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## **ESG perception and green logistics adoption: the mediating role of brand image and trust in emerging markets**

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**Keywords:** sustainable supply chain, green logistics, ESG and sustainable consumer behavior, generation Z, green marketing.

**Abstract:** Despite the growing adoption of Environmental, Social, and Governance (ESG) criteria in corporate strategy, a significant gap exists in understanding how consumer perceptions of ESG translate into the adoption of tangible green logistics services. This study investigates how ESG factors influence consumer willingness to pay for green logistics such as sustainable transport, optimized material flow and eco-friendly packaging in an emerging market context. Grounded in the Theory of Planned Behavior, the model examines the mediating roles of green brand image, green trust, and green purchase intention in shaping sustainable logistics consumption. A structured online survey was administered to 350 young consumers belong to Generation Z, and data were analyzed using PLS-SEM. Structural model results reveal that green marketing and CSR significantly enhance green purchase intention, while greenwashing undermines trust. All hypothesized relationships were statistically significant. This research provides a novel, validated model linking perceived ESG performance to consumer willingness to pay for green logistics. It offers practical insights for supply chain managers on leveraging transparent ESG practices to build brand trust and drive adoption of sustainable logistics solutions.

### **1 Introduction**

In the context of rapid global economic expansion, sustainability has become a pivotal issue in policymaking and corporate strategies, particularly in industries with considerable environmental consequences such as logistics and transportation, which manage the core material and information flows of the economy [1]. Initially intended to evaluate corporate governance, ESG initiatives have transformed to play a crucial role in shaping brand identity and influencing consumer purchasing decisions [1].

Despite this importance, a significant research gap persists. There is limited empirical comprehension of how ESG-aligned practices concretely impact consumers' willingness to adopt and pay for environmentally responsible logistics services such as sustainable transport, optimized supply chains, and green warehousing. While concepts like green marketing [2-5] and green trust [6] are recognized, the specific mechanisms linking ESG perception, brand image, trust, and the adoption of green logistics solutions remain under-examined, especially in emerging markets.

To address this gap, the present study aims to investigate the factors influencing Green Logistics Consumption Willingness, understood as the intention to support environmentally friendly logistics services through active participation and payment. The primary contribution of this work is an empirically validated framework connecting intangible ESG perceptions to tangible consumer willingness to pay for green logistics.

This issue is particularly salient among Gen Z, a powerful demographic characterized by its robust environmental values [2,3]. In Vietnam, specifically Ho Chi Minh City the nation's economic hub these concerns are amplified by challenges like pollution and traffic congestion, highlighting the need for private sector commitment in logistics and supply chain management. Utilizing the Theory of Planned Behavior, this study provides insights for firms managing sustainable supply chains by merging ESG alignment with behavioral intentions.

### **2 Literature review and hypothesis development**

#### **2.1 Green logistics and willingness for green logistic consumption**

Green logistics represents an integrated strategic response to the growing environmental concerns within the logistics and supply chain sectors. It encompasses a wide range of environmentally responsible practices across transportation, packaging, warehousing, and product return systems. This concept aligns with the definition of green logistics consumption, which involves a comprehensive set of practices that aim to reduce emissions, optimize energy usage, and promote circularity in packaging and materials across supply chain operations. Research [7-11] emphasize that the objective of green logistics is not only to protect the environment but also to enhance social equity and economic efficiency throughout logistics networks. As logistics operations increasingly embrace sustainable development principles, the adoption of innovations such as electric vehicles, energy-efficient routing, and resource recycling

contributes to reduced material waste, carbon emissions, and overall environmental impact. According to research [1], these initiatives also play a critical role in supporting circular economic models and in fostering responsible resource management within supply chains.

The concept of willingness for green logistics consumption refers to the extent to which consumers are ready to accept higher costs in exchange for environmentally sustainable delivery or supply chain solutions. This willingness reflects a growing preference for services that are consistent with environmental and ethical values. A global survey by PwC in 2024 revealed that consumers, on average, are willing to pay an additional 9.7 percent for green products and services, underscoring the tangible economic potential of green consumerism. This trend illustrates how ethical and environmental priorities are becoming more prominent in shaping modern consumption choices, particularly among younger generations.

Several psychological and perceptual factors contribute to this willingness. Study of Kwak et al. (2020) found that perceived environmental benefits and the perceived value of sustainability are among the most influential drivers behind the willingness to pay for green logistics. In addition, consumer trust in service providers plays a pivotal role [12]. When brands communicate clear and credible commitments to environmental, social, and governance principles, this fosters green trust and strengthens purchase intention. On the other hand, deceptive greenwashing practices that misrepresent environmental efforts can significantly erode trust and reduce the likelihood of consumer engagement [13]. Recent reports from PMC indicate that Vietnam's Gen Z exhibits stronger eco-conscious preferences than previous generations. However, most documented behaviors remain focused on sectors such as fashion and personal care, with limited exploration of logistics services.

This identifies a critical research gap. Existing studies tend to focus on Western or Latin American contexts, with minimal evidence from emerging Asian cities. Furthermore, few studies have comprehensively examined how ESG signals, such as genuine green marketing, corporate social responsibility, and greenwashing, interact within a behavioral framework like the Theory of Planned Behavior to influence sustainable logistics choices among Gen Z consumers. While these studies establish a link between values and willingness to pay, they often fail to deconstruct how specific corporate ESG signals (marketing, CSR, greenwashing) interact to form the trust and brand image necessary to motivate adoption of complex services like green logistics. This study synthesizes these disconnected streams to address this gap.

## 2.2 Environmental, social and governance

ESG represents a set of three core criteria widely applied to assess the sustainability performance of businesses. The three components, namely environmental responsibility, social engagement, and governance practices have emerged as crucial metrics for evaluating long-term corporate value. The concept of ESG was first presented in the 2003 report entitled *Who Cares Wins*, which received support from the United Nations. This report underscored the importance of embedding sustainability into business strategies to foster responsible growth. Emerging from the broader context of corporate social responsibility, ESG has evolved into a widely accepted framework that signals a shift from prioritizing short-term profits toward a comprehensive consideration of societal and environmental impacts [14]. In the current business landscape, ESG factors are not only regarded as compliance obligations but also as strategic levers for enhancing corporate reputation and attracting long-term investment. Studies in the United States reveal a clear generational pattern in consumer behavior, with younger cohorts, particularly Gen Z, demonstrating a readiness to support sustainable brands. Approximately 66 percent of this group are willing to pay a premium for environmentally certified products, while 75 percent believe that companies should actively contribute to social welfare rather than focusing solely on profit generation.

Each component within the ESG framework plays a distinct role in advancing corporate sustainability. The environmental dimension concerns how organizations manage their interactions with the natural environment, including reducing greenhouse gas emissions, minimizing waste, conserving energy, protecting biodiversity, and implementing broader ecological protection measures. These practices have become increasingly influential in shaping consumer attitudes, particularly among Gen Z, who display a strong preference for environmentally responsible brands [2]. The social dimension addresses how companies manage relationships with stakeholders such as employees, customers, partners, and communities, covering aspects like fair labor conditions, employee well-being, data privacy, product safety, and community investment [9]. Firms that uphold transparency, diversity, fairness, and ethical conduct tend to be evaluated more favorably by Gen Z, who are also quick to disengage from brands that violate labor ethics or human rights. The governance dimension focuses on internal management structures, adherence to legal standards, transparency in reporting, protection of intellectual property, and effective risk management. Generation Z consumers not only expect sustainable products but also demand verifiable proof of corporate commitment, often rejecting companies involved in scandals such as corruption or tax evasion.

While prior studies have extensively discussed the positive relationship between ESG performance and consumer support, particularly in green product contexts, there remains a gap in understanding how each ESG dimension individually and interactively shapes Gen Z's willingness to pay for green logistics services. Existing literature tends to treat ESG as a unified construct, overlooking potential variations in how environmental, social, and governance factors influence consumer perceptions and purchase intentions. However, much of the literature treats ESG as a unified

construct, or focuses on its impact on green products, not on green services like logistics. This gap provides the foundation for the next section, which develops specific hypotheses to test the differentiated impacts of ESG components on Gen Z's behavioral responses in the context of green logistics.

### 2.3 Hypothesis development

Green marketing behavior refers to environmentally responsible business practices aimed at reducing environmental harm while creating long-term value for both companies and consumers. From a theoretical perspective, green marketing includes actions such as minimizing non-renewable resource usage, reducing pollution, and promoting sustainable product lifecycles [15]. When companies implement genuine green marketing strategies and establish environmentally friendly brand images, they can increase consumer loyalty and purchasing intention [16,17]. On the other hand, superficial or insincere green marketing efforts may cause skepticism among consumers, thereby reducing their intention to purchase green products. Similar trends have been observed in Vietnam, where eco-labeling and transparent supply chain communication have been shown to strengthen purchase intention in green markets [18]. Therefore, it is proposed that effective green marketing behavior enhances consumers' willingness to adopt environmentally friendly consumption.

#### **H1.** Green marketing behavior positively influences green product consumption intention.

In response to growing environmental awareness and global sustainability trends, firms have increasingly turned to CSR initiatives to build brand equity. Green brand image, reflecting a brand's environmental responsibility, has become an intangible asset that fosters consumer trust and differentiation in the marketplace. Prior studies have demonstrated that CSR enhances the public perception of a company and strengthens its association with sustainable values [19,20]. This relationship is mirrored in Vietnam, where CSR-linked environmental programs in sectors such as food and beverage have been shown to improve brand recognition and consumer [21]. When consumers perceive that a company genuinely engages in socially responsible behavior, including environmental stewardship, they are more likely to view its brand as credible and eco-conscious. This alignment leads to a stronger green brand image and a deeper emotional connection between the consumer and the brand.

#### **H2.** Corporate social responsibility (CSR) positively influences green brand image.

Greenwashing refers to deceptive practices where companies exaggerate or fabricate their environmental efforts to appeal to eco-conscious consumers. These actions can damage both corporate reputation and consumer trust [22]. In today's saturated green market, ambiguous or unverified environmental claims create confusion and skepticism among consumers. As shown in studies by [21] greenwashing increases perceived risk and reduces consumer confidence in environmental commitments. The more consumers recognize greenwashing tactics, the less they trust green messages and products, ultimately diminishing their green trust. Therefore, reducing greenwashing is essential for maintaining authentic relationships with consumers who value sustainability.

#### **H3.** Greenwashing negatively influences green trust.

Consumers' perception of a brand as environmentally responsible has a significant impact on their trust in the brand. A positive green brand image not only reduces perceived risks but also enhances consumer confidence and likelihood of purchase [23,24]. According to branding theories, when a brand consistently aligns with environmental values that consumers care about, it builds a trustworthy image. This trust becomes especially important in green markets, where consumers rely on brand credibility to validate eco-friendly claims [25]. A strong green brand image signals to consumers that the company is committed to sustainability, which fosters deeper green trust.

#### **H4.** Green brand image positively influences green trust.

Green trust, defined as the belief in a brand's environmental commitments, plays a crucial role in shaping consumer intentions and behavior toward sustainable products. Studies have shown that consumers who trust eco-labels or green claims are more likely to engage in organic or green consumption [26,27]. When consumers trust a brand's environmental efforts, they perceive lower risk and complexity in purchasing green products, which facilitates behavioral engagement [28,29]. Trust enables consumers to accept uncertainty and believe that the product will meet their expectations, increasing the likelihood of trial and long-term use. Hence, stronger green trust translates into higher intention to consume green products.

#### **H5.** Green trust positively influences green product consumption intention.

Drawing upon the Theory of Planned Behavior, which frames behavior as shaped by attitudes, subjective norms, and perceived behavioral control, several studies have emphasized the predictive power of intention in driving green behaviors. While intention does not always translate directly into action, it remains a critical antecedent to behavior, especially in environmentally conscious consumption. In the context of green logistics, intention can be reframed as the willingness to pay for sustainable logistics services, encompassing eco-friendly transport, optimized supply chains, and

reduced emissions. Prior research [10,13,30] supports the notion that consumers with strong pro-environmental intentions are more likely to invest in green logistics solutions when they perceive environmental and personal benefits. Accordingly, this study hypothesizes that stronger green logistics intention is positively associated with higher willingness to pay, forming the basis for sustainable adoption and market expansion of such services.

**H6.** Green consumption intention positively influences green logistic consumption willingness.

The resulting framework captures both cognitive and affective evaluations mediating the ESG intention link and introduces an extended TPB path from green intention to logistics consumption presented in the figure 1. This model provides an integrative lens to understand how firms' sustainability related actions and missteps shape consumer behavior within the context of sustainable logistics. This is consistent with Vietnamese market reports showing that urban consumers with strong green intentions are increasingly willing to pay premiums for sustainable delivery options.

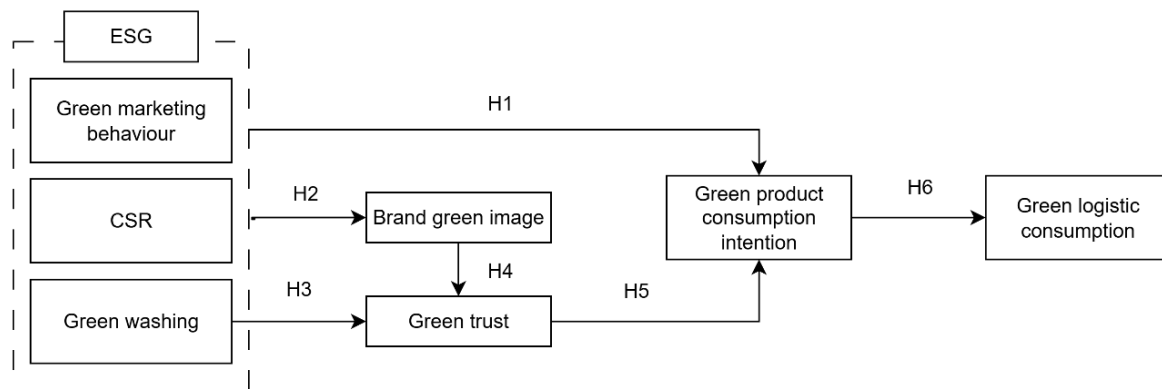


Figure 1 Research model

### 3 Methodology

#### 3.1 Research design and model

To examine the factors influencing consumers' willingness for green logistics services consumption (GLC), this study develops a conceptual framework grounded in the Theory of Planned Behavior and integrates relevant constructs such as green marketing behavior, corporate social responsibility, greenwashing, green brand image, and green trust. The research adopts a quantitative approach, operationalized through a structured questionnaire survey targeting Gen Z consumers who have experienced e-commerce delivery services in urban Vietnam. This demographic was selected due to their increasing environmental consciousness and substantial influence on future consumption patterns. Drawing from validated scales in prior studies, the survey items were refined and contextualized to fit the logistics service domain. A pilot test was conducted with 30 participants to ensure content clarity and reliability prior to full deployment. The selection of PLS-SEM was based on this study's primary objective of prediction and the model's complexity, including multiple mediators. This approach is robust for complex predictive models and is not constrained by the strict data normality assumptions required by covariance-based SEM.

The measurement model includes seven latent variables: green marketing behavior, corporate social responsibility, greenwashing, green brand image, green trust, green consumption intention, and willingness to pay for green logistics services. Each construction is measured using multi-item Likert-type scales adapted from existing literature. Data was collected via an online survey platform, employing a purposive sampling strategy to reach respondents who are both familiar with sustainable products and have experience with logistics services. A total of 350 valid responses were obtained and analyzed using structural equation modelling (SEM) to validate the proposed model and test the hypothesized relationships. The model aims to empirically explore how psychological and perceptual variables influence consumers' consumption willingness in the context of sustainable logistics, thereby offering insights into how green behavioral intentions translate into economic actions. In the second phase, a quantitative method was applied to test the proposed model using data from 350 Gen Z respondents in Ho Chi Minh City. A convenience sampling approach targeted university students with experience in green consumption. Surveys were distributed both online and offline. SPSS was used for descriptive statistics and bias checks, while Smart PLS 4 assessed reliability, validity, and structural relationships through PLS-SEM and bootstrapping. Key metrics included Cronbach's Alpha, CR, AVE, and R<sup>2</sup>. Harman's single-factor test was employed to address common method bias. The findings empirically validated the influence of ESG factors, green image, and green trust on green product intention and green logistics consumption.

### 3.2 Data collection

This research utilized a two-phase data collection methodology to investigate the willingness of Generation Z in Vietnam to pay for green logistics services. The first qualitative phase revealed the ESG-related factors that affect the consumption of green products. A systematic questionnaire was subsequently created and disseminated utilizing a convenience sampling approach, selected for its ease of access and effectiveness [31]. The survey targeted both undergraduate and graduate students attending universities in Ho Chi Minh City, including the University of Finance – Marketing, the University of Economics Ho Chi Minh City, FPT University, RMIT, and others. This location was chosen because of its significant population of Gen Z consumers and their considerable engagement with sustainability initiatives.

Data were collected both online (via Google Forms) and offline, utilizing social media platforms such as Facebook and Zalo for broader reach. A total of 30 observed variables was assessed utilizing a 5-point Likert scale, grounded in validated constructs from existing ESG and green logistics literature. In accordance with [32], a minimum of 150 responses was necessary; however, the study sought to gather 350 responses to enhance statistical reliability. The questionnaire was reviewed by experts and pilot-tested for clarity and validity before official distribution with a data collection period spanned from March to April 2025.

Table 1 Sample characteristics

Category	Frequency	Percent	Valid Percent	Cumulative Percent
<b>Gender</b>				
Male	167	47.7	47.7	47.7
Female	183	52.3	52.3	100.0
<b>Total</b>	350	100.0	100.0	
<b>Age group</b>				
Under 18	82	23.4	23.4	23.4
18–22	144	41.1	41.1	64.6
23–28	124	35.4	35.4	100.0
<b>Total</b>	350	100.0	100.0	
<b>Education Level</b>				
High School Diploma (12/12)	64	18.3	18.3	18.3
College/University Degree	282	80.6	80.6	98.9
Postgraduate	4	1.1	1.1	100.0
<b>Total</b>	350	100.0	100.0	

## 4 Result and discussion

### 4.1 Outer model and scale validation

Figure 2 presents the outer loadings of the observed variables, confirming their reliability and contribution to the respective constructions. All items exceeded the recommended threshold (>0.7), indicating strong indicator reliability. CSR-related items ranged from 0.833 to 0.886, with CSR3 and CSR4 showing the highest contributions. Green brand image (GBI) indicators ranged from 0.828 to 0.887, with GBI1 as the strongest. Green consumption intention (GI) items showed high loadings from 0.823 to 0.911, particularly GI4. Green marketing behavior (GMB) loadings ranged from 0.833 to 0.878, with GMB4 leading. Green trust (GT) items also demonstrated strong values (0.841–0.899), while greenwashing (GW) variables were the most robust (0.882–0.938), with GW4 being the highest. These results confirm the strong convergent validity and internal consistency of all constructs in the research model.

From out loading model in Figure 2, the evaluation of the quality of observed variables in the research model through the outer loadings of each construct. These values indicate the degree of contribution of each observed variable to its corresponding latent construct. The results show that all outer loadings exceed the recommended threshold of 0.70, confirming that the measurement items demonstrate strong reliability and are suitable for further analysis.

For the CSR construct, outer loadings range from 0.833 to 0.886, reflecting a high level of contribution from the measurement items. CSR3 (0.886) and CSR4 (0.877) record the highest values, indicating that these items play the most critical role in measuring CSR within the context of this study. Regarding Green Brand Image, outer loadings fall between 0.828 and 0.887, with GBI1 achieving the highest loading (0.887), suggesting its substantial influence on shaping consumers' perception of a green brand.

For the Green Consumption Intention, the outer loadings vary from 0.823 to 0.911, with GI4 reaching the highest value (0.911). This implies that this item strongly captures the essence of consumers' willingness to adopt green logistics services. In the case of Green Marketing Behavior, the outer loadings are between 0.833 and 0.878, with GMB4 recording the highest score (0.878), indicating its strong impact on consumers' perception of green marketing initiatives.

The Green Trust construct also demonstrates robust item contributions, with outer loadings ranging from 0.841 to 0.899, reflecting the significant role of these variables in shaping trust toward green products and services. Finally,

Greenwashing shows the highest overall loadings among all constructs, ranging from 0.882 to 0.938. Notably, GW4 reaches 0.938, indicating that it is a particularly influential indicator in assessing consumer perceptions of greenwashing practices.

Overall, the consistently high outer loading values across all constructs confirm that the measurement model has strong indicator reliability, ensuring the conceptual soundness and empirical robustness of the study. This provides a solid foundation for subsequent analyses, including the assessment of internal consistency, convergent validity, and discriminant validity in the following sections.

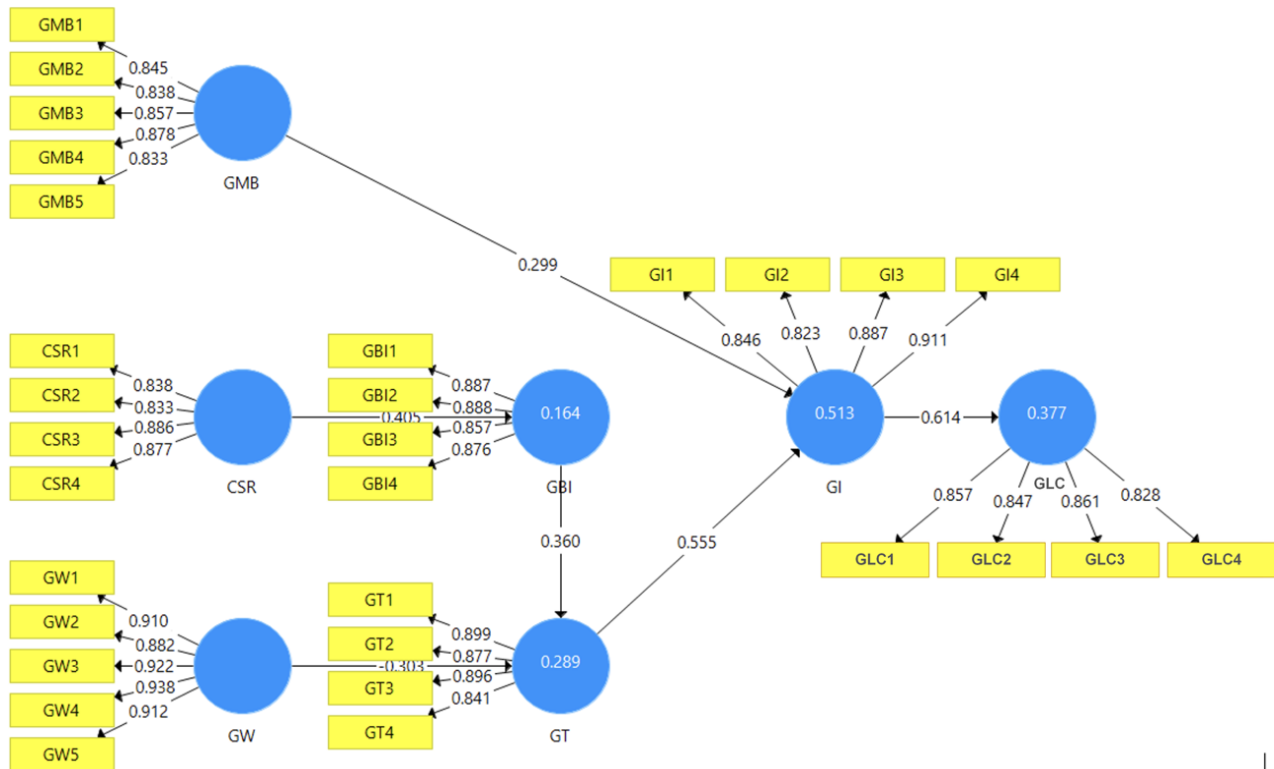


Figure 2 Research quantitative model

Besides, Table 2 demonstrates the internal consistency and convergent validity of all constructs using Cronbach’s Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). All values exceed the recommended thresholds (Alpha > 0.70, CR > 0.70, AVE > 0.50), indicating that the measurement model has strong reliability and convergent validity. Among them, greenwashing shows the highest reliability (Alpha = 0.950, CR = 0.962, AVE = 0.833), while other constructs such as green trust, green marketing behavior, and green brand image also report high scores, confirming the robustness of the measurement items.

Table 2 Reliability analysis and convergent validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
CSR	0.882	0.888	0.918	0.738
GLC	0.870	0.872	0.911	0.720
GBI	0.901	0.908	0.930	0.770
GI	0.890	0.891	0.924	0.752
GMB	0.904	0.906	0.929	0.723
GT	0.901	0.902	0.931	0.771
GW	0.950	0.956	0.962	0.833

Moreover, table 3 presents the discriminant validity using the Fornell-Larcker criterion. The square roots of AVE (diagonal values) are higher than the correlations among constructs (off-diagonal), confirming that each construct is distinct from the others. For instance, the square root of AVE for GI is 0.867, which is higher than its correlations with other constructs, such as GT (0.659) and GMB (0.492). This supports the discriminant validity of the model, showing that each latent variable captures unique aspects of the green logistics and consumer behavior framework.

*Table 3 Discriminant validity (Fornell-Larcker Criterion)*

	CSR	GLC	GBI	GI	GMB	GT	GW
CSR	0.859						
GLC	0.344	0.848					
GBCI	0.405	0.414	0.877				
GI	0.557	0.614	0.693	0.867			
GMB	0.297	0.243	0.401	0.492	0.850		
GT	0.447	0.368	0.454	0.659	0.348	0.878	
GW	-0.367	-0.328	-0.312	-0.538	-0.349	-0.415	0.913

The study then assessed discriminant validity through the Heterotrait-Monotrait ratio of correlations (HTMT) as in Table 4, which present a robust criterion for evaluating the extent to which constructs in the model are distinct from one another. The results indicate that the HTMT values for all construct pairs range from 0.273 to 0.771, which are well below the 0.85 cut-off. This finding provides evidence of clear discriminant validity among the constructs in the research model. Besides, the HTMT value between CSR and GLC is 0.392, suggesting a satisfactory degree of distinction between these two constructs. Similarly, the highest HTMT value observed is between GI and GBI at 0.771. While this value is relatively high compared to other construct pairs, it remains below the critical threshold, indicating that these constructs are related yet still conceptually and empirically distinct.

*Table 4 Discriminant validity (Heterotrait-Monotrait Ratio)*

	CSR	GLC	GBI	GI	GMB	GT	GW
CSR							
GLC	0.392						
GBCI	0.447	0.463					
GI	0.626	0.698	0.771				
GMB	0.331	0.273	0.444	0.547			
GT	0.499	0.414	0.501	0.735	0.386		
GW	0.396	0.357	0.329	0.580	0.373	0.445	

#### 4.2 Inner structural model evaluation

According to figure 3, the direct relationships among variables in the research model, including values for Original Sample (O), Sample Mean (M), Standard Deviation (STDEV), T Statistics, and P Values. All T Statistics exceed the 1.96 threshold, and all P Values are below 0.05, confirming the statistical significance of the relationships. Notably, GT strongly influences green intention GI with the highest T Statistic of 11.427. CSR has a moderate yet significant effect on green brand-consumer identification GBI (O = 0.405, T = 8.391), while GBI positively impacts GT (O = 0.360, T = 6.575). Green intention significantly affects willingness for GLC (O = 0.614, T = 10.388), and green marketing behavior GMB has a smaller yet meaningful influence on GI (O = 0.299, T = 6.648). Additionally, GW shows a negative impact on GT (O = -0.303, T = 6.438), indicating that greenwashing undermines consumer trust. Overall, all paths are statistically robust and practically meaningful, reinforcing the validity and reliability of the research model.

The research findings confirm that the measurement model demonstrates strong reliability, convergent validity, and discriminant validity across all constructions, ensuring the robustness of the research framework. These results provide a solid foundation for interpreting the structural relationships among variables in the next stage. With validated measures, the study is well-positioned to explore theoretical contributions, particularly in advancing understanding of how ESG-related factors influence consumer behavior and decision-making in the context of green logistics.

Building on this measurement confirmation, the structural model results provide insights into the relationships among constructs (Table 5). All direct effects are significant, with GT having the strongest influence on GI (O = 0.555, T = 11.427). CSR positively affects GBI (O = 0.405, T = 8.391), which in turn strengthens GT (O = 0.360, T = 6.575). GI strongly drives GLC (O = 0.614, T = 10.388), while GMB also supports GI (O = 0.299, T = 6.648). In contrast, GW exerts a significant negative impact on GT (O = -0.303, T = 6.438). Indirect effects reinforce these dynamics. GT influences GLC through GI (O = 0.341, T = 7.529), GMB affects GLC via GI (O = 0.184, T = 5.508), and multi-step mediation paths such as CSR → GBI → GT → GI → GLC (O = 0.050, T = 3.534) highlight the layered nature of the relationships. Conversely, GW reduces GLC indirectly through its negative effects on GT and GI, as seen in GW → GT → GI → GLC (O = -0.103, T = 4.497). Together, these findings confirm that enhancing GT, GI, and GBI strengthens GLC, while GW emerges as a critical barrier to be mitigated.

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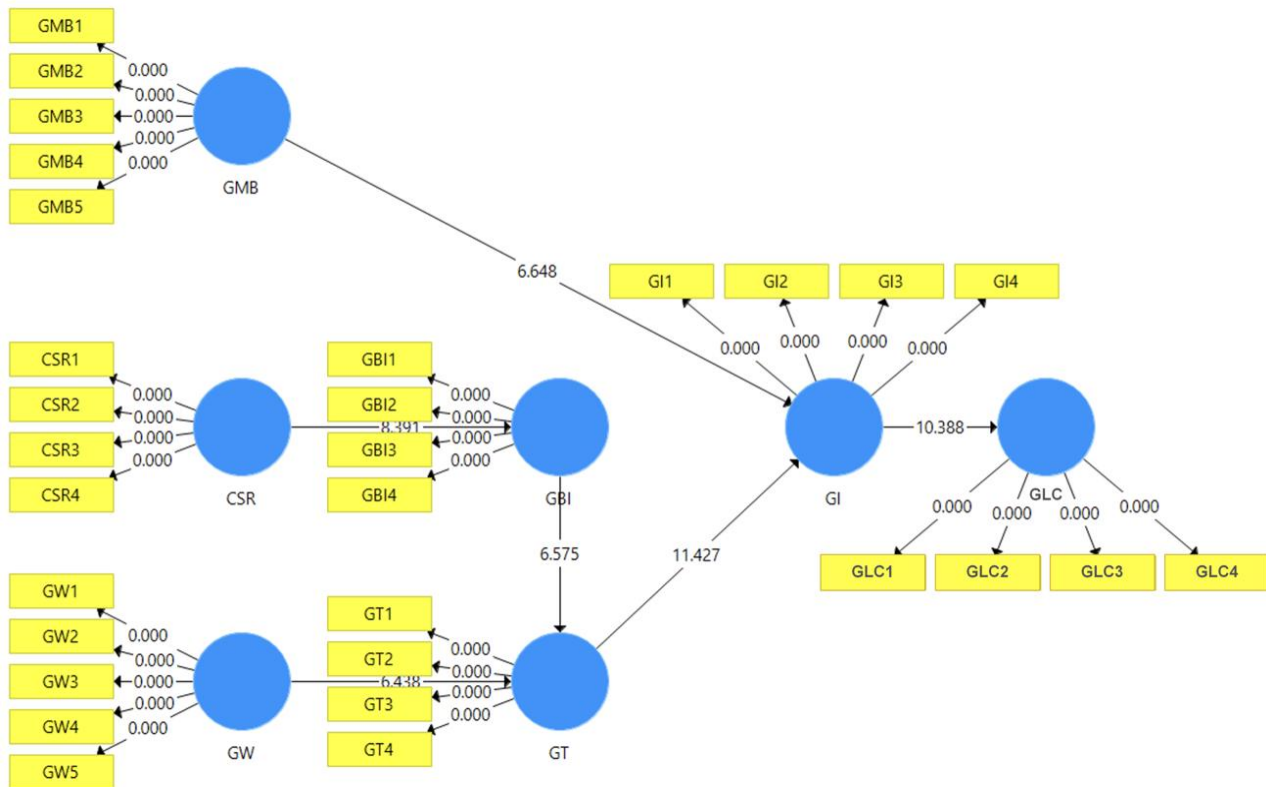


Figure 3 A framework of the inner model result

With measurement validity established, the structural model provides deeper insight into the dynamics among constructs. GT emerges as the most powerful driver of GI, reinforcing the idea that trust in green products is a critical precondition for purchasing intentions. CSR contributes meaningfully to GBI, which in turn enhances GT, indicating a sequential pathway from corporate responsibility to brand perception to trust. GI is the strongest direct driver of GLC, showing that intentions translate effectively into willingness to engage with green logistics services. GMB also supports GI, suggesting that marketing actions can stimulate intention, while GW acts in the opposite direction, eroding trust and, indirectly, the willingness to adopt green logistics.

Table 5 Confirmation of direct and indirect relationship between factors

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
<b>Direct relationship</b>					
<b>CSR -&gt; GBI</b>	0.405	0.409	0.048	8.391	0.000
<b>GBI -&gt; GT</b>	0.360	0.359	0.055	6.575	0.000
<b>GI -&gt; GLC</b>	0.614	0.615	0.059	10.388	0.000
<b>GMB -&gt; GI</b>	0.299	0.301	0.045	6.648	0.000
<b>GT -&gt; GI</b>	0.555	0.555	0.049	11.427	0.000
<b>GW -&gt; GT</b>	-0.303	-0.305	0.047	6.438	0.000
<b>Indirect relationship</b>					
<b>GMB -&gt; GI -&gt; GLC</b>	0.184	0.186	0.033	5.508	0.000
<b>GBI -&gt; GT -&gt; GI -&gt; GLC</b>	0.123	0.123	0.028	4.433	0.000
<b>CSR -&gt; GBI -&gt; GT -&gt; GI -&gt; GLC</b>	0.050	0.051	0.014	3.534	0.000
<b>GT -&gt; GI -&gt; GLC</b>	0.341	0.342	0.045	7.529	0.000
<b>GW -&gt; GT -&gt; GI -&gt; GLC</b>	-0.103	-0.104	0.023	4.497	0.000
<b>GBI -&gt; GT -&gt; GI</b>	0.200	0.201	0.041	4.839	0.000
<b>CSR -&gt; GBI -&gt; GT -&gt; GI</b>	0.081	0.082	0.021	3.809	0.000
<b>GW -&gt; GT -&gt; GI</b>	-0.168	-0.169	0.032	5.319	0.000
<b>CSR -&gt; GBI -&gt; GT</b>	0.146	0.148	0.032	4.563	0.000

The mediation analysis further clarifies these interactions, revealing how constructs influence each other through layered pathways. Notably, positive mediations strengthen the impact of CSR and GMB, whereas GW transmits a negative influence through trust and intention.

### 4.3 Implications

#### 4.3.1 Theoretical implications

By empirically validating the relationships among CSR, green marketing behavior, green brand image, trust, study advances theoretical understanding of sustainable consumption by empirically examining the interplay among CSR, green marketing behavior, green brand image, trust, greenwashing, and willingness to pay in a unified framework. While prior studies have tended to investigate these constructs in isolation [6,33], the findings reveal their combined effects in shaping Gen Z's willingness to pay for green logistics services. CSR and green marketing behavior strengthen brand image and trust, whereas greenwashing diminishes them, extending the TPB by demonstrating that perceptions of corporate ESG conduct influence not only intention but also price-related behavioral outcomes.

The results further confirm and extend the mediating roles of green brand image and trust identified in earlier literature, showing their relevance in service-based sustainability contexts. In line with signaling theory and brand credibility frameworks, authentic ESG initiatives enhance trust through credible brand signaling, with trust emerging as the most influential driver of willingness to pay. This reinforces prior sustainability marketing findings while adding new evidence on trust as a critical mechanism linking ESG strategies to consumer behavior among digitally native, socially conscious cohorts. This finding extends the work of Kwak et al. (2020), by demonstrating that trust is not just a general antecedent, but the critical mechanism mediating the path from ESG perception to willingness to pay specifically for logistics services.

A generational perspective strengthens the contribution of this work. Gen Z's heightened ESG sensitivity and skepticism toward greenwashing indicate that conventional persuasion models may require adaptation to account for active ethical evaluation and values-driven decision-making.

Finally, the study contributes to the limited body of ESG research in emerging economies by contextualizing findings in Vietnam, where environmental awareness intersects with economic development. The positive relationship between green consumption intention and willingness to pay supports the extension of TPB to contexts involving service trade-offs and premium pricing, while highlighting the need for ESG theories to incorporate localized socio-cultural and regulatory conditions.

#### 4.3.2 Managerial implications

Building on these theoretical insights, the findings offer several actionable directions for practitioners in the green logistics sector. First, the positive effects of CSR and green marketing suggest firms should invest in transparent, verifiable ESG initiatives. For logistics firms, this means moving beyond annual reports to create transparent dashboards showing real-time data on carbon emissions per delivery, the percentage of sustainable packaging materials used, and ethical labor practices in their warehouses and transport flow. Given Gen Z's high sensitivity to authenticity, communication must emphasize concrete actions to avoid perceptions of greenwashing.

Second, as green brand image and trust are pivotal in translating ESG efforts into willingness to pay, managers should prioritize brand-building strategies that integrate sustainability into core value propositions rather than treating it as an add-on. This includes leveraging credible third-party certifications, transparent supply chain disclosures, and ongoing consumer engagement to reinforce brand credibility.

Third, the generational differences identified indicate that marketing strategies should be tailored to the digital-native preferences of Gen Z, employing interactive platforms, social media storytelling, and participatory campaigns that invite consumer co-creation of sustainability narratives. Such approaches can strengthen emotional bonds and foster long-term loyalty.

Finally, in emerging markets such as Vietnam, where environmental awareness is growing alongside economic development, logistics firms should design green service offerings that balance sustainability with cost-effectiveness. Policies such as tiered pricing for green options, government-backed incentives, and partnerships with NGOs can help lower adoption barriers and broaden market appeal. Aligning these practices with local socio-cultural values will not only meet regulatory expectations but also enhance competitive advantage in a rapidly evolving sustainability landscape.

## 5 Conclusion

### 5.1 Findings

This study examined the factors influencing Gen Z's willingness to use green logistics services in Ho Chi Minh City by validating a conceptual model grounded in ESG dimensions and the Theory of Planned Behavior. By emphasizing key mediators such as green brand image and consumer trust, the study offers a clearer understanding of the underlying mechanisms through which ESG strategies shape actual consumer readiness. This comprehensive framework provides a strategic basis for logistics firms to synchronize their sustainability efforts with changing market demands and the value preferences of environmentally aware consumers in fast-urbanizing economies.

In contrast, greenwashing behavior undermines consumer trust and weakens the effectiveness of green communication strategies. The study contributes to the logistics literature by connecting ESG constructs with behavioral intention models, providing a more cohesive view of the factors that drive consumer engagement with sustainable logistics services. By identifying green brand image and trust as critical mediators, the research clarifies how ESG initiatives affect Gen Z's readiness to embrace green logistics.

While the empirical focus is Vietnam, the findings have broader implications for other emerging markets, especially in Central and Eastern Europe, where digital-native consumers are increasingly sustainability-conscious and expect authentic corporate ESG practices. The insights derived from this context may inform policymakers and logistics providers in comparable economies facing similar urbanization pressures and demographic shifts.

Practically, the findings suggest that logistics providers should focus on transparency, social responsibility, and active engagement with ESG principles to build customer trust and promote sustainable brand equity. It is essential to raise awareness and foster behavioral readiness among Gen Z consumers to support the green transition in urban logistics systems. As cities like Ho Chi Minh City and counterparts in the CE/SEE region pursue sustainable development objectives, encouraging young consumers to endorse green logistics emerges as a strategic necessity –for both environmental outcomes and competitive positioning.

### 5.1 Limitations and future work

Several constraints of this study should be acknowledged to guide future investigations. The study primarily relied on the theory of planned behavior and existing conceptual frameworks to examine the willingness of Generation Z in Ho Chi Minh City to adopt green logistics services. This focus may have neglected other contextual elements such as cultural norms, political factors, emotional conditions, or social influences that could affect consumer behavior.

Subsequent studies should integrate these elements. A concrete future study, for example, could test the moderating effect of perceived logistics infrastructure quality on the relationship between green intention and willingness to pay. Furthermore, the reliance on convenience sampling and a relatively limited sample size of 350 participants, restricted to those who are accessible digitally, may limit the generalizability of the results. Subsequent studies should employ probability-based sampling techniques and target more diverse demographic groups to enhance representativeness and practical relevance.

Additionally, the geographic focus of the study was limited to Ho Chi Minh City and was conducted over a brief period, which may not adequately reflect regional or temporal differences in the adoption of green logistics. Future research should move beyond intention-based surveys. A concrete next step would be a longitudinal study or a field experiment A/B testing different green delivery options on an e-commerce platform to measure actual adoption behavior, not just willingness.

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### **Review process**

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