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Sustainable air travel consumption behavior of Generation Z in Vietnam: Developing a theoretical measurement framework

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Abstract: This study aims to formulate and empirically test a theoretical framework elucidating sustainable air travel consumption behavior among Generation Z in Vietnam. A quantitative survey was conducted, yielding 752 valid responses from Vietnamese Generation Z travelers. The analysis employed partial least squares structural equation modeling (PLS-SEM) to examine the relationships between green consumption values, environmental concern, personal norms, willingness to sacrifice, behavioral intention, and actual sustainable behavior, with economic constraints serving as a moderating variable. The findings indicate that green consumption values significantly enhance environmental awareness and perspectives on sustainable air travel. Personal norms strongly predict the propensity to sacrifice, while attitude and willingness to sacrifice positively influence behavioral intention. Economic restrictions negatively impact the relationship between behavioral intention and actual sustainable conduct. The integrated framework, combining the Value–Belief–Norm, Theory of Planned Behavior, and Motivation–Opportunity–Ability models, effectively explains the attitude–behavior gap in sustainable air travel. Airlines and governments should strengthen value-based communication, reduce economic barriers, and enhance transparency to promote sustainable flying options among young consumers.

Keywords: *Economic constraints, Vietnam, Generation Z, Motivation–Opportunity–Ability framework, Pro-environmental behavior, Sustainable air travel, Theory of Planned Behavior, Value-Belief-Norm theory.*

1. Introduction

Environmental sustainability, particularly in the tourism sector, is becoming a global concern, and it is crucial to understand and promote environmentally friendly behavior among tourists [1, 2]. The aviation sector plays a pivotal role in connecting people and economies worldwide, yet it is also one of the most carbon-intensive modes of transportation, posing significant challenges to global sustainability objectives. After the widespread disruption caused by the COVID-19 pandemic, air travel has rebounded strongly: global passenger volumes recovered and continued to rise, presenting both opportunities for tourism growth and urgent environmental challenges for the sector [3].

Energy and climate analyses indicate that aviation accounts for a meaningful share of CO_2 emissions from energy use, and that emissions are approaching or returning to pre-pandemic levels as travel demand recovers. For example, recent industry overviews report that aviation contributed roughly 2.5% of global CO_2 from energy consumption in recent years, with an upward pressure on emissions as passenger numbers expand. This recovery emphasizes the urgency of decarbonization measures within commercial aviation. This highlights the urgency of implementing tourism behavior that is oriented towards more sustainable development [4].

In Vietnam, the recovery and expansion of the aviation market are likewise evident. Recent national aviation statistics and news reports indicate that Vietnam handled tens of millions of air passengers

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annually during the post-pandemic rebound: for instance, over 64 million passengers were reported in the first nine months of the 2024–2025 period, underscoring a rapid return to high passenger throughput and reflecting strong domestic and international travel demand. These figures highlight the practical significance of understanding air-travel consumption behavior in Vietnam for both policy and industry stakeholders.

At the same time, Generation Z, typically defined as those born from the mid-1990s through the early 2010s, is emerging as a major consumer cohort, especially in experience-driven markets such as tourism [5]. Currently, this generation comprises 32% of the global population and has rapidly become one of the fastest-growing segments of the tourism industry, making it an increasingly important target market [6]. Vietnam's population reached approximately 101 million by early 2025, and the country's demographic structure remains relatively young; Generation Z comprises a considerable share of the population and exerts significant influence on household and market consumption choices. Digital engagement among Vietnamese youth is especially high, which shapes how this cohort searches for, plans, and purchases travel [7].

Generation Z is usually regarded as the most environmentally conscious generation, even called "the greenest generation," because they show a strong interest in sustainable development and are willing to pay more for environmentally responsible products and services [8, 9]. However, many studies have pointed out a significant "gap between attitude and behavior" in this group: their concerns and intentions about the environment do not always translate into actual sustainable consumption behavior, especially when faced with financial obstacles [8, 10, 11]. For example, although Generation Z may express a desire to support environmentally friendly hotels, their final decision is often seriously affected by financial constraints [12, 13]. This contradiction is self-evident in high-cost activities such as air travel.

Despite the growing academic interest in Gen Z's pro-environmental behavior in tourism, there remains a dearth of empirical research specifically investigating their sustainable air travel consumption behavior [9, 14-16]. Furthermore, a comprehensive theoretical measurement framework specifically tailored to this behavior and generation in emerging markets like Vietnam is largely absent. Vietnam, with its rapidly expanding tourism sector and a young, digitally native population, presents a unique and important context to explore these dynamics. Understanding the drivers and barriers that shape Gen Z's sustainable air travel decisions in Vietnam is crucial for developing effective strategies to promote sustainable tourism practices.

While Gen Z is increasingly recognized as a key demographic for sustainable tourism, a comprehensive understanding of their sustainable air travel consumption behavior remains elusive, particularly in specific cultural contexts like Vietnam. Most studies have not adequately investigated the interplay of values, ascribed responsibility, environmental concern, attitudes, willingness to sacrifice, and green consumption values in driving this specific behavior within this generation, nor have they developed an integrated theoretical framework to measure it [9, 15-17]. The limited research on generational differences in PEB in tourism further highlights this gap [9, 14, 18].

This study aims to fill a critical gap by establishing a theoretical framework to measure the consumption behavior of Generation Z regarding sustainable air tourism in Vietnam. Accordingly, the study not only enhances the theoretical understanding of environmentally friendly behavior, particularly in the context of air travel and Generation Z, but also offers practical recommendations for decision-makers and stakeholders within Vietnam's tourism industry. To address these gaps, the study raises the following questions:

RQ1: What are the central values, beliefs, and attitudes of Generation Z towards sustainable air tourism in Vietnam?

RQ2: How do personal responsibility, environmental concern, and green consumption values affect the willingness of Generation Z to make sacrifices for sustainable air tourism in Vietnam?

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RQ3: What are the main driving factors and obstacles, including economic constraints and convenience, that affect the actual sustainable aviation consumption behavior of Generation Z in Vietnam?

2. Literature Review

2.1. Generation Z and Sustainable Consumption in Tourism

Generation Z is characterized by distinct traits associated with a "digital native" environment, marked by widespread internet access, through which they easily engage in social, economic, and sustainable interactions [17, 19, 20]. They are often described as open-minded, culturally conscious, and sensitive to social and environmental issues [21]. Gen Z actively supports brands that create positive global change and is willing to pay more for environmentally friendly products and services [19, 22]. For example, 64% of Gen Z are willing to pay more for eco-friendly products [23], and 70% try to buy from companies that are considered ethical [24]. However, this generation is also very price-sensitive and often chooses low-cost accommodation, placing cost as a top factor in their travel decisions [13, 25]. This creates a conflict for businesses offering affordable services that want to attract Generation Z while also incorporating sustainable elements [13].

Recent studies have also shown that emotional factors, particularly eco-anxiety, are shaping young people's behavior and motivations, with Generation Z reporting higher levels of environmental anxiety than many other age groups. Eco-anxiety can promote sustainable awareness and behavioral intentions, but it can also cause cognitive dissonance when personal interests conflict with ethical norms [26, 27]. Therefore, in addition to value and cognitive factors, the emotional aspect is emerging as a key factor that needs to be taken into account when explaining Gen Z's sustainable aviation consumption behavior.

2.2. Determinants of Pro-Environmental Behavior (PEB)

Several fundamental theoretical frameworks have been used to study pro-environmental behavior (PEB):

Value-Belief-Norms Theory (VBN): This theory suggests that environmental behavior is governed by individuals' fundamental values (egoism, ecology, altruism), which shape their ecological worldview and beliefs about environmental issues, leading to ascribed responsibility and personal norms that promote pro-environmental behavior [9, 28, 29]. Among them, ecological and altruistic values, along with willingness to sacrifice, are identified as the primary motivators [9].

Theory of Planned Behavior (TPB): Argues that behavioral intention is the strongest predictor of actual behavior and is determined by attitudes toward the behavior, subjective norms (perceived social pressure), and perceived behavioral control (how easy or difficult it is to perform the behavior) [30, 31].

Norm Activation Model (NAM): This model focuses on the role of personal moral norms in motivating altruistic behavior, which are activated when individuals perceive the negative consequences of inaction and feel personally responsible [9, 32].

Motivation-Opportunity-Ability (MOA) Framework: Examines how motivation (desire to act), opportunity (external factors that support the action), and ability (internal capabilities) jointly influence behavior [33]. This is particularly relevant for Generation Z, where economic barriers often limit opportunities to engage in sustainable tourism [15, 17].

Goal Framing Theory (GFT) argues that behavior is guided by different goal frames (hedonic, gain, and normative), with normative goals often competing with hedonic or utilitarian goals [33, 34].

Research on Gen Z's pro-environmental behavior (PEB) in travel, defined as actions that reduce negative impacts or contribute positively to the environment, has shown mixed results [14].

2.3. The Relation between Green Consumption, Environmental Concern, and Attitudes Toward Sustainable Air Travel

Some studies are optimistic about Gen Z's commitment to sustainability, while others highlight a discrepancy between stated values and actual behavior [10]. This "attitude-behavior gap" is particularly

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evident due to factors such as economic uncertainty, psychological convenience, or showmanship behavior on social media [15, 16]. Green consumer value reflects a commitment to environmental protection through consumption behavior. When GCV is strong, individuals prioritize resource conservation and strengthen the link between ecological concern, attitudes, willingness to sacrifice, and actual PEB [9, 35, 36]. For instance, Polish Gen Z's pro-environmental behaviors, such as turning off lights, were driven more by cost-saving motives than ecological awareness [12]. Similarly, a study among Portuguese Gen Z found that despite interest in Sustainable Development Goals (SDGs), this did not translate into pro-environmental daily habits or sustainable tourism choices, especially regarding air travel [16]. Italian Gen Z shows strong emotional attitudes towards environmental quality, particularly regarding litter and single-use plastics, but exhibits less willingness to adopt behaviors perceived as inconvenient [37]. Swedish Generation Z does not prioritize PEB in vacation plans, attributing this to a lack of attractive eco-friendly travel options and related barriers [33].

Based on these insights, it is evident that individuals with high green consumer values tend to exhibit higher levels of environmental concern and develop more positive attitudes towards sustainable air travel. Therefore, the study hypothesizes:

H_1: Green consumer values (GCV) have a positive impact on environmental concern (EC).

H_2: Green consumer values (GCV) have a positive impact on attitudes towards sustainable air travel (ATT).

2.4. The Relation between Environmental Concern, Ascribed Responsibility, and Personal Norms

When individuals perceive responsibility, they tend to activate personal norms, internal moral standards that guide pro-environmental behavior [32]. Furthermore, green consumption values refer to individuals' inclination to express commitment to environmental protection through purchasing and consumption habits. Stronger green consumption values prioritize resource conservation and strengthen the link between environmental concern, attitudes, willingness to sacrifice, and actual PEB [9, 35, 36].

Environmental concern reflects individuals' awareness and worry about environmental issues, which can foster a sense of ascribed responsibility (AR) for mitigating personal contributions to environmental problems [29]. When individuals perceive personal responsibility, they are more likely to activate their personal moral norms (PN) that guide environmentally responsible actions [32].

In addition to VBN and NAM models, recent research also emphasizes that the moral restraint mechanism, which explains, mitigates, or justifies how to help individuals continue non-environmental behavior, even if cognition is wrong, is an important factor in explaining the attitude-behavior gap. In tourism, Wu et al. [38] show that moral intervention can weaken the positive influence of moral standards on responsible tourism behavior, thus helping those who have strong intentions not to adopt sustainable behavior. Therefore, the study proposes:

H_3: Environmental concern (EC) positively affects personal responsibility (AR).

H_4: Personal responsibility (AR) positively affects personal norms (PN).

2.5. Personal Norms and Willingness to Sacrifice

Personal norms represent intrinsic moral obligations, which are considered to be strong predictors of willingness to sacrifice in sustainable choices [9, 28].

A related trend is the phenomenon of flygskam (flight-shaming), the social pressure and negative online response to flight behavior, which has been widely studied in recent decades. Research shows that flygskam and related concepts significantly increase public awareness of the climate impact of aviation, but the effect of conversion into actual behavior depends on knowledge of emissions, personal costs, and the impact of social networks [39-41]. With Gen Z, a group heavily engaged in social networking campaigns or content on social platforms, can amplify both subjective norms and green guilt, thereby influencing intentions and behavior in a complex way. Therefore:

H_5: Personal norms (PN) positively affect willingness to sacrifice (WTS).

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2.6. The Relation Between Attitude Toward Sustainable Air Travel, Willingness to Sacrifice, and Behavioral Intention

According to the Theory of Planned Behavior [30, 42], attitude toward the behavior is a strong predictor of behavioral intention. At the same time, previous research emphasizes that willingness to bear personal costs (pay higher prices, invest more time) increases sustainable travel intentions [17].

Notably, for Gen Z, subjective norms and peer influence, especially on social media platforms, are often more influential on behavioral intentions than for previous generations [19, 30]. Therefore, predictive models of sustainable aviation behavior in Generation Z should place more emphasis on online social influence, the interaction of emotions (eco-anxiety), and moral disengagement. Therefore:

H_6. Attitude toward sustainable air travel (ATT) positively affects behavioral intention (BI).

H_7. Willingness to sacrifice (WTS) positively affects behavioral intention (BI).

2.7. Behavioral Intention and Sustainable Air Travel

Air travel poses a significant sustainability challenge due to its high carbon footprint [14]. Studies show that for Gen Z, environmental factors often take precedence over economic and cognitive factors when choosing a mode of transport. Financial incentives (e.g., subsidies for green travel programs) are effective in motivating young people to select low-emission vehicles, although the primary motivation is economic rather than environmental. This suggests the potential to close the attitude-behavior gap in air travel. Another barrier is the lack of knowledge about the climate impacts of travel [25].

Behavioral intention is considered the closest predictor of actual behavior [31, 42]. In the context of sustainable air travel, it is expected that stronger intentions will lead to more frequent adoption of sustainable consumption behaviors. Therefore:

H_8. Behavioral intention (BI) positively affects actual sustainable air travel behavior (ASB).

2.8. The Impact of Economic Constraints on the Relationship between Behavioral Intention and Actual Sustainable Air Travel Behavior

Previous research consistently indicates that behavioral intention is a strong predictor of actual pro-environmental behavior; however, this relationship is often weakened by situational and contextual barriers [28, 42]. Among these barriers, economic constraints (ECN), reflecting limited financial capacity, perceived cost burdens, or lack of affordable, sustainable alternatives, are particularly salient in high-cost contexts such as air travel [25].

Within the Motivation–Opportunity–Ability (MOA) framework, motivation (the willingness or intention to act) only translates into behavior when opportunity and ability are present [33]. In the case of sustainable air travel, even when Generation Z travelers hold strong environmental intentions, high ticket prices, lack of low-carbon flight options, or limited governmental incentives may constrain their ability to make sustainable choices [28, 39]. This aligns with the notion of the "intention–behavior gap," which is exacerbated when perceived behavioral control and financial opportunity are low [31, 38].

Moreover, psychological studies on sustainable consumption demonstrate that perceived affordability and opportunity significantly mediate or moderate the translation of green intentions into real purchasing behavior [36]. Specifically, when consumers perceive sustainable alternatives as financially inaccessible or impractical, their behavioral intentions may not manifest, despite strong moral and attitudinal support [9].

Therefore, drawing upon the MOA framework and prior empirical findings, this study hypothesizes that:

H_9. Economic constraints (ECN) negatively moderate the relationship between behavioral intention (BI) and actual sustainable air travel behavior (ASB), making the relationship weaker when financial constraints are high.

Recent studies on Generation Z's sustainable tourism behavior underscore the intricacy of converting pro-environmental attitudes into uniform behavioral outcomes. Seyfi et al. [17] characterize

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Generation Z as "pioneers and paradoxes" in sustainable tourism, highlighting the enduring intention-behavior mismatch even among environmentally conscious youth. Ribeiro et al. [9] discovered that green consumption values mitigate the impact of moral and attitudinal elements on pro-environmental travel, indicating that sustainability-oriented identities are progressively influenced by digital socialization. In the same way, Nilsson Vestola and Ek Styvén [33] found that Gen Z's interest in green travel is based on a combination of motivation, opportunity, and ability, which shows how important contextual enablers are. Minazzi and Grechi [15] examined emotional and social barriers, indicating that convenience and social media representation frequently surpass environmental considerations. Forleo and Bredice [37] also found that Italian Gen Z travelers who are very concerned about the environment do not always follow sustainable tourism practices. These findings collectively suggest an increasing acknowledgment that sustainable behavior is influenced not only by values but also by economic, emotional, and digital constraints. Thus, the integration of moral, attitudinal, and situational dimensions as suggested in this study provides a more holistic framework for elucidating sustainable air travel consumption among young consumers.

3. Methodology

3.1. Research Design Context

This study was designed through a quantitative survey to investigate sustainable air travel behavior among Generation Z in Vietnam. The aviation industry provides a suitable research context due to its high carbon footprint and the urgent need to promote sustainable practices [14]. The target audience for this study is Generation Z, who represent an essential segment for the aviation industry, as their travel patterns and environmental attitudes will shape the trajectory of sustainable aviation in the coming decades [17, 19]. A pilot test was conducted with 20 respondents to refine the survey instrument. Official data were collected from May to June 2025 via a structured online questionnaire distributed through social media and university networks, which are commonly used to reach Generation Z respondents. The survey received 821 responses, of which 752 were valid, exceeding the minimum threshold for structural equation modeling [43].

3.2. Measurement Development

All constructs were measured using multi-item scales adapted from previously validated instruments: Green Consumption Values. [44], Environmental Concern [45], Ascribed Responsibility [46], Personal Norms [46, 47], Attitude toward Sustainable Air Travel and Behavioral Intention [42], Willingness to Sacrifice [48], Actual Sustainable Air Travel Behavior [49], and Economic Constraints [25, 33]. In addition to existing scales, items were adapted to the aviation context following Han [28], Ribeiro et al. [9], Wang et al. [35], O'Connor and Assaker [1], Steg et al. [29], Nordlund and Garvill [50], Qiu et al. [30], Liu et al. [31], Seyfi et al. [17], Carvajal-Trujillo et al. [14], Pinho and Gomes [16], and Nagaj and Žuromskaitė [25]. All items were measured on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree), except for Attitude items that used semantic differential formats, which were converted to Likert statements to ensure consistency. PLS-SEM was chosen for data analysis due to its suitability in handling complex models with formative and reflective structures, as well as its robustness for forecasting research in emerging markets [43].

4. Results

Internal consistency reliability is necessary when assessing the reliability of different observed variables that measure the same construct [51]. Traditionally, internal consistency reliability can be assessed through Cronbach's Alpha. In this study, Cronbach's Alpha for all variables had values of 0.8 or higher, which is higher than the commonly accepted threshold of 0.7, indicating good reliability. However, to account for the limitation of Cronbach's Alpha, Composite Reliability (CR) was also

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considered. The analysis results indicate that all scales have AVE coefficients exceeding 0.5. Thus, it can be concluded that the scales in the model are considered to have convergent validity (Table 1).

Discriminant validity measures whether supposedly unrelated concepts are actually distinct from each other. Here, the results indicate that the discriminant validity between the latent variables is below 0.9, suggesting that the correlation coefficient between the concepts is not too high, thereby ensuring that each idea measures a unique value (Table 1).

Table 1.
Construct correlations, reliability, and validity Heterotrait-monotrait (HTMT) ratios.

	Cronbach's α	AVE	AR	ASB	ATT	BI	EC	ECN	GCV	PN	WTS
ASB	0.804	0.718	0.175								
ATT	0.827	0.657	0.150	0.297							
BI	0.845	0.763	0.088	0.407	0.569						
EC	0.826	0.741	0.343	0.112	0.147	0.042					
ECN	0.857	0.700	0.019	0.114	0.055	0.178	0.067				
GCV	0.882	0.739	0.133	0.224	0.297	0.179	0.252	0.049			
PN	0.882	0.677	0.234	0.141	0.056	0.068	0.056	0.035	0.086		
WTS	0.802	0.717	0.165	0.153	0.118	0.470	0.050	0.083	0.072	0.293	
	0.817	0.732									

The above results show that all interaction effects have P values < 0.001; these interaction effects are statistically significant. Two variables significantly influenced behavioral intention: attitude toward sustainable air travel (β = 0.443) and willingness to sacrifice (β = 0.347). Therefore, these coefficients show that attitude toward sustainable air travel has a stronger influence on behavioral intentions than willingness to sacrifice (see Table 2 and Figure 1). In addition, economic constraints have a negative moderating effect on the relationship between behavioral intentions and actual sustainable air travel behavior.

Table 2.
Path coefficients.

	β	STDEV	T	P	f2
AR -> PN	0.190	0.034	5.585	0.000	0.037
ATT -> BI	0.443	0.028	15.758	0.000	0.297
BI -> ASB	0.268	0.034	7.908	0.000	0.087
EC -> AR	0.285	0.035	8.231	0.000	0.088
GCV -> ATT	0.263	0.035	7.576	0.000	0.074
GCV -> EC	0.228	0.035	6.496	0.000	0.055
PN -> WTS	0.239	0.034	7.118	0.000	0.061
WTS -> BI	0.347	0.029	12.166	0.000	0.182
ECN x BI -> ASB	-0.325	0.033	9.964	0.000	0.142

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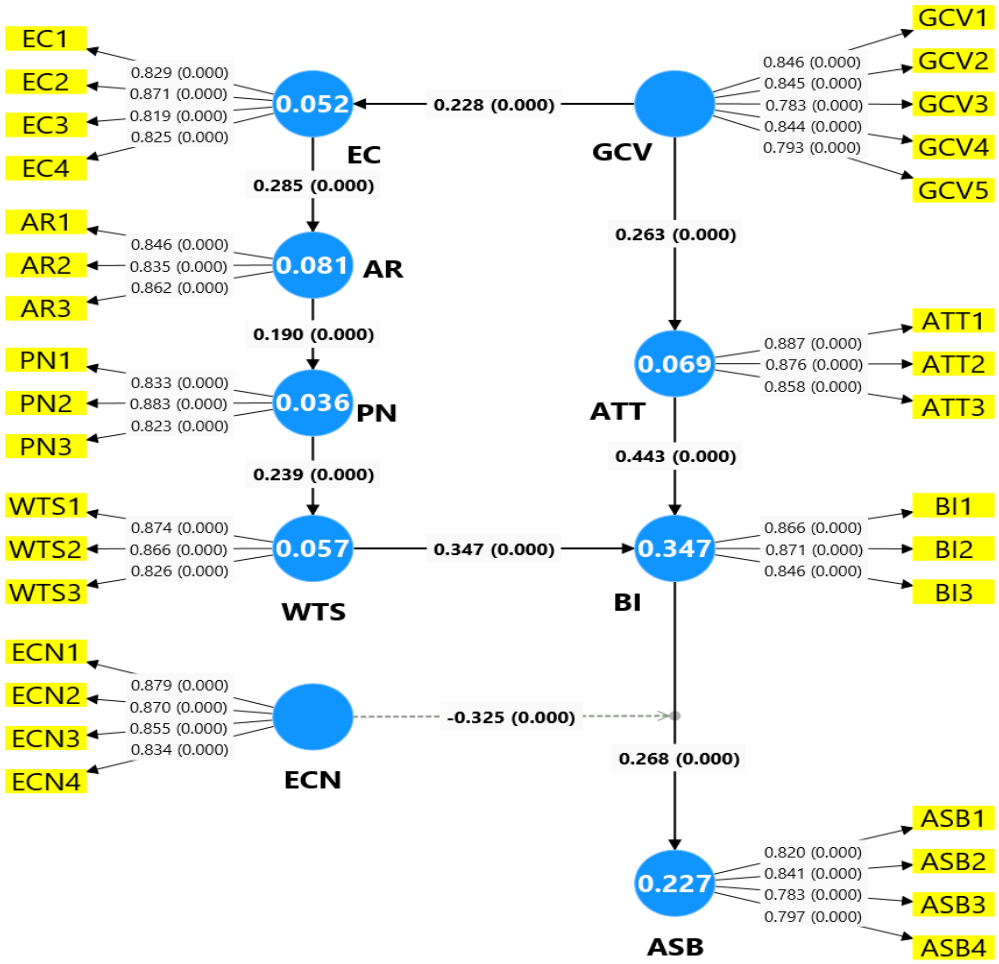

Figure 1.
PLS_Sem Bootstrap5000 modeling results.

According to Cohen, f^2 values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects, respectively [52]. The results indicate that all model relationships are statistically significant; overall, the model demonstrates good fit and predictive relevance. In summary, the results demonstrate high internal consistency and validity for the measures employed in the study, with attitudes towards sustainable air travel having a powerful predictive effect on behavioral intentions. The combination of robust statistical measures, including reliability coefficients (rho_a and CR), AVE, and f^2 effect size, confirms the relevance and importance of these constructs in understanding sustainable air travel consumption behavior of Generation Z in Vietnam.

5. Conclusion and Implications

5.1. Theoretical Contributions

This study aims to develop and validate a theoretical framework explaining the sustainable air travel consumption behavior of Generation Z in Vietnam. By integrating the Value–Belief–Norm (VBN) theory, the Theory of Planned Behavior (TPB), and the Motivation–Opportunity–Ability (MOA) framework, the research provides a holistic understanding of how value-based, normative, and contextual factors jointly influence sustainable travel behavior in a high-cost and high-carbon sector such as aviation.

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In addressing RQ1, the findings confirm that green consumption values (GCV) are pivotal in shaping both environmental concern (EC) and attitudes toward sustainable air travel (ATT). This relationship underscores that internalized green values among young consumers foster stronger environmental consciousness and more favorable evaluations of sustainable travel choices. These findings reinforce the centrality of value orientation in VBN theory [9, 28] and extend it to the context of emerging economies where environmental awareness coexists with cost sensitivity.

For RQ2, the study reveals that environmental concern (EC) enhances individuals' ascribed responsibility (AR), which subsequently strengthens personal norms (PN) and the willingness to sacrifice (WTS). This progression confirms the moral activation process proposed by the NAM and VBN frameworks [29], emphasizing that Gen Z's sustainable actions are not purely utilitarian but deeply moralized and socially embedded. When young travelers feel personally responsible for environmental degradation, they develop stronger moral obligations to act sustainably, even when such actions entail personal costs.

Addressing RQ3, the results show that attitude (ATT) and willingness to sacrifice (WTS) significantly influence behavioral intention (BI), which in turn predicts actual sustainable air travel behavior (ASB). However, the translation of intention into action is significantly constrained by economic limitations (ECN). This moderating effect highlights the relevance of the MOA framework in understanding sustainability behavior among youth segments in developing countries: motivation and intention alone are insufficient without supportive economic and structural conditions.

Collectively, these findings advance theory in several ways. First, the study develops and validates a context-specific framework that integrates motivational, normative, and economic factors into the analysis of sustainable air travel behavior. Second, it empirically demonstrates the moderating role of financial constraints, an often-overlooked barrier in sustainability models. Third, it expands the cross-theoretical dialogue between VBN, TPB, and MOA, suggesting that moral commitment, attitudinal favorability, and contextual feasibility interact dynamically to explain sustainable consumption among young travelers.

5.2. Practical Implications

The findings provide several practical directions for stakeholders in the aviation and tourism sectors, especially in emerging markets like Vietnam.

Embedding sustainability in value communication. Airlines and tourism brands should design marketing strategies that align with Gen Z's moral and environmental values. Rather than focusing solely on price or convenience, communication should highlight the social and ecological benefits of sustainable air travel. Storytelling campaigns, green certifications, and influencer-led advocacy can strengthen the emotional and moral appeal of sustainable choices.

Reducing the economic barrier to sustainable behavior. Given that economic constraints weaken the link between intention and behavior, policymakers and airlines should consider financial mechanisms such as eco-reward programs, discounted carbon offsets, or government-backed subsidies for sustainable travel initiatives. These measures can help close the intention–action gap identified in this study.

Activating social and moral norms. Environmental education and social media campaigns can leverage Gen Z's collective identity and social influence. Positioning sustainable air travel as a socially desirable and morally responsible act can reinforce pro-environmental norms and foster peer-driven behavioral diffusion.

Enhancing transparency and perceived behavioral control. Providing clear and accessible information about carbon emissions, offset options, and sustainability certifications at the point of purchase can empower travelers to make informed choices. Transparency also enhances trust and perceived behavioral control, key antecedents of behavioral intention in TPB.

Policy-level strategies for Vietnam's tourism industry emphasize the importance of integrating sustainable air travel within national green tourism frameworks and public–private partnerships.

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Collaborative actions between airlines, government agencies, and educational institutions are essential to foster systemic change and nurture a culture of sustainable mobility among future generations.

5.3. Limitations and Directions for Future Research

Despite its contributions, the study acknowledges several limitations. First, its cross-sectional design restricts the ability to infer causality; longitudinal or experimental studies could better capture the evolution of sustainable behaviors over time. Second, the study's focus on Vietnam limits its generalizability; cross-cultural comparative studies across Southeast Asia or other emerging markets could provide broader insights. Finally, incorporating digital engagement factors such as eco-app usage or AI-based personalization could improve understanding of how digitalization shapes Gen Z's sustainable travel behavior.

5.4. Conclusion

In conclusion, this research provides a robust empirical foundation for understanding sustainable air travel behavior among Generation Z in Vietnam. It demonstrates that although this generation holds strong environmental values and moral intentions, economic realities and structural barriers continue to limit their ability to act sustainably. The proposed integrative framework contributes to bridging the longstanding attitude–behavior gap by linking value-based motivation with economic and contextual enablers.

Ultimately, promoting sustainable air travel among young consumers requires a multi-dimensional approach that harmonizes moral motivation, social influence, and economic feasibility. By embedding sustainability into both policy and practice, stakeholders can foster a new generation of travelers who not only care about the planet but also possess the means and opportunities to act upon those values.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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References

[1] A. O'Connor and G. Assaker, "Values, environmental concern, and responsible behavior in tourism: A meta-analysis," *Journal of Sustainable Tourism*, vol. 29, no. 1, pp. 1–25, 2021.

[2] S. Dolnicar, A. Hurlimann, and B. Grün, "Towards a more sustainable tourism: Measuring the environmental impact of Australian tourists," *Tourism Management Perspectives*, vol. 30, pp. 124–134, 2019.

[3] International Air Transport Association (IATA), *IATA annual review 2025*. Montreal, QC, Canada: International Air Transport Association, 2025.

[4] C. Campos *et al.*, "Towards more sustainable tourism: Methodological guide to evaluate the carbon footprint of tourism from a life cycle assessment approach," *Sustainability*, vol. 15, no. 3, p. 2097, 2023.

[5] S. Corey and M. Grace, *Generation Z. A century in the making*. London, UK: Routledge, 2019.

[6] World Economic Forum, "Generation Z will outnumber millennials this year," 2018. https://www.weforum.org/agenda/2018/08/generation-z-will-outnumber-millennials-by-2019/

[7] DataReportal, "Digital 2025: Vietnam — population and digital usage statistics (population ≈ 101 million in January 2025)," 2025. https://datareportal.com/reports/digital-2025-vietnam

[8] T. Gresham, "Gen Z vs. millennials. Today's Hotelier," 2020. https://todayshotelier.com/

[9] M. A. Ribeiro, S. Seyfi, S. Elhoushy, K. M. Woosnam, and V. Patwardhan, "Determinants of generation Z pro-environmental travel behaviour: The moderating role of green consumption values," *Journal of Sustainable Tourism*, vol. 33, no. 6, pp. 1079-1099, 2025. https://doi.org/10.1080/09669582.2023.2230389

[10] S. Seyfi, C. M. Hall, J. Saarinen, M. Zaman, and T. Vo-Thanh, "Identifying constraints on Gen Z's path toward ethical tourism consumption and practices," *Journal of Sustainable Tourism*, vol. 33, no. 6, pp. 1216-1234, 2025. https://doi.org/10.1080/09669582.2024.2418967

[11] S. MacInnes and S. Dolnicar, *Contributing to SDG12 by making tourism consumption and production more environmentally sustainable. In K. A. Boluk, F. Higgins-Desbiolles, & M. Akhoundoghli (Eds.), The Elgar companion to tourism and the sustainable development goals.* Cheltenham, UK: Edward Elgar Publishing, 2024.

[12] A. J. Parzonko, A. Balińska, and A. Sieczko, "Pro-environmental behaviors of Generation Z in the context of the concept of homo socio-oeconomicus," *Energies*, vol. 14, no. 6, p. 1597, 2021. https://doi.org/10.3390/en14061597

[13] A. Fei, J. Kim, and S. in Kim, "Effects of environmental sustainability practice in the economy hotel to Gen Zer's purchase decision: Behavior economy approach using choice based conjoint analysis," *International Journal of Hospitality Management*, vol. 118, p. 103678, 2024. https://doi.org/10.1016/j.ijhm.2023.103678

[14] E. Carvajal-Trujillo, J. C. Pérez-Gálvez, and J. J. Orts-Cardador, "Exploring tourists' pro-environmental behavior: A bibliometric analysis over two decades (1999–2023)," *Journal of Tourism Futures*, 2024. https://doi.org/10.1108/JTF-02-2024-0033

[15] R. Minazzi and D. Grechi, "Exploring gen Z sustainable behavior in the hospitality industry," *Administrative Sciences*, vol. 15, no. 7, p. 266, 2025. https://doi.org/10.3390/admsci15070266

[16] M. Pinho and S. Gomes, "Generation Z as a critical question mark for sustainable tourism–An exploratory study in Portugal," *Journal of Tourism Futures*, vol. 10, no. 3, pp. 486-503, 2024. https://doi.org/10.1108/JTF-07-2022-0171

[17] S. Seyfi, C. Michael Hall, and M. Strzelecka, "Gen Z–pioneers or paradox in sustainable tourism?," *Journal of Sustainable Tourism*, vol. 33, no. 6, pp. 987-1015, 2025. https://doi.org/10.1080/09669582.2025.2491702

[18] M. Nowacki, J. Kowalczyk-Anioł, and Y. Chawla, "Gen Z's attitude towards green image destinations, green tourism and behavioural intention regarding green holiday destination choice: A study in Poland and India," *Sustainability*, vol. 15, no. 10, p. 7860, 2023. https://doi.org/10.3390/su15107860

[19] G. Prayag, R. S. Aquino, C. M. Hall, N. Chen, and P. Fieger, "Is Gen Z really that different? Environmental attitudes, travel behaviours and sustainability practices of international tourists to Canterbury, New Zealand," *Journal of Sustainable Tourism*, vol. 33, no. 6, pp. 1016-1037, 2025. https://doi.org/10.1080/09669582.2022.2131795

[20] N. Sharma, P. Goel, R. Nunkoo, A. Sharma, and N. P. Rana, "Food waste avoidance behavior: How different are generation Z travelers?," *Journal of Sustainable Tourism*, vol. 33, no. 6, pp. 1181-1195, 2025. https://doi.org/10.1080/09669582.2023.2187741

[21] J. Van den Bergh and K. Pallini, "Marketing to generation Z," *Research World*, vol. 2018, no. 70, pp. 18-23, 2018. https://doi.org/10.1002/rwm3.20660

[22] D.-C. Dabija, B. M. Bejan, and V. Dinu, "How sustainability oriented is Generation Z in retail? A literature review," *Transformations in Business & Economics*, vol. 18, no. 2, pp. 140–155, 2019.

[23] A. Bergamini, "The Gen Z consumer: How to connect with the planet's newest, youngest, and most powerful consumer force. Global Web Index," 2020. https://www.gwi.com/

[24] T. Francis and F. Hoefel, "Generation Z characteristics and its implications for companies. McKinsey & Company," 2018. https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/true-gen-generation-z-and-its-implications-for-companies

[25] R. Nagaj and B. Žuromskaitė, "Young Travellers and green travel in the post-COVID era," *Sustainability*, vol. 15, no. 18, p. 13822, 2023. https://doi.org/10.3390/su151813822

[26] T. L. Hogg, S. K. Stanley, L. V. O'Brien, M. S. Wilson, and C. R. Watsford, "The hogg eco-anxiety scale: Development and validation of a multidimensional scale," *Global Environmental Change*, vol. 71, p. 102391, 2021. https://doi.org/10.1016/j.gloenvcha.2021.102391

[27] S. Heinzel *et al.*, "Anxiety in response to the climate and environmental crises: Validation of the Hogg Eco-Anxiety Scale in Germany," *Frontiers in Psychology*, vol. 14, p. 1239425, 2023. https://doi.org/10.3389/fpsyg.2023.1239425

[28] H. Han, "The role of social values in predicting tourists' low-carbon travel behavior," *Journal of Hospitality & Tourism Research*, vol. 45, no. 6, pp. 1133–1152, 2021.

[29] L. Steg, J. I. De Groot, L. Dreijerink, W. Abrahamse, and F. Siero, "General antecedents of personal norms, policy acceptability, and intentions: The role of values, worldviews, and environmental concern," *Society and Natural Resources*, vol. 24, no. 4, pp. 349-367, 2011. https://doi.org/10.1080/08941920903214116

[30] H. Qiu, X. Wang, A. M. Morrison, C. Kelly, and W. Wei, "From ownership to responsibility: Extending the theory of planned behavior to predict tourist environmentally responsible behavioral intentions," *Journal of Sustainable Tourism*, vol. 33, no. 6, pp. 1122-1145, 2025. https://doi.org/10.1080/09669582.2022.2116643

[31] J. Liu, J. Liu, and Y. Wang, "How to inspire green creativity among Gen Z hotel employees: An investigation of the cross-level effect of green organizational climate," *Journal of Sustainable Tourism*, vol. 33, no. 2, pp. 189-206, 2025. https://doi.org/10.1080/09669582.2024.2316300

[32] H. Rezapouraghdam, A. Akhshik, and H. Ramkissoon, "Application of machine learning to predict visitors' green behavior in marine protected areas: Evidence from Cyprus," *Journal of Sustainable Tourism*, vol. 31, no. 11, pp. 2479-2505, 2023. https://doi.org/10.1080/09669582.2021.1887878

[33] J. Nilsson Vestola and M. Ek Styvén, "Drivers and inhibitors of gen Z's proenvironmental travel engagement: Exploring MOA factors and goal frames," *Young Consumers*, vol. 26, no. 7, pp. 55-73, 2025. https://doi.org/10.1108/YC-06-2024-2096

[34] T. Liu, E. Juvan, H. Qiu, and S. Dolnicar, "Context-and culture-dependent behaviors for the greater good: A comparative analysis of plate waste generation," *Journal of Sustainable Tourism*, vol. 30, no. 6, pp. 1200-1218, 2022. https://doi.org/10.1080/09669582.2021.1918132

[35] Q.-C. Wang, K.-X. Xie, X. Liu, G. Q. P. Shen, H.-H. Wei, and T.-Y. Liu, "Psychological drivers of hotel guests' energy-saving behaviours—Empirical research based on the extended theory of planned behaviour," *Buildings*, vol. 11, no. 9, p. 401, 2021. https://doi.org/10.3390/buildings11090401

[36] Q.-C. Wang, Y.-N. Lou, X. Liu, X. Jin, X. Li, and Q. Xu, "Determinants and mechanisms driving energy-saving behaviours of long-stay hotel guests: Comparison of leisure, business and extended-stay residential cases," *Energy Reports*, vol. 9, pp. 1354-1365, 2023. https://doi.org/10.1016/j.egyr.2022.12.051

[37] M. B. Forleo and M. Bredice, "Italian Gen Z and sustainable coastal tourism: A segmentation analysis of knowledge, attitudes and pro-environmental behaviours," *Journal of Tourism Futures*, 2025. https://doi.org/10.1108/JTF-07-2024-0146

[38] J. Wu, X. Font, and J. Liu, "Tourists' pro-environmental behaviors: Moral obligation or disengagement?," *Journal of Travel Research*, vol. 60, pp. 735-748, 2020.

[39] P. Chiambaretto, E. Mayenc, H. Chappert, J. Engsig, A.-S. Fernandez, and F. Le Roy, "Where does flygskam come from? The role of citizens' lack of knowledge of the environmental impact of air transport in explaining the development of flight shame," *Journal of Air Transport Management*, vol. 93, p. 102049, 2021. https://doi.org/10.1016/j.jairtraman.2021.102049

[40] J. E. S. Higham, "Climate change, discretionary air travel and the 'flyers' dilemma'," *Journal of Transport Geography*, vol. 41, pp. 72–80, 2014.

[41] J. Higham and M. Young, *The Flyers' Dilemma: Confronting the negative psychological effects of air passenger travel. In J. Small (Ed.), The Passenger Experience of Air Travel: A Critical Approach.* Bristol, UK: Channel View, 2023.

[42] I. Ajzen, "The theory of planned behavior," *Organizational Behavior and Human Decision Processes*, vol. 50, no. 2, pp. 179-211, 1991. https://doi.org/10.1016/0749-5978(91)90020-T

[43] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *European Business Review*, vol. 31, no. 1, pp. 2-24, 2019. https://doi.org/10.1108/EBR-11-2018-0203

[44] K. L. Haws, K. P. Winterich, and R. W. Naylor, "Inner green or recent convert: The role of self-brand connection in promoting green consumer behavior," *Journal of Consumer Psychology*, vol. 24, no. 4, pp. 496–509, 2014.

[45] R. E. Dunlap, K. D. Van Liere, A. G. Mertig, and R. E. Jones, "New trends in measuring environmental attitudes: measuring endorsement of the new ecological paradigm: a revised NEP scale," *Journal of Social Issues*, vol. 56, no. 3, pp. 425-442, 2000. https://doi.org/10.1111/0022-4537.00176

[46] P. C. Stern, T. Dietz, T. Abel, G. A. Guagnano, and L. Kalof, "A value-belief-norm theory of support for social movements: The case of environmentalism," *Human Ecology Review*, vol. 6, no. 2, pp. 81-97, 1999.

[47] S. H. Schwartz and R. E. Ames, "Positive and negative referent others as sources of influence: A case of helping," *Sociometry*, vol. 40, no. 1, pp. 12-21, 1977. https://doi.org/10.2307/3033541

[48] J. I. De Groot and L. Steg, "Value orientations to explain beliefs related to environmental significant behavior: How to measure egoistic, altruistic, and biospheric value orientations," *Environment and Behavior*, vol. 40, no. 3, pp. 330-354, 2008. https://doi.org/10.1177/0013916506297831

[49] F. G. Kaiser and M. Wilson, "Motivation for ecological behavior," *Journal of Environmental Psychology*, vol. 24, no. 3, pp. 323–338, 2004.

[50] A. M. Nordlund and J. Garvill, "Effects of values, problem awareness, and personal norm on willingness to reduce personal car use," *Journal of Environmental Psychology*, vol. 23, no. 4, pp. 339-347, 2003. https://doi.org/10.1016/S0272-4944(03)00037-9

[51] D. L. Streiner, "Starting at the beginning: an introduction to coefficient alpha and internal consistency," *Journal of Personality Assessment*, vol. 80, no. 1, pp. 99-103, 2003. https://doi.org/10.1207/S15327752JPA8001_18

[52] J. Cohen, *Statistical power analysis for the behavioral sciences*, 2nd ed. Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers, 1988.