International Review of Management and Marketing

ISSN: 2146-4405

available at http: www.econjournals.com

International Review of Management and Marketing, 2026, 16(4), 159-167.

Drivers of Carbon Credit Adoption among Low-Cost Airline Passengers in Thailand: A PLS-SEM Study of Consumer Attitudes, Perceived Value, and Behavioral Intention

Worachot Sribua[1,2], Bordin Phayaphrom[1,2]*, Zulfahmi Bin Rashid[1], Pathom Sawatmuang[1,2], Jakkawat Laphet[3], Duangrat Tandamrong[4]

[1]IQRA Business School, University of Geomatika Malaysia, Kuala Lumpur, Malaysia, [2]Advanced Executive Management School, Bangkok, Thailand, [3]College of Tourism and Hospitality, Sripatum University, Khon Kaen, Thailand, [4]Mahasarakham Business School, Mahasarakham University, Mahasarakham, Thailand. *Email: alex@advex.ac.th

Received: 16 December 2025 **Accepted:** 29 March 2026 **DOI:** https://doi.org/10.32479/irmm.23298

ABSTRACT

This study investigates the key drivers of consumer adoption of carbon credits in the low-cost airline context in Thailand. Drawing on consumer behavior and sustainable marketing perspectives, the study examines how psychological, social, and economic factors shape passengers' attitudes, perceived value, and behavioral intention toward carbon offset programs. A quantitative survey of 500 low-cost airline passengers in Thailand was conducted. Partial least squares structural equation modeling (PLS-SEM) was employed to test the proposed model linking environmental awareness, climate change concern, perceived environmental responsibility, trust in carbon credit programs, perceived effectiveness, social norms, and price sensitivity to attitude, perceived value, and behavioral intention. The findings indicate that environmental awareness, climate change concern, perceived environmental responsibility, trust in carbon credit programs, perceived effectiveness, and social norms positively influence consumer attitudes toward carbon credit adoption, while price sensitivity negatively affects attitude formation. Attitude significantly enhances perceived value, and both attitude and perceived value strongly predict consumers' intention to adopt carbon credits when purchasing low-cost airline tickets. This study relies on cross-sectional self-reported data from low-cost airline passengers in Thailand, which may limit causal inference and generalizability to other airline segments or national contexts. The results provide actionable insights for airline managers and marketers. Airlines should integrate carbon offset options into the ticketing process, enhance transparency and trust in carbon credit programs, communicate tangible environmental impacts, and design affordable pricing or bundled offers to increase perceived value among price-sensitive consumers.

Keywords: Consumer Behavior, Sustainable Marketing, Low-Cost Airlines, Carbon Credit Adoption, Perceived Value, Trust in Sustainability Programs, Thailand
JEL Classifications: L83, Z32, Z33, Q56

1. INTRODUCTION

The rapid expansion of low-cost airlines has fundamentally transformed air travel accessibility in Thailand, (Law, 2025) enabling broader population segments to engage in frequent domestic and short-haul international travel. The low-cost carrier (LCC) business model, characterized by affordable fares and high operational efficiency, has stimulated tourism growth, regional connectivity, and economic mobility across Southeast Asia (Thongkruer and Wanarat, 2023). However, alongside these socioeconomic benefits, the accelerated growth of air travel has intensified environmental pressures, particularly through increased greenhouse gas emissions from the aviation sector (Amtrakul et al., 2025).

Aviation-related carbon dioxide emissions are widely recognized as a significant contributor to global climate change, with the sector accounting for a growing share of transport-related emissions worldwide Intergovernmental Panel on Climate Change (Jiang et al., 2019). As passenger demand continues to rise, especially in emerging markets such as Thailand, the challenge of balancing aviation growth with environmental sustainability has become increasingly urgent. International aviation organizations and policymakers have therefore emphasized market-based mechanisms and voluntary mitigation strategies to complement technological and regulatory solutions (Iamtrakul et al., 2024; Srikhwan and Choibamroong, 2025).

One prominent mechanism for addressing aviation emissions is carbon credit utilization through voluntary carbon offset programs. These programs enable individuals and organizations to compensate for their carbon footprint by financially supporting certified emission reduction projects, including renewable energy development, reforestation, and energy efficiency initiatives. Within the airline industry, carbon offset options are increasingly integrated into ticket purchasing systems, allowing passengers to offset emissions associated with their flights (Becken and Mackey, 2017). Carbon credits thus represent a flexible sustainability tool that directly links individual travel behavior with global climate mitigation efforts.

Despite their growing availability, passenger participation in carbon offset programs remains relatively low. Previous studies indicate that many travelers perceive carbon offsetting as abstract, inconvenient, or financially burdensome, particularly within the low-cost airline segment where price sensitivity strongly influences decision-making (Gössling et al., 2019). While environmentally conscious consumers may express concern about climate change, this concern does not always translate into actual sustainable purchasing behavior, reflecting a persistent attitude–behavior gap in environmental consumption (Gössling and Humpe, 2020).

In Thailand, low-cost carriers dominate both domestic and regional air travel markets, serving millions of passengers annually (Law et al., 2022). At the same time, national sustainability agendas increasingly emphasize climate action and responsible tourism development. However, sustainable travel behaviors among Thai airline passengers remain in an early stage of adoption, and carbon credit programs are still relatively unfamiliar to the broader public. Cultural factors, economic priorities, and limited trust in environmental initiatives may further influence passengers' willingness to engage in carbon offsetting practices (Lu and Wang, 2018).

Behavioral research suggests that pro-environmental actions are shaped by a combination of cognitive awareness, emotional concern, social influence, and perceived economic value. Environmental awareness enhances individuals' understanding of the environmental consequences of their actions, while climate change concern strengthens moral motivation to engage in mitigation behaviors (Kollmuss and Agyeman, 2002). Perceived environmental responsibility reflects the internalized obligation to contribute to environmental protection, which has been linked to sustainable consumption choices (Steg and Vlek, 2009). Moreover, trust in environmental programs and perceived effectiveness of mitigation actions play crucial roles in determining whether individuals believe their contributions will produce meaningful environmental outcomes (Chen and Tung, 2014).

Social norms further influence sustainable behavior by shaping perceptions of socially acceptable and expected actions, particularly in collectivist societies where peer behavior strongly guides individual decision-making. Meanwhile, economic considerations such as price sensitivity remain central within low-cost travel contexts, often acting as barriers to voluntary environmental payments unless clear value is perceived (Demir, 2025).

Accordingly, this study aims to examine carbon credit utilization as a sustainable choice among low-cost airline passengers in Thailand by developing and testing a structural equation model (SEM). The proposed model integrates environmental awareness, climate concern, perceived responsibility, trust, perceived effectiveness, social norms, and price sensitivity to explain how passengers form attitudes toward carbon credit utilization and perceive its value, ultimately shaping their behavioral intention to participate in carbon offset programs. By empirically investigating these relationships, the study seeks to contribute to sustainable aviation literature and provide actionable insights for airlines and policymakers aiming to promote environmentally responsible travel without undermining affordability and market competitiveness.

From a marketing and management perspective, understanding passengers' sustainable choice behavior is essential for designing effective service strategies in the low-cost airline sector. As low-cost carriers operate under high price competition and thin margins, managerial decisions related to pricing, service design, communication strategies, and sustainability positioning play a critical role in shaping consumer adoption of voluntary carbon offset programs. This study therefore positions carbon credit utilization as a consumer decision-making and service marketing issue rather than solely an environmental concern, contributing to marketing and management literature by explaining how attitudes and perceived value translate into sustainable purchase intentions in a highly price-sensitive market.

2. LITERATURE REVIEW

This study draws upon multiple behavioral and sustainability theories to explain carbon credit utilization as a sustainable choice among low-cost airline passengers in Thailand. By integrating environmental cognition, attitudinal formation, social influence, trust mechanisms, value perception, and economic sensitivity, the proposed framework offers a comprehensive understanding of pro-environmental decision-making within the aviation context.

2.1. Environmental Awareness and Climate Concern Theory

Environmental awareness theory emphasizes individuals' cognitive understanding of environmental issues and the consequences of human activities on ecological systems. Higher

awareness enhances recognition of personal environmental impact and increases motivation to engage in sustainable behaviors. Climate change concern further reflects emotional engagement and perceived seriousness of environmental threats, which strengthen moral responsibility toward environmental protection.

Previous research consistently demonstrates that individuals with higher environmental awareness and stronger climate concern are more likely to develop positive attitudes toward environmentally responsible behaviors, including energy conservation, green consumption, and carbon offset participation (Kollmuss and Agyeman, 2002; Steg and Vlek, 2009). In aviation contexts, awareness of flight-related emissions has been shown to increase willingness to offset carbon emissions (Demir, 2025).

Accordingly, environmental awareness and climate change concern function as foundational cognitive and affective drivers shaping passengers' attitudes toward carbon credit utilization.

2.2. Norm Activation and Perceived Environmental Responsibility

Norm activation theory posits that pro-environmental behavior is triggered when individuals become aware of environmental consequences and feel personally responsible for mitigating harm. Perceived environmental responsibility reflects this internalized moral obligation, motivating individuals to act in environmentally beneficial ways (Tam, 2019).

When passengers perceive themselves as contributors to aviation-related emissions, they are more likely to accept responsibility and support mitigation mechanisms such as carbon offset programs. Empirical evidence indicates that moral norms and perceived responsibility strongly predict sustainable consumption and voluntary environmental payments (Confente and Scarpi, 2021; Oh and Ki, 2023).

Thus, perceived environmental responsibility serves as a key psychological mechanism translating awareness and concern into favorable attitudes toward carbon credit utilization.

2.3. Trust Theory in Environmental Governance

Trust plays a central role in shaping individuals' acceptance of sustainability initiatives, particularly when environmental outcomes are intangible or long-term. Trust theory suggests that individuals are more likely to support environmental programs when they perceive institutions as credible, transparent, and competent (Henriksen and Ponte, 2017).

In carbon credit markets, skepticism regarding greenwashing and ineffective projects has often hindered participation. Passengers' trust in carbon credit programs specifically in certification processes, project legitimacy, and emission reduction outcomes directly influences their willingness to engage in offsetting behavior. High trust reduces perceived risk and increases confidence in environmental impact (Bamidele et al., 2023; Eid et al., 2024).

Therefore, trust functions as a critical attitudinal determinant influencing support for carbon offset utilization.

2.4. Perceived Effectiveness and Outcome Expectancy Theory

Outcome expectancy theory proposes that individuals are more likely to engage in a behavior when they believe it will produce meaningful and desirable outcomes. In environmental contexts, perceived effectiveness refers to beliefs that personal contributions can lead to tangible environmental improvements (Mehboob and Othman, 2020).

When airline passengers perceive carbon offsetting as an effective tool for mitigating climate change, their motivation to participate increases significantly. Empirical studies confirm that perceived environmental effectiveness positively influences pro-environmental attitudes and behavioral intention (Permzadian and Shen, 2024).

Thus, perceived effectiveness of carbon offsetting reinforces positive attitudes toward carbon credit utilization by strengthening belief in real-world environmental impact.

2.5. Social Norms and Social Influence Theory

Social influence theory highlights the role of normative pressures in shaping individual behavior through perceived expectations of significant others and society. Social norms operate through both descriptive norms (what others do) and injunctive norms (what others approve of) (Jaeger and Schultz, 2017).

In collectivist cultures such as Thailand, social conformity and group endorsement play particularly strong roles in guiding sustainable consumption choices. When environmentally responsible travel behaviors are socially encouraged or commonly practiced, individuals are more likely to adopt similar behaviors, including participation in carbon offset programs (Vighnesh et al., 2022).

Accordingly, social norms serve as powerful social drivers shaping passengers' attitudes toward carbon credit utilization.

2.6. Value-Based Decision Making and Price Sensitivity Theory

Consumer value theory posits that individuals evaluate behaviors based on perceived benefits relative to costs. Within low-cost airline markets, price sensitivity strongly influences purchasing decisions, often outweighing ethical or environmental considerations (Parmar, 2025).

Passengers may view carbon offset payments as additional financial burdens unless the perceived environmental and moral benefits justify the cost. Perceived value thus becomes a crucial mediating factor linking attitudes toward sustainability with actual behavioral intention. When passengers perceive carbon credits as delivering meaningful environmental impact at acceptable cost levels, their willingness to utilize offsets increases (Guerreiro and Amaral, 2018).

Consequently, economic sensitivity and value perception explain why positive environmental attitudes do not always translate into sustainable action.

2.6.1. Integrated theoretical implication

By synthesizing these six theoretical perspectives, the present study proposes that environmental awareness, climate concern, perceived responsibility, trust, perceived effectiveness, and social norms collectively shape passengers' attitudes toward carbon credit utilization. Price sensitivity moderates attitudinal formation through cost considerations. Attitude subsequently enhances perceived value, which together determine behavioral intention to utilize carbon credits.

This integrated framework provides a robust explanation of sustainable choice behavior in the low-cost aviation context and supports the proposed SEM relationships.

3. RESEARCH MODEL AND HYPOTHESES

As shown in Figure 1, environmental awareness, climate change concern, perceived environmental responsibility, trust, perceived effectiveness, social norms, and price sensitivity influence attitude toward carbon credit utilization, which subsequently affects perceived value and behavioral intention.

H_1: Environmental awareness positively influences attitude toward carbon credit utilization
H_2: Climate change concern positively influences attitude toward carbon credit utilization
H_3: Perceived environmental responsibility positively influences attitude toward carbon credit utilization
H_4: Trust in carbon credit programs positively influences attitude toward carbon credit utilization
H_5: Perceived effectiveness of carbon offsetting positively influences attitude toward carbon credit utilization
H_6: Social norms positively influence attitude toward carbon credit utilization
H_7: Price sensitivity negatively influences attitude toward carbon credit utilization
H_8: Attitude toward carbon credit utilization positively influences perceived value of carbon credits
H_9: Attitude toward carbon credit utilization positively influences behavioral intention to utilize carbon credits
H_{10}: Perceived value of carbon credits positively influences behavioral intention to utilize carbon credits.

4. METHODOLOGY

This study examines passengers' sustainable decision-making regarding carbon credit utilization among low-cost airline travelers in Thailand by analyzing the structural relationships among environmental awareness (EA), climate change concern (CCC), perceived environmental responsibility (PER), trust in carbon credit programs (TRU), perceived effectiveness of carbon offsetting (PEO), social norms (SN), price sensitivity (PS), attitude toward carbon credit utilization (ATT), perceived value of carbon credits (PV), and behavioral intention to utilize carbon credits (BI). A quantitative research design was employed to test the proposed conceptual framework and hypotheses using survey data collected from low-cost airline passengers in Thailand.

Data collection was conducted over a 1-month period, from December 01 to 30, 2025, following approval from the Ethics Committee and authorization from the University Research Committee. All research procedures complied with ethical principles outlined in the Belmont Report and internationally recognized standards for social and behavioral research.

4.1. Population and Sampling

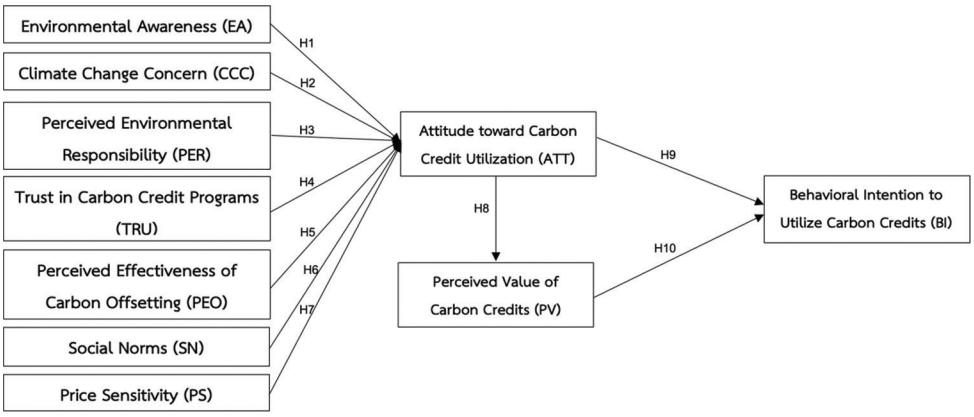
The target population of this study consists of passengers who have used low-cost airline services in Thailand for domestic or short-haul travel. This population was selected due to the dominant role of low-cost carriers in Thailand's aviation market and their relevance to sustainability challenges related to mass air travel.

The unit of analysis is the individual airline passenger, as the study focuses on personal perceptions, attitudes, and behavioral intentions regarding carbon credit utilization. A purposive sampling technique was employed to recruit respondents who had prior experience traveling with low-cost airlines in Thailand and were at least 18 years old. To enhance accessibility and response rates, convenience sampling was applied through online distribution channels such as social media platforms and travel-related communities. This sampling approach is considered appropriate for behavioral and sustainability research where a comprehensive sampling frame is unavailable.

4.2. Sample Size Determination

The sample size was determined based on the indicator-based rule commonly applied in partial least squares structural equation

Figure 1: Research conceptual model



modeling (PLS-SEM), which recommends a minimum sample size of ten times the number of observed measurement items included in the research model. In this study, the research instrument consists of 50 observed indicators representing the latent constructs in the SEM framework. Accordingly, the minimum required sample size was calculated as: 50 indicators × 10 = 500 respondents (Hair et al., 2017).

Therefore, the target sample size was set at 500 low-cost airline passengers. A total of 500 valid and usable questionnaires were collected, which satisfies the recommended threshold for robust PLS-SEM analysis and enhances the statistical power and generalizability of the findings.

4.3. Research Instrument

The research instrument is a structured self-administered questionnaire comprising 50 items organized into ten construct sections: Environmental awareness (EA), climate change concern (CCC), perceived environmental responsibility (PER), trust in carbon credit programs (TRU), perceived effectiveness of carbon offsetting (PEO), social norms (SN), price sensitivity (PS), attitude toward carbon credit utilization (ATT), perceived value of carbon credits (PV), and behavioral intention to utilize carbon credits (BI).

All items were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was developed based on an extensive review of sustainability behavior and environmental psychology literature and refined through expert validation to ensure content validity, clarity, and alignment with the conceptual framework (Nunnally, 1978).

4.4. Data Collection and Analysis

Data were collected via an online survey distributed through social media platforms, travel forums, and low-cost airline passenger communities in Thailand. Participation was voluntary, and informed consent was obtained from all respondents prior to completing the questionnaire. Responses were screened for completeness and consistency, resulting in 500 usable questionnaires for final analysis.

Data analysis was conducted using IBM SPSS Statistics for descriptive analysis and SmartPLS for inferential modeling. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic characteristics and general response patterns.

Inferential analysis employed partial least squares structural equation modeling (PLS-SEM) to assess both the measurement and structural models. Reliability and validity were evaluated using Cronbach's Alpha, composite reliability (CR), average variance extracted (AVE), and discriminant validity criteria. Structural relationships were tested using a bootstrapping procedure with 5,000 resamples at a significance level of 0.05.

5. RESULTS

The analysis of data collected from 500 low-cost airline passengers in Thailand provides insights into respondents' environmental perceptions, attitudes, and intentions toward carbon credit utilization. Among the respondents, 58.6% (n = 293) were female and 41.4% (n = 207) were male. The majority were aged between 21 and 30 years (64.2%), followed by 31-40 years (22.8%). Most respondents were single (67.4%), and 69.2% were employed in the private sector. Monthly income levels were primarily between 20,001 and 35,000 Baht (46.8%), indicating a predominantly working-age group of frequent low-cost airline travelers.

Overall, respondents demonstrated moderate to high awareness of aviation-related environmental impacts and positive attitudes toward carbon credit utilization. Mean scores across all constructs ranged from 3.89 to 4.32, suggesting generally favorable perceptions toward sustainable travel behaviors, although price sensitivity remained a notable concern among low-cost airline passengers.

5.1. Measurement Model Assessment

The adequacy of the measurement model was evaluated using goodness-of-fit indices. The results are summarized in Table 1.

The fit statistics indicate that the measurement model demonstrates a satisfactory fit with the empirical data. The χ^2/df value is below the recommended threshold of 3.00, while RMSEA and SRMR values fall within acceptable limits. The CFI and TLI values exceed 0.90, confirming strong model adequacy.

5.2. Reliability and Convergent Validity

All standardized factor loadings exceeded 0.72 and were statistically significant ($P < 0.001$), as shown in Table 2. Composite reliability (CR) values ranged from 0.901 to 0.958, and Cronbach's alpha values ranged from 0.892 to 0.951, indicating excellent internal consistency. In addition, the Average Variance Extracted (AVE) values ranged from 0.681 to 0.823, exceeding the recommended threshold of 0.50 (Table 2), thereby confirming convergent validity.

5.3. Discriminant Validity

Discriminant validity was confirmed using the Fornell-Larcker criterion. As presented in Table 3, the square root of AVE for each construct exceeded its correlations with other constructs (Fornell and Larcker, 1981).

5.4. Structural Model and Hypothesis Testing

The structural relationships were tested using bootstrapping with 5,000 resamples. The results of hypothesis testing are summarized in Table 4. All hypothesized relationships were found to be statistically significant. Specifically, environmental awareness (EA), climate change concern (CCC), perceived environmental responsibility (PER), trust in carbon programs (TRU), perceived effectiveness (PEO), and social norms (SN) have significant positive effects on attitude (ATT), whereas price sensitivity (PS) has a significant negative effect on ATT. Furthermore, attitude (ATT) significantly influences perceived value (PV) and behavioral

Table 1: Measurement model fit indices

χ^2/df	RMSEA	SRMR	CFI	TLI
2.184	0.052	0.041	0.934	0.928
Recommended	<3.00	<0.07	<0.08	>0.90

Table 2: Measurement model results

Construct	Item	Loading	CR	α	AVE
Environmental awareness	EA1-EA3	0.781-0.864	0.921	0.914	0.708
Climate change concern	CCC1-CCC3	0.794-0.882	0.934	0.928	0.742
Perceived environmental responsibility	PER1-PER3	0.756-0.861	0.915	0.907	0.694
Trust in carbon programs (TRU)	TRU1-TRU3	0.803-0.892	0.942	0.936	0.781
Perceived effectiveness (PEO)	PEO1-PEO3	0.815-0.903	0.948	0.941	0.799
Social norms	SN1-SN3	0.748-0.867	0.918	0.909	0.701
Price sensitivity	PS1-PS3	0.732-0.858	0.901	0.892	0.681
Attitude	ATT1-ATT3	0.829-0.904	0.952	0.946	0.823
Perceived value	PV1-PV3	0.802-0.889	0.937	0.931	0.763
Behavioral intention	BI1-BI3	0.821-0.901	0.949	0.943	0.804

Table 3: Fornell-Larcker criterion

Construct	EA	CCC	PER	TRU	PEO	SN	PS	ATT	PV	BI
EA	**0.842**									
CCC	0.462	**0.861**								
PER	0.511	0.498	**0.833**							
TRU	0.398	0.421	0.376	**0.884**						
PEO	0.455	0.472	0.439	0.592	**0.894**					
SN	0.387	0.401	0.423	0.361	0.408	**0.837**				
PS	−0.312	−0.298	−0.275	−0.241	−0.269	−0.233	**0.825**			
ATT	0.556	0.583	0.541	0.602	0.641	0.497	−0.382	**0.907**		
PV	0.468	0.491	0.453	0.574	0.611	0.421	−0.436	0.683	**0.873**	
BI	0.489	0.523	0.471	0.558	0.602	0.438	−0.401	0.701	0.659	**0.897**

Diagonal elements (bold values) represent the square root of the Average Variance Extracted (AVE) for each construct. Off-diagonal elements represent inter-construct correlations. Discriminant validity is established as the square root of AVE for each construct is greater than its correlations with other constructs (Fornell & Larcker, 1981).

Table 4: Path analysis results

Hypothesis	Path	t-value	P-value	Result
H_1	EA→ATT	4.892	0.000	Accepted
H_2	CCC→ATT	5.174	0.000	Accepted
H_3	PER→ATT	3.986	0.000	Accepted
H_4	TRU→ATT	6.215	0.000	Accepted
H_5	PEO→ATT	7.043	0.000	Accepted
H_6	SN→ATT	3.421	0.001	Accepted
H_7	PS→ATT	−4.108	0.000	Accepted
H_8	ATT→PV	9.337	0.000	Accepted
H_9	ATT→BI	6.584	0.000	Accepted
H_{10}	PV→BI	8.129	0.000	Accepted

intention (BI), and perceived value (PV) also has a significant positive effect on behavioral intention (BI) (Table 4).

5.5. Discussion of Structural Results

The findings demonstrate that environmental awareness, climate change concern, perceived environmental responsibility, trust in carbon credit programs, perceived effectiveness of carbon offsetting, and social norms all exert significant positive influences on passengers' attitudes toward carbon credit utilization. Conversely, price sensitivity negatively affects attitude formation, highlighting cost concerns among low-cost airline passengers.

Attitude toward carbon credit utilization strongly predicts perceived value, indicating that favorable evaluations enhance the perceived benefits of carbon offset participation. Furthermore, both attitude and perceived value significantly influence behavioral intention to utilize carbon credits, confirming the central role of cognitive evaluation and value perception in sustainable travel decision-making.

Overall, the results validate the proposed SEM framework and underscore the importance of integrating psychological, social, and economic mechanisms in explaining carbon credit utilization behavior within the low-cost aviation context.

6. DISCUSSION

This study provides empirical evidence on the psychological, social, and economic mechanisms underlying carbon credit utilization as a sustainable choice among low-cost airline passengers in Thailand. By integrating environmental cognition, moral responsibility, institutional trust, social influence, and value-based evaluation within a structural equation modeling framework, the findings offer a comprehensive explanation of pro-environmental decision-making in the aviation context.

The results demonstrate that environmental awareness and climate change concern significantly influence passengers' attitudes toward carbon credit utilization. This is consistent with environmental behavior frameworks suggesting that knowledge of environmental consequences combined with emotional engagement strengthens positive sustainability attitudes (Kollmuss and Agyeman, 2002; Steg and Vlek, 2009). Passengers who recognize the environmental impact of aviation and feel concerned about climate change are more likely to view carbon offsetting as a responsible and meaningful action. This finding reinforces the notion that both cognitive and affective components are essential in shaping sustainable consumption behavior.

Perceived environmental responsibility also exhibits a significant positive effect on attitude formation, supporting norm activation theory, which posits that pro-environmental behavior emerges

when individuals internalize personal moral obligations toward environmental protection (Khan et al., 2026; Schwartz, 1977; Steg and de Groot, 2010). When passengers perceive themselves as contributors to aviation-related emissions, they are more inclined to engage in mitigation efforts such as carbon credit utilization. This suggests that moral motivation plays a central role in voluntary environmental actions within the aviation sector.

Trust in carbon credit programs emerges as one of the strongest predictors of attitude toward carbon credit utilization. This aligns with trust-based sustainability research emphasizing that credibility and transparency are crucial when environmental outcomes are intangible and long-term (Chen and Tung, 2014; Terwel et al., 2011). In the context of carbon offsetting, where passengers cannot directly observe emission reductions, trust reduces perceived risk and uncertainty. The strong effect of trust indicates that skepticism toward environmental claims may significantly hinder participation unless credible verification mechanisms are clearly communicated.

Similarly, perceived effectiveness of carbon offsetting significantly enhances favorable attitudes, consistent with outcome expectancy theory, which suggests that individuals are more likely to engage in behaviors they believe will produce meaningful outcomes (Bandura, 1996). When passengers believe that carbon credits contribute to real emission reductions, they are more motivated to participate in offset programs. This finding highlights the importance of demonstrating measurable environmental impact to sustain engagement in voluntary mitigation initiatives.

Social norms also exert a significant influence on attitude formation, reflecting social influence theory, which emphasizes that perceived expectations and behaviors of others shape individual decision-making (Ajzen, 1991; Cialdini et al., 1990). In collectivist societies such as Thailand, socially endorsed behaviors play a particularly strong role in guiding sustainable choices. When carbon offset participation is perceived as socially desirable or increasingly common, passengers are more likely to adopt similar behaviors, reinforcing the diffusion of sustainable travel practices.

Conversely, price sensitivity negatively affects attitudes toward carbon credit utilization, consistent with consumer value theory, which posits that individuals evaluate behaviors based on perceived benefits relative to financial costs (Zeithaml, 1988). Within the low-cost airline context, passengers are highly cost-conscious, and additional environmental payments may be viewed as burdensome unless perceived value is sufficiently high. This result confirms the tension between affordability and sustainability in low-cost travel markets and explains why positive environmental attitudes do not always translate into sustainable purchasing behavior.

The strong positive relationship between attitude and perceived value further supports value-based decision-making frameworks. When passengers develop favorable evaluations of carbon offsetting, they are more likely to perceive carbon credits as worthwhile investments rather than unnecessary expenses (Sweeney and Soutar, 2001). This indicates that attitude formation enhances perceived benefits, which in turn facilitates sustainable choice behavior.

Moreover, both attitude and perceived value significantly influence behavioral intention to utilize carbon credits, aligning with attitudinal models such as the Theory of Planned Behavior, which emphasize the central role of attitudes in predicting intention (Ajzen, 1991). The mediating role of perceived value suggests that even environmentally concerned passengers require tangible benefits to justify offset participation, particularly in price-sensitive markets. This finding underscores the importance of clearly communicating environmental impact and personal contribution outcomes to strengthen sustainable travel intentions.

Overall, the results validate the proposed integrated framework and demonstrate that carbon credit utilization behavior is shaped by an interaction of environmental awareness, moral norms, trust, perceived effectiveness, social influence, and economic evaluation. This extends existing aviation sustainability literature by illustrating how psychological and institutional mechanisms jointly influence voluntary carbon mitigation behavior among low-cost airline passengers in emerging markets.

From a theoretical perspective, this study contributes to pro-environmental behavior research by empirically integrating norm activation theory, social influence theory, trust theory, and consumer value theory within a unified SEM framework. The findings demonstrate that sustainable aviation behavior cannot be fully explained by environmental concern alone but requires consideration of institutional credibility and economic feasibility.

In practical terms, the results suggest that airlines and policymakers should enhance environmental education initiatives to increase awareness, strengthen transparency mechanisms to build trust in carbon credit programs, and leverage social marketing strategies to normalize carbon offset participation. At the same time, addressing cost concerns through affordable offset options or bundled pricing strategies may improve perceived value and participation rates.

7. CONCLUSION

In conclusion, carbon credit utilization among low-cost airline passengers in Thailand is driven by a combination of cognitive understanding, moral responsibility, institutional trust, social endorsement, and perceived value. Promoting sustainable aviation behavior therefore requires integrated strategies that address both psychological motivation and economic barriers.

This study investigated carbon credit utilization as a sustainable consumption choice among low-cost airline passengers in Thailand by integrating consumer environmental cognition, moral responsibility, trust mechanisms, social influence, and value-based evaluation within a structural equation modeling framework. The findings demonstrate that environmental awareness, climate change concern, perceived environmental responsibility, trust in carbon credit programs, perceived effectiveness of carbon offsetting, and social norms significantly shape consumers' attitudes toward carbon credit adoption, while price sensitivity acts as a critical barrier in the low-cost airline context.

Moreover, attitude toward carbon credit utilization strongly enhances perceived value, which, together with attitude, significantly predicts consumers' behavioral intention to adopt carbon credits during ticket purchasing. These results confirm that sustainable aviation consumption behavior is driven not only by environmental concern but also by perceived institutional credibility and economic justification. Carbon credit adoption therefore represents a complex consumer decision-making process influenced by psychological, social, and financial considerations.

From a theoretical perspective, this study contributes to marketing and management literature by integrating multiple behavioral and sustainability theories into a unified SEM framework to explain sustainable consumer choice in the low-cost airline industry. Empirically, the findings extend sustainable marketing and service management research by providing evidence from an emerging economy where low-cost carriers dominate air travel markets.

From a managerial and policy perspective, the findings suggest that low-cost airline managers should embed carbon offset options seamlessly into the booking journey and position them as value-added services rather than optional donations. Transparent communication regarding the credibility and impact of carbon credit projects can enhance consumer trust and reduce skepticism. Marketing communication should emphasize tangible environmental outcomes and social endorsement to strengthen positive consumer attitudes. Moreover, airlines may consider value-based pricing strategies, such as micro-offset pricing, default opt-in options, or bundled sustainability packages, to mitigate price sensitivity and enhance perceived value. Policymakers can support these initiatives by standardizing certification systems and providing clear guidelines that enhance consumer confidence in carbon credit programs.

7.1. Limitations

Despite its contributions, this study has several limitations that should be acknowledged. First, the use of a cross-sectional research design restricts the ability to infer causal relationships among the constructs. Although SEM allows for robust testing of structural associations, longitudinal studies would provide deeper insights into changes in passenger attitudes and behaviors over time.

Second, data were collected through self-reported questionnaires, which may be subject to social desirability bias and common method variance. Respondents may have overstated their environmental concern or intention to engage in sustainable behaviors. Future studies may benefit from incorporating behavioral data, such as actual carbon offset purchases, to enhance measurement accuracy.

Third, the sample focused exclusively on low-cost airline passengers in Thailand, which may limit the generalizability of the findings to other aviation segments or cultural contexts. Passengers of full-service airlines or travelers in different countries may exhibit distinct behavioral patterns influenced by income levels, service expectations, and cultural norms.

Finally, while the study integrated key psychological, social, and economic variables, other potentially influential factors such as perceived convenience, airline reputation, environmental labeling, and policy incentives were not examined. Including these variables could further strengthen explanatory power.

7.2. Future Research Directions

Building on the findings of this study, several avenues for future research are recommended. First, longitudinal research designs should be employed to examine how environmental awareness, trust, and perceived value evolve over time and influence sustained participation in carbon offset programs. Such approaches would provide stronger causal insights into sustainable behavior development.

Second, future studies could incorporate experimental or quasi-experimental methods to test the effectiveness of different communication strategies, pricing models, and incentive mechanisms in promoting carbon credit utilization. For example, comparing mandatory versus voluntary offset schemes or bundled ticket pricing could offer practical policy guidance.

Third, comparative studies across airline types, such as low-cost versus full-service carriers, would help identify how service expectations and income levels moderate sustainable decision-making. Cross-cultural comparisons across different regions could further enhance understanding of how social norms and cultural values shape carbon offset adoption.

Finally, future research should explore the role of technological interventions, such as mobile apps, real-time carbon footprint displays, and gamification strategies, in enhancing passenger engagement with carbon offset programs. Integrating behavioral economics perspectives could also reveal how nudges and default options influence sustainable travel choices.

REFERENCES

Ajzen, I. (1991), The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179-211.

Amtrakul, P., Chayphong, S., Seo, D., Trinh, T.A. (2025), Promoting accessibility for sustainable tourism: A spatial analysis of tourist attractions and public transportation networks in Bangkok. City, Territory and Architecture, 12, 13.

Bamidele, R.O., Ozturen, A., Haktanir, M., Ogunmokun, O.A. (2023), Realizing green airport performance through green management intransigence, airport reputation, biospheric value, and eco-design. Sustainability, 15(3), 2475.

Bandura, A. (1996), Ontological and epistemological terrains revisited. Journal of Behavior Therapy and Experimental Psychiatry, 27(4), 323-345.

Becken, S., Mackey, B. (2017), What role for offsetting aviation greenhouse gas emissions in a deep-cut carbon world? Journal of Air Transport Management, 63, 71-83.

Chen, M.F., Tung, P.J. (2014), Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels. International Journal of Hospitality Management, 36, 221-230.

Cialdini, R.B., Reno, R.R., Kallgren, C.A. (1990), A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. Journal of Personality and Social Psychology,

58(6), 1015-1026.
Confente, I., Scarpi, D. (2021), Achieving environmentally responsible behavior for tourists and residents: A norm activation theory perspective. Journal of Travel Research, 60(6), 1196-1212.
Demir, Ş.S. (2025), Sustainable airline choice: The role of environmental awareness, carbon offsets, and perceived corporate social responsibility. Corporate Social Responsibility and Environmental Management, 32, 6627-6640.
Eid, A., Obrecht, M., Ali, A.H., Barakat, M. (2024), Does environmental knowledge and performance engender environmental behavior at airports? A moderated mediation effect. Business Process Management Journal, 30(3), 671-698.
Fornell, C., Larcker, D.F. (1981), Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39-50.
Gössling, S., Hanna, P., Higham, J., Cohen, S., Hopkins, D. (2019), Can we fly less? Evaluating the "necessity" of air travel. Journal of Air Transport Management, 81, 101722.
Gössling, S., Humpe, A. (2020), The global scale, distribution and growth of aviation: Implications for climate change. Global Environmental Change, 65, 102194.
Guerreiro, R., Amaral, J.V. (2018), Cost-based price and value-based price: Are they conflicting approaches? Journal of Business and Industrial Marketing, 33(3), 390-404.
Hair, J., Hollingsworth, C.L., Randolph, A.B., Chong, A.Y.L. (2017), An updated and expanded assessment of PLS-SEM in information systems research. Industrial Management and Data Systems, 117(3), 442-458.
Henriksen, L.F., Ponte, S. (2017), Public orchestration, social networks, and transnational environmental governance: Lessons from the aviation industry. Regulation and Governance, 12, 23-45.
Iamtrakul, P., Klaylee, J., Raungratanaamporn, I. (2024), An evaluation of travel mode choice and travel patterns: A case study in Pathum Thani province, Thailand. Sage Open, 14(4), 13.
Jaeger, C.M., Schultz, P.W. (2017), Coupling social norms and commitments: Testing the underdetected nature of social influence. Journal of Environmental Psychology, 51, 19-208.
Jiang, Z., Wang, Z., Zeng, Y. (2019), Can voluntary environmental regulation promote corporate technological innovation? Business Strategy and the Environment, 29, 390-406.
Khan, S., Mehmood, S., Khan, K.U. (2026), The impact of digital interaction on sustainable tourism choices: The moderating roles of digital trust and personal norms. Journal of Travel Research. Available at: https://doi.org/10.1177/004728752514033
Kollmuss, A., Agyeman, J. (2002), Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research, 8(3), 239-260.
Laphet, J., Sanvises, D., Tandamrong, D., Tantrabundit, P. (2025), Decoding sustainable air travel choices: An extended TPB of green aviation. Tourism and Hospitality, 6(5), 232.
Law, C.C.H. (2025), Exploring the relationship between air travel demand and tourism in Thailand: An ARDL approach. Transport Economics and Management, 3, 183-191.
Law, C.C.H., Prompitak, K., Wongwattanakit, C. (2022), Effects of low-cost airlines on domestic tourism economy in Thailand. Journal of Environmental Management and Tourism, 13(4), 935-948.
Lu, J.L., Wang, C.Y. (2018), Investigating the impacts of air travellers' environmental knowledge on attitudes toward carbon offsetting and willingness to mitigate the environmental impacts of aviation. Transportation Research Part D: Transport and Environment, 59, 96-107.
Mehboob, F., Othman, N. (2020), Examining the links leading to behavioral support for change: An expectancy theory perspective. Innovation Journal of Social Sciences and Economic Review, 2(4), 1-09.
Nunnally, J.C. (1978), An overview of psychological measurement. In: Clinical Diagnosis of Mental Disorders: A Handbook. Boston, MA: Springer. p97-146.
Oh, J., Ki, E. (2023), Extending norm activation theory to understand publics' support for environmentally responsible organizations. Corporate Communications: An International Journal, 28(3), 381-399.
Parmar, J.R. (2025), AI-driven price sensitivity analysis and consumer value optimization for competitive markets. International Journal of AI, BigData, Computational and Management Studies, 6(4), 34-45.
Permzadian, V., Shen, T. (2024), Assessing the predictive validity of expectancy theory for academic performance. BMC Psychol, 12, 437.
Schwartz, S.H. (1977), Normative influences on altruism. Advances in Experimental Social Psychology, 10, 221-279.
Srikhwan, B., Choibamroong, T. (2025), Factors influencing the decision to reuse rail transport services from the main airport by foreign tourists traveling in Thailand. Geojournal of Tourism and Geosites, 59(2), 520-528.
Steg, L., De Groot, J. (2010), Explaining prosocial intentions: Testing causal relationships in the norm activation model. British Journal of Social Psychology, 49(4), 725-743.
Steg, L., Vlek, C. (2009), Encouraging pro-environmental behaviour: An integrative review and research agenda. Journal of Environmental Psychology, 29(3), 309-317.
Sweeney, J.C., Soutar, G.N. (2001), Consumer perceived value: The development of a multiple item scale. Journal of Retailing, 77(2), 203-220.
Tam, K.P. (2019), Anthropomorphism of nature, environmental guilt, and pro-environmental behavior. Sustainability, 11(19), 5430.
Terwel, B.W., Harinck, F., Ellemers, N., Daamen, D.D.L. (2011), Going beyond the properties of CO_2 capture and storage (CCS) technology: How trust in stakeholders affects public acceptance of CCS. International Journal of Greenhouse Gas Control, 5(2), 181-188.
Thongkruer, P., Wanarat, S. (2023), the relationship between air travel service quality and factors of theory of planned behavior: Evidence from low-cost airlines in Thailand. Sustainability, 15(11), 8839.
Vighnesh, N.V., Balachandra, P., Chandrashekar, D., Sawang, S. (2022), How cultural values influence sustainable consumption behavior? An empirical investigation in a non-Western context. Sustainable Development, 31, 990-1007.
Zeithaml, V.A. (1988), Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. Journal of Marketing, 52(3), 2-22.