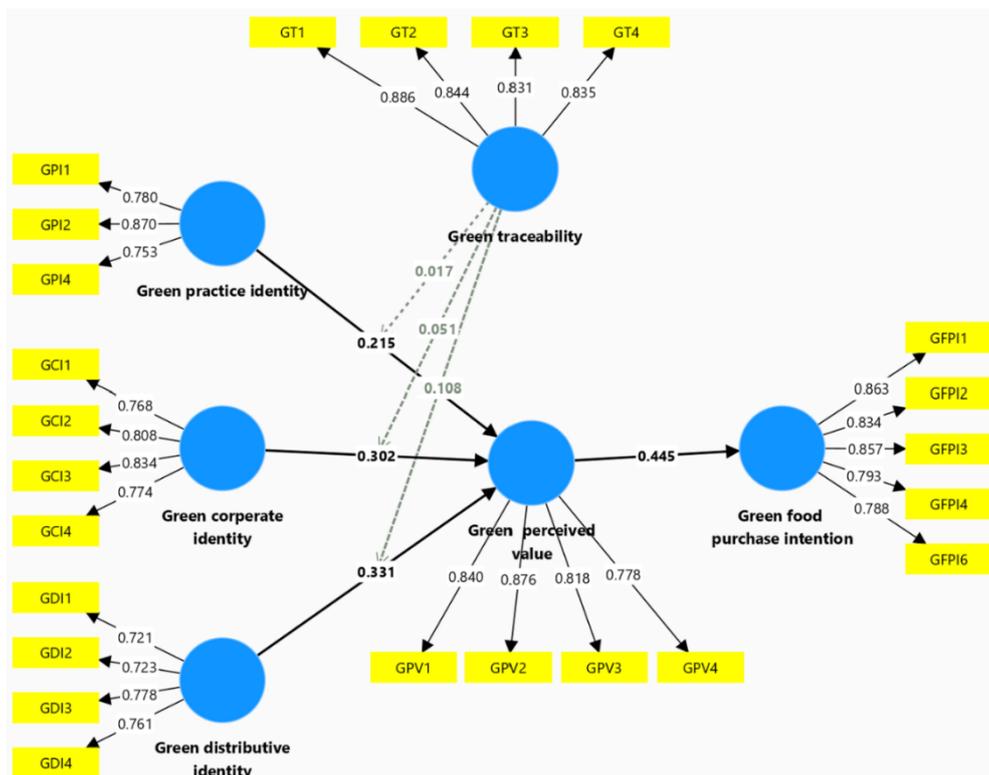
The results indicated that the effects of green practice identity, green corporate identity and green distributive identity on GPV ( $\beta = 0.215, p < 0.001$ ;  $\beta = 0.302, p < 0.001$ ;  $\beta = 0.331, p < 0.001$ ) are significant. Among these, green distributive identity has the most tremendous impact, underscoring the importance of sustainable retail settings and transparent distribution in shaping consumers' perceptions of value in emerging markets. Additionally, GPV significantly influences GFPI ( $\beta = 0.445, p < 0.001$ ), underscoring its key role as a direct predictor of consumers' behavioral intentions. GPI, GCI, and GDI all have a significant impact on GPV, and their indirect effects on GFPI through GPV are even more substantial (Table 6). Therefore, hypotheses H1, H2, H3, and H4 are supported. The path coefficients and significance levels in Table 5 are shown in Figure 3.

**Table 6. Mediation effects summary**

Relationships	Direct Effect	Mediation → Loyalty	Indirect Effect ( $\beta$ )	Decision
GPI → GPV → GFPI	0.215	0.445	0.095675	Significant
GCI → GPV → GFPI	0.302	0.445	0.13439	Significant
GDI → GPV → GFPI	0.331	0.445	0.147295	Significant

Note: \*\*\* $p < .001$ ; \*\* $p < .05$ ; (n.s.) = not significant

Note: GPI: Green practice identity; GCI: Green corporate identity; GDI: Green distributive identity; GPV: Green perceived value; GFPI: Green food purchase intention.



**Figure 3. Structural model assessments with control variables**

### 4.2.1. Moderating Effects of Green Traceability

To assess the conditional effect of green traceability, interaction terms were included in the model (Table 5). The findings indicate a specific moderating role: the interaction between green traceability and green distributive identity significantly increases GPV ( $\beta = 0.108, p < 0.05$ ). However, the interactions between green traceability and both green practice identity and green corporate identity were not statistically significant ( $\beta = 0.003, p = 0.925$ ;  $\beta = 0.065, p = 0.098$ ). These results suggest that traceability primarily enhances perceived value when associated with distribution-related cues, such as retail transparency, QR codes, and store verification, rather than with abstract production practices or corporate sustainability claims. This pattern suggests that consumers in emerging markets tend to rely on visible and easily verifiable information. Therefore, hypothesis H5c is supported, while hypotheses H5a and H5b are not. Figures 4a, 4b, and 4c illustrate the moderating role of green traceability.

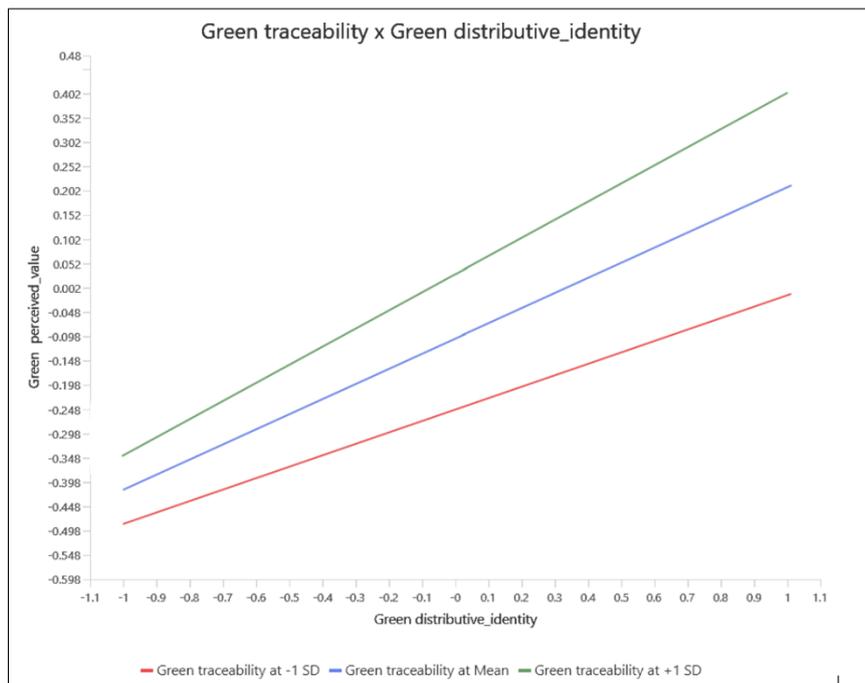


Figure 4a. Moderating effects on the relationship between green distributive identity and green perceived value

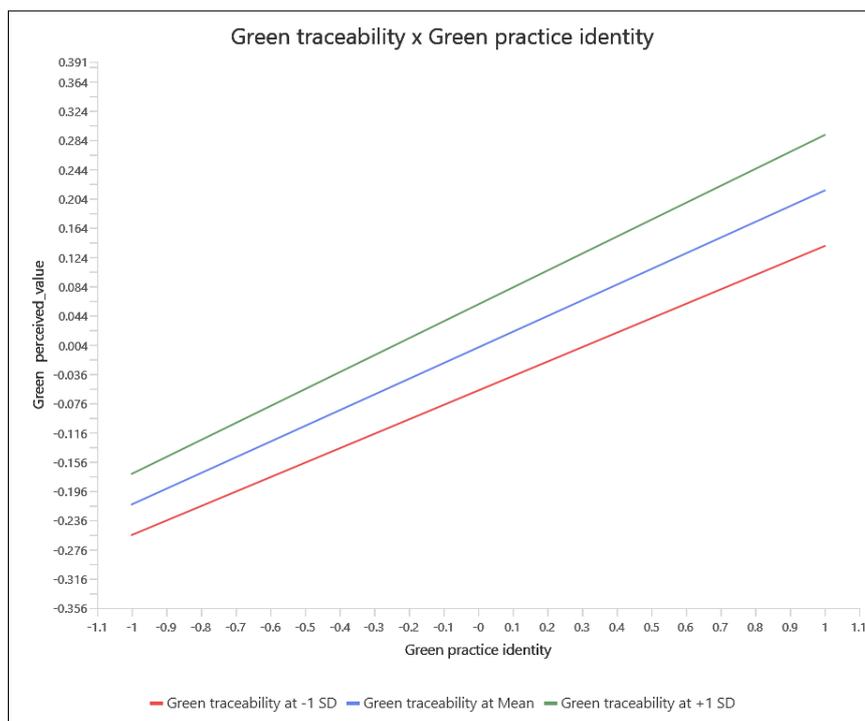


Figure 4b. Moderating effects between green practice identity and green perceived value



Figure 4c. Moderating effects on the relationship between green corporate identity and green perceived value

## 5. Discussion

This study provides strong empirical evidence on how the green brand identity system (GBIS) affects consumers' intention to purchase green foods, with green perceived value (GPV) as a mediator in an emerging market context.

The key finding is that green distributive identity has the most significant impact on green perceived value ( $\beta = 0.331$ ), exceeding the influence of green corporate and green practice identities. This aligns with Signaling Theory, which suggests that signals are most effective when they are observable, verifiable, and near the decision point. In emerging markets, consumers often lack the technical knowledge or institutional assurances to assess upstream sustainability claims (like farming practices), making retail-level cues—such as certified outlets, traceable logistics, and eco-friendly stores—more understandable and trustworthy [73, 74]. From a contextual standpoint, Vietnam and similar emerging economies experience recurrent food safety incidents, prompting consumers to rely more on downstream assurance signals. Studies indicate that retail credibility boosts perceived value and purchase intent for safe, sustainable foods [10]. By integrating distribution strategies with modern retail practices, food systems can become more transparent and sustainable, enhancing both business outcomes and social value in emerging markets.

The strong influence of green corporate identity on perceived value ( $\beta = 0.302$ ) implies that companies partially compensate for weak formal institutions by signaling ethical governance, social responsibility, and a long-term outlook. In emerging markets, where regulatory enforcement and certification credibility can vary, consumers increasingly depend on trust signals at the corporate level as informal institutions [29, 42]. Importantly, the results show that consumers view corporate sustainability not just as environmental concern but also as an indicator of food safety responsibility and moral legitimacy. This is consistent with recent research indicating that corporate sustainability boosts perceived integrity and diminishes skepticism, especially in high-risk categories like fresh food [9].

While green practice identity positively influences perceived value ( $\beta = 0.215$ ), its relatively weaker impact highlights a common issue in emerging markets: the sustainability efforts at the production level often go unnoticed by consumers. Practices such as sustainable farming, chemical reduction, or the use of eco-friendly inputs occur early in the process and are hard to verify without proper traceability or third-party certification. This aligns with recent findings indicating that sustainable practices add value to consumers only when communicated through recognizable signals, such as certifications or retailer endorsements [14]. Without such clear signals, green practices may be ignored or seen as merely symbolic instead of genuinely substantial.

The strong impact of green perceived value on purchase intention ( $\beta = 0.445$ ) highlights its role as the main psychological pathway through which sustainability signals (Green practice identity, green corporate identity, green distributive identity) shape behavior. According to the S–O–R framework, green perceived value combines functional (safety, quality), emotional (peace of mind), and moral (environmental responsibility) benefits into an overall

evaluation that directly encourages action. Importantly, the full mediation results show that green identity alone does not influence behavior unless it is interpreted as perceived value. This supports prior research indicating that value perception is a closer predictor of green purchasing than attitudes or environmental concern, particularly in price-sensitive emerging markets [8].

Interestingly, green traceability does not have a statistically significant direct effect on green perceived value, indicating that traceability by itself doesn't automatically increase value perceptions. Contrary to previous research that views traceability as a direct predictor of perceived value and purchase intent, this study shows that green traceability ( $\beta = 0.059$ ,  $p = 0.169$ ) does not meaningfully improve green perceived value (GPV). This highlights an important point: Earlier studies, especially those from developed markets, often assume that access to traceability information enhances perceptions of functional and moral value. In emerging markets, consumers may see this information more as proof of reduced risk than as a benefit [12]. From a signaling theory view, traceability acts as a credibility booster but lacks influence without visible green identity cues, such as sustainable retail environments. Digital traceability systems require effort and technological skills, which may be lacking in emerging markets, limiting consumer engagement unless driven by the context [54]. Moreover, fresh produce relies more on sensory evaluation and retail environment than digital records, making downstream signals more pertinent. Therefore, traceability alone does not significantly increase GPV without visible links [11].

Finally, green traceability's moderating effects significantly influence the relationship between green distributive identity and GPV ( $\beta = 0.108$ ,  $p < 0.05$ ), but its moderating effects on green practice identity ( $\beta = 0.003$ ,  $p = 0.925$ ) and green corporate identity ( $\beta = 0.065$ ,  $p = 0.098$ ) are not supported. These results align with recent research indicating that traceability enhances consumer trust mainly when it is easily accessible, verifiable, and connected to the purchase environment [12, 16]. In emerging markets, where trust in greenwashing is low, traceability systems at retail and logistics stages greatly shape consumer perceptions more than manufacturing processes or corporate sustainability claims. Therefore, downstream traceability acts as a trustworthy signal that enhances retailer credibility and reduces skepticism about upstream claims, especially in these markets. This underscores the importance of integrating technological transparency into visible brand identity cues to ensure it is truly impactful. [11, 54].

## 6. Conclusions

The research summarizes the main findings and presents key business recommendations, outlining directions for future study:

### 6.1. Research Conclusion

This study examines how a Green Brand Identity System (GBIS) affects consumers' willingness to buy green fruits and vegetables in emerging markets. Using the S–O–R framework and signalling theory, it shows that green brand identity influences behavior through a psychological process, with green perceived value (GPV) mediating the relationship between identity signals and purchase intention. The evidence shows that all three facets of GBIS—green practice identity, green corporate identity, and green distributive identity—boost green perceived value, with green distributive identity having the greatest effect. This underscores the need for visible sustainability indicators at purchase points, such as certified retail environments and eco-friendly distribution methods. In emerging markets, where trust is often lacking, consumers rely more on these tangible signals than on production claims. Green corporate identity also positively affects perceived value, highlighting the role of corporate sustainability initiatives. Meanwhile, green practice identity has a lesser effect, probably because production practices are less visible in fresh food markets.

The study emphasizes green perceived value as a strong and direct predictor of green food purchase intention, acting as a complete mediator for the influence of all GBIS dimensions. It underscores perceived value as the main psychological pathway through which sustainability-related identity signals lead to actual purchase intentions. Additionally, the results highlight a subtle role for green traceability: although it does not directly increase perceived value, it notably boosts the impact of green distributive identity on perceived value. This indicates that traceability primarily serves as a credibility booster when integrated into accessible, verifiable touchpoints within distribution and retail systems.

### 6.2. Theoretical Contributions

This study offers several key theoretical contributions compared to prior research on green food consumption, especially by distinguishing fresh fruits and vegetables (FFV) from processed organic foods and framing the Green Brand Identity System (GBIS) as a multi-level signaling framework.

First, we contribute to FFV's initiative to go beyond the bias toward processed organic food. Most existing research on green consumption emphasizes packaged or processed foods, where quality signals are embedded in labels, certifications, and branding, such as eco-labels, organic logos, and CSR claims [13, 29]. In these cases, signalling is

fairly standardized and less reliant on situational verification. Conversely, FFV markets are marked by high perishability, visual evaluation, safety concerns, and short purchase cycles, which increase information asymmetry and perceived risk [9, 75]. This study expands signaling theory by showing that in FFV contexts, downstream and experiential signals—especially green distributive identity—have a stronger capacity to create value than upstream production signals or abstract corporate signals. This refines previous research that viewed green signals as uniform across food categories.

Second, we contribute by presenting GBIS as a systemic signaling configuration. Prior studies often examine factors such as environmental concern, health awareness, and traceability as separate predictors [10, 14]. In contrast, this research conceptualizes GBIS as an integrated system comprising green practice identity (production-level signals), green corporate identity (organizational-level signals), and green distributive identity (retail/logistics-level signals). Empirical results indicate that green distributive identity has the strongest influence on perceived green value in FFV markets, offering a hierarchical view of signal effectiveness. This suggests that, for fresh produce where consumers make quick, in-store judgments, visible and verifiable retail cues serve as primary credibility signals.

The third contribution involves repositioning traceability as a context-embedded meta-signal. Contrary to studies that see traceability as directly building trust or purchase intent [10, 11], our findings show that traceability alone does not increase perceived value in FFV markets. Instead, it enhances the impact of green distributive identity by acting as a credible contextual cue. This refinement is especially relevant for emerging markets, where institutional trust gaps increase skepticism toward abstract sustainability claims [1]. It emphasizes that technological transparency must be embedded in consumer-facing moments to be perceived as valuable.

Finally, this research advances sustainable food theory by focusing on fresh produce rather than processed organic foods. It recognizes product-category differences in signal interpretation, demonstrates that perceived value mechanisms vary under high perishability and safety risks, and integrates S–O–R, Brand Identity System theory, and Signalling Theory into a model tailored for fresh produce markets.

### 6.3. Management Recommendations

First, this study highlights how green practice identity can enhance market value through effective communication. While environmentally friendly production practices improve perceived green value, their impact is limited without clear communication or independent verification. Therefore, food producers should establish transparency mechanisms, such as standardized eco-certifications, clear labels, and digital disclosures, such as QR codes linking to sustainable practices. Research indicates that consumers value green foods more when sustainable practices are observable and verifiable, particularly in emerging markets characterized by information asymmetry. Thus, firms should focus on communicating their green practices to maximize perceived value and credibility.

Second, the findings suggest that a green corporate identity is essential for shaping green perceived value, underscoring the importance of long-term commitments to sustainability, ethical governance, and consumer welfare. Companies should align their sustainability vision with internal operations and external communications. Practical steps include publishing transparent sustainability reports, aligning missions with environmental objectives, and participating in community initiatives focused on food safety and public health. Empirical evidence suggests that firm corporate sustainability commitments build trust and enhance perceived value in food markets [29, 47]. Thus, green corporate identity should be treated as a strategic asset rather than just a branding tool.

Third, this study identifies green distributive identity as the key factor influencing green perceived value, highlighting the importance of retail environments in evaluating sustainability claims. The shift to supermarkets and convenience stores enhances transaction efficiency and signals quality, building trust through standardized offerings. This retail credibility boosts perceived value and purchase intent for safe, sustainable foods [10, 11]. In emerging markets, consumers rely on visible cues at the point of purchase to assess product credibility. Retailers should invest in eco-friendly designs, certified distribution systems, and transparent logistics, as these improvements enhance perceptions of safety, quality, and environmental responsibility. Overall, investing in downstream sustainability may offer greater perceptual benefits than upstream initiatives when resources are limited.

Ultimately, this study clarifies the role of green traceability, demonstrating that it primarily serves as a verification tool rather than an independent value driver. While it does not directly enhance green perceived value, it strengthens green distributive identity. For practitioners, integrating traceability technologies, such as QR codes and blockchain, into retail and distribution is essential for markets [12]. Accessible traceability information at the point of sale enhances credibility and alleviates concerns about greenwashing. Evidence suggests that consumer-facing traceability systems increase trust in green food products, particularly in emerging markets [16]. Thus, firms should prioritize usability, accessibility, and contextual relevance in their traceability solutions.

From a policy perspective, these findings have several key implications. Firstly, regulators should encourage the development of standardized, interoperable green traceability systems to promote consistency, credibility, and

consumer trust in food markets. Secondly, public policies ought to incentivize the creation of certified green distribution and retail networks, acknowledging their vital role in shaping consumer perceptions of value and safety. Additionally, governments can assist small and medium-sized enterprises by subsidizing certification expenses and easing access to digital traceability infrastructure. Collaboration between the public and private sectors can also accelerate the adoption of transparent food systems and help mitigate information asymmetry. Existing research shows that institutional support for traceability and green retail infrastructure fosters sustainable consumption, enhances food safety, and strengthens green brand ecosystems [11].

#### 6.4. Research Limitations

Despite its valuable contributions, this study faces several limitations. First, the cross-sectional design restricts causal conclusions and does not show how consumer perceptions, trust, or behavioral intentions evolve. Future research should adopt longitudinal or experimental designs to better understand how repeated exposure to green brand cues and traceability systems influences trust, perceived value, and purchasing decisions over time. Second, using convenience sampling within a single metropolitan area limits the generalizability of the results to rural populations or other emerging markets with different institutional factors, consumption habits, and sustainability awareness.

#### 6.5. Recommendation for Future Research

Future studies could test the GBIS framework across diverse cultural, geographic, and institutional settings, including rural areas and cross-country comparisons between emerging and developed markets, to evaluate the model's robustness. Lastly, although perceived value is the primary mediator, other psychological factors, such as green trust, perceived risk, and scepticism of greenwashing, were not explicitly included. Incorporating these additional mediators and moderators—such as environmental knowledge, price sensitivity, and green claim scepticism; would enhance understanding of consumer decision-making in green food markets.

### 7. Declarations

#### 7.1. Author Contributions

Conceptualization, B.V.Q.; methodology, B.V.Q.; software, B.V.Q.; validation, B.V.Q.; formal analysis, B.V.Q.; investigation, B.V.Q. and C.T.H.; resources, B.V.Q.; data curation, B.V.Q. and C.T.H.; writing—original draft preparation, B.V.Q.; writing—review and editing, B.V.Q. and C.T.H.; visualization, B.V.Q. and C.T.H.; supervision, B.V.Q. and C.T.H.; project administration, B.V.Q. All authors have read and agreed to the published version of the manuscript.

#### 7.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

#### 7.3. Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

#### 7.4. Institutional Review Board Statement

Not applicable.

#### 7.5. Informed Consent Statement

Not applicable.

#### 7.6. Declaration of Competing Interest

The authors declare that there are no conflicts of interest concerning the publication of this manuscript. Furthermore, all ethical considerations, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies, have been completely observed by the authors.

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## Appendix I: Questionnaire Items and Construct

Construct	Items
GPI	Green practice identity (GPI) adapted from Chang et al. [63].
GPI1	I can identify (X) green food production processes that minimise the use of synthetic fertilisers.
GPI2	I can identify (X) green foods as having an environmentally friendly manufacturing process.
GPI4	I can identify (X) green foods as incorporating eco-friendly technology.
GCI	Green corporate identity (GCI) adapted from Davari & Strutton [64] and Thi & Le Van [65].
GCI1	I can identify that (X) company has established sustainable development goals.
GCI2	I can identify that (X) food company prioritizes consumer benefits.
GCI3	I can identify that (X) food company is committed to environmental protection.
GCI4	I can confirm that (X) food company adheres to sustainable business practices.
GDI	Green distributive identity (GDI) adapted from Davari & Strutton [64] and Jiang et al. [66].
GDI1	The stores that are identified for distributing (X) green food.
GDI2	The stores that sell (X) green foods always have a traceability code.
GDI3	The (X) green foods distribution store system has a distinct identification system.
GDI4	The Stores that sell environmentally friendly green foods (X).
GPV	Green perceived value (GPV) adapted from Cui et al. [55].
GPV1	(X) Foods contribute positively to my family's health
GPV2	(X) Food offers good value for the price.
GPV3	I perceive that (X) company ensures safety as committed to
GPV4	The store selling (X) foods helps people feel safe
GT	Green traceability (GT) adapted from Duong et al. [10].
GT1	I can trace (X) green foods back to the specific farm practices
GT2	The package/label clearly shows the origin of (X) green foods
GT3	The traceability information lets me verify authenticity
GT4	It is easy to scan the origin information for (X) green foods on the package/label
GFPI	Green food purchase intention (GFPI) adapted by Konuk [37] and Madududu et al. [1].
GFPI1	I will consider buying green food because it is less polluting in the future
GFPI2	I will think about switching to eco-friendly food brands due to environmental concerns.
GFPI3	I definitely plan to buy green food soon.
GFPI4	I plan to purchase green food because the brand is environmentally friendly.
GFPI6	I am willing to pay more for green food because it demonstrates significant environmental benefits.