Passengers' Behavioral Intentions toward Eco-Friendly Aviation Services: An Analysis of Marketing Mix Factors at Chiang Mai International Airport

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Abstract

While eco-friendly aviation services are growing globally, Thailand still faces challenges due to their limited availability and the lack of strategic marketing to promote sustainable aviation services. This article aimed to study (1) the 7Ps of service marketing mix factors (Product, Price, Place, Promotion, People, Process, and Physical Evidence) that influence passengers' intentions to choose eco-friendly aviation services at Chiang Mai International Airport, (2) the level of passengers' willingness to select eco-friendly aviation services, and (3) to guide the influential marketing mix factors for Thai airlines in developing eco-friendly services. For this study, the sample was 420 Thai passengers traveling through Chiang Mai International Airport. They were selected by a quota sampling method across six major Thai airlines. The instruments for collecting data were structured questionnaires using a 5-point Likert scale, validated by three experts with IOC values ranging from 0.60 to 1.00. Data analysis was conducted using descriptive statistics (percentage, mean, standard deviation) and inferential statistics (linear regression analysis). The research results were found as follows:

1.) Passengers rated all 7Ps marketing mix factors at a high level of importance (mean = 3.78, S.D. = 0.212) regarding their intention to choose eco-friendly aviation services. Four marketing mix factors Promotion (β = 0.172, p = 0.004), Physical Evidence (β = 0.147, p = 0.011), Price (β = 0.121, p = 0.044), and People (β = 0.106, p = 0.017) significantly influenced passengers' intention to choose eco-friendly aviation services, while Product, Place, and Process showed no significant effect.

2.) Passengers demonstrated high willingness to choose eco-friendly aviation services (mean = 3.82), with the strongest agreement on recognizing the necessity to select eco-friendly aviation services to reduce environmental impact in Chiang Mai (mean = 4.19).

3.) The findings provide a 4Ps framework (Promotion, Physical Evidence, Price, and People) to guide Thai Airlines in developing eco-friendly aviation services that meet passenger preferences and support sustainable aviation development in Northern Thailand.

Keywords: Marketing Mix (7 Ps), Eco-friendly Aviation Services, Sustainable Aviation, Passenger Behavioral Intentions, Chiang Mai International Airport

Introduction

Today, consumers recognize and are conscious of their actions and behaviors as they relate to the environment. This consciousness is also reflected in their purchasing decisions across various industries, including aviation. Research has shown that airline passengers are generally concerned about their environmental footprint and therefore seek alternative options with the least ecological effects when making travel choices (Baumeister et al., 2022; Hui et al., 2024). In the global aviation sector, airlines have responded to this demand by implementing various sustainability initiatives, including sustainable aviation fuel (SAF) programs, carbon offset schemes, and waste reduction measures (International Air Transport Association, 2021). In a competitive airline business, providing awareness of such sustainable measures is hence critical in influencing passengers' purchasing decisions. As a result, understanding how marketing strategies can incentivize passengers toward eco-friendly aviation choices is imperative for both airlines and environmental policymakers.

In Thailand, the domestic aviation industry faces particular environmental challenges, especially in Northern Thailand, where Chiang Mai serves as a major regional hub. Between 2014 and 2018, CO_2 emissions from domestic passenger flights had increased by 42%, rising from 1.9 million tons to 2.7 million tons in the region (Champeecharoensuk et al., 2023). Chiang Mai also experiences severe seasonal air pollution with high PM2.5 concentrations (Chansuebsri et al., 2024), which makes this airport a suitable case study for examining sustainable aviation transitions.

Unlike international carriers, which have implemented visible eco-friendly services, Thai domestic airlines have made limited progress in developing such environmentally sustainable aviation options. This creates a research gap and an opportunity to further examine this matter. While international studies have examined passengers' preferences for 'existing' green aviation services, research about Thai passengers' attitudes and intentions toward eco-friendly aviation is rather hypothetical and less well-known.

The service marketing mix, particularly the 7Ps framework (Product, Price, Place, Promotion, People, Process, and Physical Evidence), provides a comprehensive lens for understanding how airlines could potentially develop and market eco-friendly services to meet passengers' preferences (Kotler et al., 2021). Previous research has examined general factors influencing choice of airlines (Abdelhady et al., 2018) and passengers' willingness to pay for sustainable aviation (Rice et al., 2020; Hinnen et al., 2017); yet, only a few studies have specifically analyzed the marketing mix elements that are influential in shaping passengers' intentions toward eco-friendly aviation services in a Thai context. Therefore, this study aimed to examine how the 7Ps of marketing influence passengers' behavioral intentions to choose eco-friendly aviation services at Chiang Mai International Airport. By identifying which marketing mix factors significantly affect passengers' preferences, this research attempts to provide practical recommendations to Thai airlines, who intend to develop eco-friendly services and

contribute to the broader understanding of sustainable aviation marketing in Southeast Asian contexts, where environmental services remain underdeveloped. Moreover, the findings will serve as a guide to the Thai aviation industry in developing more sustainable operations and contribute to the United Nations Sustainable Development Goals (SDGs), particularly Goal 13 (Climate Action) and Goal 12 (Responsible Consumption and Production).

Objectives

1. To study the 7 Ps of service marketing mix factors that influence passengers' intentions to choose eco-friendly aviation services at Chiang Mai International Airport.
2. To study the level of passengers' willingness to select eco-friendly aviation services.
3. To guide Thai airlines considering the development of eco-friendly services.

Literature Review

1. Eco-Friendly Aviation Services: International Context vs. Thai Reality

Major airlines around the world have implemented various environmental initiatives generally known as ‘eco-friendly' aviation services. These include sustainable aviation fuel (SAF) programs, carbon offset strategies, waste reduction plans, and ‘eco-labeling’ (Mayer et al., 2012, 2014). Airlines such as KLM Royal Dutch Airlines, Singapore Airlines, and Lufthansa have established clear sustainability programs that passengers can recognize and choose from (George Saade et al., 2025). However, the Thai domestic aviation market, encompassing Thai domestic carriers operating at Chiang Mai International Airport, including Thai Airways, Bangkok Airways, and various low-cost carriers, has made limited commitments to eco-friendly operations when compared to their international counterparts (Champeecharoensuk et al., 2023). For instance, Thai Airways publishes sustainability reports about their international operations and not their domestic flights. Furthermore, none of the major Thai domestic carriers currently offers passengers 'green flight' options, ‘SAF’ operated flights, or any carbon offsetting programs at the point of booking.

The gap between international practices and Thai operations thus provided the context for this study. Rather than examining passengers’ choices among international eco-friendly carriers, this research opted to examine passengers’ behaviors and intentions conceptually, i.e., how Thai passengers would respond to the implementation of ‘eco-friendly’ services. This approach follows the ‘Theory of Planned Behavior’ (Ajzen, 1991), which claims that behavioral intentions often predict and lead to actual behaviors. Ajzen (1991) further explains that individuals’ intentions to perform a behavior are influenced by their attitudes toward that action, their ‘perceived behavioral control’, and ‘subjective norms’ and social influences relating to that action. In the course of this study, the ‘Theory of Planned Behavior’ (TPB) was utilized to predict how attitudes, subjective norms, and perceived behavioral control would influence behavioral intentions. The outcomes of the study revealed that, in the context of

air travel, passengers are more likely to choose environmentally friendly flights when they have positive attitudes toward the environment, feel supported by social norms that encourage sustainability, and believe that such flights are easily accessible.

2. The service marketing mix factors (7Ps)

Businesses apply the marketing mix elements to create a well-balanced strategy that meets the needs and expectations of their target customers (Kotler et al., 2021). The concept of 7Ps in marketing was derived from the traditional 4Ps (Product, Price, Place, Promotion). The 4Ps are primarily used for tangible products, while the 7Ps are applied to the service sector (Saputri & Sari, 2019). The 7Ps include Product, Price, Place, Promotion, People, Process, and Physical Evidence, which are especially applicable to the service business, including airlines and the aviation business. The 7Ps consist of the following (Kotler et al., 2021):

1. Product refers to goods or services offered by a company to meet their customers' needs, ensuring satisfaction and benefits after use.

2. Price refers to the pricing strategy by taking into account both economic and environmental costs associated with production and marketing, while ensuring value for customers and profitability for the business.

3. Place refers to the distribution channels that help to deliver goods and services from a company to its consumers efficiently.

4. Promotion refers to communication strategies, such as advertising and promotions, aimed at informing and persuading customers to take action to purchase a product or service.

5. People provide critical services to passengers and thus play a crucial role in customer satisfaction. Their attitudes, skills, and responsiveness significantly impact the overall service and travel experience.

6. Process refers to service procedures that enhance operational efficiency and service quality by optimizing resources.

7. Physical Evidence refers to the quality of a service that is often reflected by its physical aspects, such as cleanliness, speed, design, and presentation.

3. 7Ps of Marketing Mix Factors for Eco-Friendly Aviation Services (Case studies of global green airline practices from major international carriers).

George Saade et al. (2025) pointed out that there is no clear definition of "green marketing mix" in aviation. However, it generally refers to sustainable operations in the aviation industry that reduce environmental impacts and enhance social well-being.

This study thus attempted to examine the role of such a marketing mix in airline operations, particularly in the context of "green services". Related literature indicate that the concepts, ideas, and processes relating to the perception of "green" in aviation are broad and often unclear. Therefore, for the purposes of this study, the researcher had reviewed a large amount of pertinent literature to identify major airlines that have already implemented 'eco-friendly activities', including sustainable aviation fuels, fuel efficiency improvements, green

services, and waste reduction programs. In the course of this study, the following airlines were examined: 1. Japan Airlines, 2. Swiss International Air Lines, 3. Alaska Airlines, 4. Turkish Airlines, 5.Qatar Airways, 6.Etihad Airways, 7.Singapore Airlines, 8. KLM Royal Dutch Airlines, 9. ANA, 10.Wizz Air, 11.United Airlines, 12.Thai Airways, 13.Finnair, 14.Cathay Pacific, 15.Delta Air Lines, 16. Emirates, 17. Qantas, 18. Vietnam Airlines and 19.Lufthansa. The study of multiple airlines with 'green services' provides a practical framework to assess marketing strategies that airlines use to promote sustainability. This study utilized the term 'green activities' as a key search variable for its purposes, as summarized in the figure below.

Figure 1 7P's Marketing Mix Factors for Eco-Friendly Airlines

Sources: Japan Airlines, Swiss International Air Lines, Alaska Airlines, Turkish Airlines, Qatar Airways, Etihad Airways, Singapore Airlines, KLM Royal Dutch Airlines, ANA, Wizz Air, United Airlines, Thai Airways, Finnair, Cathay Pacific, Delta Air Lines, Emirates, Qantas, Vietnam Airlines and Lufthansa (Mayer et al., 2012), (Hoang, 2020), (Çabuk et al., 2019), (Mayer et al.,2014), and (Hagmann et al., 2015).

4. The consumer decision-making process

In this research, the framework is applied as such to study consumer's decision-making regarding eco-friendly services, as there are currently no clearly defined "green" airlines operating in Chiang Mai. It is thus imperative to analyze the customer's intention to use green aviation services throughout the decision-making process, while purchasing an airline ticket. This process consists of the following stages: the need's recognition, information search, evaluation of alternatives, purchase decision, and post-purchase behavior (Kotler et al., 2021). As stated above, the consumer's decision-making process can be divided into five stages:

1. Problem Recognition

The first stage involves identifying a need or want, which begins the decision-making process. Consumers recognize the need for sustainable travel due to environmental concerns, leading to an increased intention to purchase eco-friendly services (Kotler et al., 2021).

2. Information Search

In this stage, once the problem has been recognized, consumers begin searching for available solutions. This stage is critical, as it involves gathering data from various sources, including online reviews, social media posts, and personal recommendations (Solomon et al., 2017).

3. Evaluation of Alternatives

After collecting pertinent information, consumers evaluate different options based on criteria such as price, service quality, and environmental impact (Kotler et al., 2021). During this stage, they may compare eco-friendly services with “normal operation” airlines. Factors such as eco-friendly services, fairness, and alternative attractiveness are crucial in this evaluation, with pleasant experiences increasing the possibility of selecting eco-friendly airline services (Chan et al., 2022).

4. Purchase Decision

Attitudes toward environmental consciousness and perceived behavioral control influence the decision to purchase eco-friendly services, with consumers willing to pay a premium for sustainability (Rice et al., 2020).

5. Post-Purchase Behavior

Finally, after the purchase, consumers reflect on their experiences, which can influence future purchasing decisions. Positive experiences may lead to repeat business and recommendations to others, while a negative experience could stop future use (Peter & Olson, 2020).

This study explores the ‘green’ marketing mix using the 7Ps framework, as summarized in the table above, and with the help of Kotler's five-stage consumer decision-making model. The study examines how these 7P factors may influence consumers’ intentions to choose environmentally friendly aviation services.

Conceptual Framework

The relevant literature, concepts, and theories relating to the 7Ps of marketing mix of eco-friendly services, examined through various airlines and consumers’ decision-making, have led to the development of the following conceptual framework.

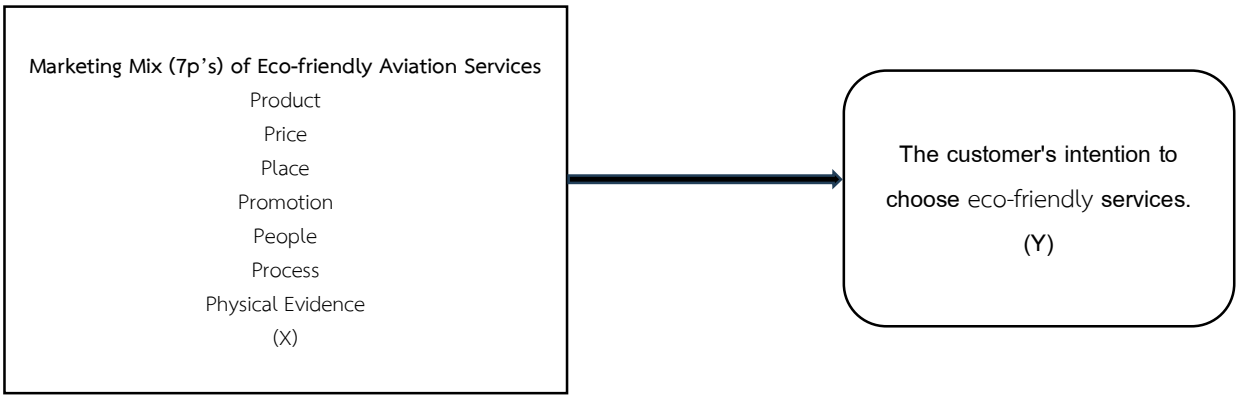

Figure 2 The conceptual framework of research

Research Methodology

1. Population and Sampling

The participants in this study were selected from the Thai passengers traveling through Chiang Mai International Airport. According to the Airports of Thailand Public Company Limited (2024), Chiang Mai International Airport recorded 861,383 domestic passenger movements during the January to December 2024 time period. Using Yamane's (1973) formula, with a 95% confidence level and 5% margin of error, the required minimum sample size was calculated as below:

Taro Yamane's formula	Calculation	Sample size
$n=\frac{N}{1+N(e)^2}$	$n = \frac{861{,}383}{1 + 861{,}383(0.05)^2}$	$n \approx 399.81$

To ensure adequate representation across different airline categories and to account for potential incomplete responses, the final sample size was set at 420 respondents. A 'non-probability quota sampling method' was employed with quotas established for six major Thai airlines operating domestic routes to/from Chiang Mai: Thai Airways and Bangkok Airways (full-service carriers), and Nok Air, Thai AirAsia, Thai VietJet, and Thai Lion Air (low-cost carriers). Each airline was assigned 70 respondents to ensure sufficient subgroup sizes for analysis and for a balanced representation across all six Thai airlines. Understandably, this approach represents 'oversampling' of passengers for smaller carriers relative to their actual market share.

The following criteria were considered in the selection of the respondents: (1) Thai nationality, (2) age 18 years or above, (3) traveling on one of the six selected airlines, and (4) voluntary consent to participate. Passengers were excluded if they were unable to understand the questionnaire items.

2. Research Instrument

A questionnaire was used as the main tool for this research. The survey consisted of closed-ended questions designed to gather data for analysis using both descriptive and inferential statistics. The questionnaire included a 5-point Likert scale, ranging from strongly agree (= 5) to strongly disagree (= 1). The survey was conducted in two stages. In the pre-survey pilot stage, 30 participants were asked to complete the questionnaire to ensure its accuracy and viability. These participants were excluded from the main sample group in the study. The reliability of the instrument was assessed using Cronbach's coefficient alpha, which yielded a value of 0.85. A value above 0.70 indicates sufficient reliability and appropriateness for data collection (Cronbach, 1970). The next stage involved the full-scale survey conducted with 420 participants. The questionnaire contained three sections:

Part 1: 'Demographic Characteristics' comprised of 8 general questions.

Part 2: The 7P marketing mix of eco-friendly aviation services comprises 32 questions.

Part 3: The Intention to choose eco-friendly aviation services comprised of 6 questions.

The questionnaire was validated for content quality by three experts: 1. a senior employee from the airline industry, 2. an Assistant Professor in Marketing, and 3. A second Assistant Professor in Marketing. The Index of Item-Objective Congruence (IOC) of the questionnaire ranged from 0.60 to 1.00, exceeding the 0.5 referred to as appropriate for research (Rovinelli, R. J., & Hambleton, R. K., 1977).

3. Data Collection

The questionnaire was designed as such to include closed-ended questions to facilitate data collection and analysis. Before distribution, the questionnaire was reviewed and approved for any exemptions by the Institutional Review Board of Chiang Mai Rajabhat University (IRBCMRU 2025/021.06.02). Data collection was carried out during February 2025. To ensure respondents understood the concept of eco-friendly aviation services, a definition was included at the beginning of the questionnaire. Half of the participants completed the questionnaire online via a Google Form. To ensure data validity, an online pre-screen questionnaire was set up to avoid duplicate responses and to confirm that respondents had experience flying with the six Thai airlines. The questionnaire's link was distributed through Facebook groups (e.g., Travel Chiang Mai in Thai) and other social media platforms. The other half of the participants were surveyed in person at Chiang Mai International Airport. Data collection was conducted in public waiting zones, during morning, afternoon, and evening periods on both weekdays and weekends to ensure broad coverage and minimal bias.

4. Data Analysis

The researcher used SPSS version 26 for the purposes of data analysis. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to analyze demographic characteristics and general information. Inferential statistics involved linear

regression analysis, which was applied to examine how variations in the 7Ps independent variables influence consumers' intention to choose eco-friendly aviation services.

Results

1. Demographic Characteristics of Respondents

Table 1 Demographic Characteristics of Respondents

	Number (n=420)	Percentage (100.0) %
1. Gender		
Male	156	37.1
Female	249	59.3
Prefer not to say	15	3.6
2. Age		
21-30 years old	30	7.1
31-40 years old	231	55.0
41-50 years old	132	31.4
51-60 years old	25	6.0
Above 61 years old	2	0.5
3. Education Level		
Less than Bachelor's degree	10	2.4
Bachelor's degree	362	86.2
Higher than Bachelor's degree	48	13.2
4. Average Monthly Income		
below 20,000 Baht.	11	2.8
20,001 - 40,000 Baht.	58	13.8
40,001 - 60,000 Baht.	311	74.0
60,001 - 80,000 Baht	38	9.0
80,001 - 100,000 Baht.	1	0.2
100,000 Baht. and above	1	0.2
5. Flight Frequency		
Once a year	19	4.5
2 – 3 times per year	292	69.5
4 – 5 times per year	95	22.6
More than 5 times per year	14	3.4
6. Flight Type Preference		
Low-cost carriers (LCCs)	285	67.9
Full-service carriers (FSCs)	135	32.1
7. Flight Purpose		
Recreation/Leisure	325	77.4

	Number (n=420)	Percentage (100.0) %
Business / Work	45	10.7
Visiting Family/Relatives/Friends	38	9.0
Education	5	1.2
Medical Treatment or Healthcare	7	1.7
8. The person responsible for the expenses in this trip is_____.		
Own expenses	359	85.5
Family	22	5.2
Company/Organization	39	9.3

In respect to demographic characteristics of the respondents, the survey revealed that the majority were female (59.3%), aged between 31–40 years (55.0%), most held a bachelor's degree (86.2%) and had a monthly income of 40,001–60,000 Baht (74.0%). The survey also indicated that a large portion of the respondents traveled by air 2–3 times per year (69.5%) and expressed preference for low-cost airlines (67.9%). The primary purpose of travel was recreation and leisure (77.4%), and 85.5% of the traveler's paid for their own air ticket. According to these results, the sample largely represents young to middle-aged individuals with moderate to high income levels, who were price-sensitive but frequently traveled for leisure.

2. Marketing Mix Factors Pertaining to Passengers' Intentions to Choose Eco-Friendly Aviation Services.

Air passengers expressed a high level of importance regarding the marketing mix in respect to their selection of eco-friendly aviation services, with an overall mean score of 3.78. Specifically, passengers rated the importance of each 7P components as follows: Product (mean = 3.83), Price (mean = 3.83), Place (mean = 3.76), Promotion (mean = 3.86), People (mean = 3.94), Process (mean = 3.81), and Physical Evidence (mean = 3.82), all at a high level of importance (as shown in Table 2).

Table 2 Marketing Mix Factors About Passengers' Intentions to Choose Eco-Friendly Aviation Services.

Marketing Mix	Mean	S.D.	Interpretation
Product	3.83	0.347	High
Price	3.83	0.349	High
Place	3.76	0.390	High
Promotion	3.86	0.279	High
People	3.94	0.386	High
Process	3.81	0.463	High
Physical Evidence	3.82	0.386	High

Marketing Mix	Mean	S.D.	Interpretation
Total	**3.78**	**0.212**	**High**

Passengers rated all seven marketing mix factors as highly important, with 'people' and 'promotion' being the most influential. This hence suggests that service staff and effective promotion have a significant impact on people's intentions to choose eco-friendly aviation services.

3. Passengers' Intentions to Choose Eco-Friendly Aviation Services at Chiang Mai International Airport

The outcomes of the survey indicated that air passengers have a strong willingness to travel with airlines that offer eco-friendly services (mean = 3.82). They most strongly agreed with the need to select eco-friendly services to help reduce the environmental impact in Chiang Mai (mean = 4.19), followed by their willingness to pay higher fares for eco-friendly aviation services (mean = 3.83) (as shown in Table 3).

Table 3 Intention to choose eco-friendly aviation services at Chiang Mai International Airport

Intention to choose	Mean	S.D.
1. Recognizing the necessity to choose eco-friendly services to reduce environmental impact in Chiang Mai.	4.19	0.619
2. Willingness to study information about each airline's environmental policies and operations before making a decision.	3.68	0.784
3. Willingness to compare environmental policies and package pricing among different airlines before deciding.	3.63	0.683
4. Willingness to pay higher fares for eco-friendly aviation services.	3.83	0.630
5. Satisfaction from contributing to the environment by selecting eco-friendly aviation services.	3.78	0.691
6. Willingness to recommend to others and intending to use eco-friendly aviation services in the future.	3.79	0.693
Total	3.82	0.281

Air passengers showed an overall high level of intention to choose eco-friendly services at Chiang Mai International Airport (mean = 3.82). The strongest agreement was expressed regarding their recognition of the necessity to select eco-friendly services to reduce environmental impact in Chiang Mai (mean = 4.19). Overall, the results suggest that passengers

were indeed environmentally conscious and willing to support eco-friendly aviation services to reduce their environmental impact, especially when they perceived concrete and clear environmental benefits by traveling with a particular airline.

Table 4 Multiple Linear Regression Analysis: Marketing Mix Factors Predicting Intention to Choose Eco-Friendly Aviation Services (N = 420)

PREDICTOR	B	SE B	β	T	P	VIF
(CONSTANT)	1.550	0.188		8.256	< .001	
PRODUCT	0.037	0.051	.045	0.724	.469	2.322
PRICE	0.097	0.048	.121	2.018	.044*	2.132
PLACE	0.041	0.035	.057	1.159	.247	1.425
PROMOTION	0.173	0.060	.172	2.883	.004**	2.126
PEOPLE	0.078	0.032	.106	2.392	.017*	1.183
PROCESS	0.058	0.038	.095	1.526	.128	2.309
PHYSICAL EVIDENCE	0.107	0.042	.147	2.551	.011*	1.974

Note. R^2 = .311, Adjusted R^2 = .299, F (7, 412) = 26.523, p < .001. *p < .05. **p < .01.
VIF = Variance Inflation Factor (values < 10 indicate acceptable multicollinearity)

Multiple linear regression analysis was conducted to examine which marketing mix factors significantly predicted passengers' intentions to choose eco-friendly services. The overall regression model was statistically significant, F (7, 412) = 26.523, p < .001, with the seven predictors explaining 31.1% of the variance in passengers' behavioral intentions (R^2 = .311, Adjusted R^2 = .299).

While examining the individual predicting factors, it was revealed that four of the seven marketing mix factors demonstrated significant positive relationships with passengers' intentions to choose eco-friendly services, with ‘Promotion’ being the strongest significant predictor (β = .172, p = .004), followed by ‘Physical Evidence’ (β = .147, p = .011), ‘Price’ (β = .121, p = .044), and ‘People’ (β = .106, p = .017), respectively. These results indicate that passengers' intentions are strongly influenced by airlines' promotional strategies to support sustainability, where clear evidence of eco-friendly operations is present, and when competitive pricing for green services exists, and staff are knowledgeable of environmental practices.

Conversely, it appears that the other three marketing mix factors did not significantly predict passengers' intentions: ‘Product’ (β = .045, p = .469), ‘Place’ (β = .057, p = .247), and ‘Process’ (β = .095, p = .128). These results suggest that specific eco-friendly product features, distribution channels, and service processes are less influential in shaping passengers' choices, when compared to the first initial 4 factors.

Discussion

Passengers showed a high intention to choose eco-friendly aviation services. The regression analysis revealed that four of the seven marketing mix factors (Promotion, Physical Evidence, Price, and People) significantly influenced passengers' behavioral intentions toward eco-friendly aviation services, while the three factors (Product, Place, Process) showed no significant effect.

1. Promotion (β = .172)

Promotion emerged as the strongest predictor of passengers' intentions, suggesting that how airlines communicate their environmental commitment may play a crucial role in influencing passengers' choices. This finding is aligned with Mayer et al.'s (2014) observation that airlines' "green image" significantly influences passengers' perceptions, even when there are fundamental differences in their specific environmental programs. One concerning aspect of this predictor (Promotion) is the idea of 'greenwashing', where passengers respond positively to an insincere promotional message based on false claims pertaining to operational sustainability efforts to reduce environmental impacts. (Hagmann et al., 2015).

Related research has indicated that 'promotion' is an important part of marketing eco-friendly airline services. It helps airlines to share their sustainability efforts with passengers and encourages them to support these environmentally friendly projects. Airlines should therefore promote their commitment to the environment through both traditional and modern marketing strategies (Rice et al., 2020). Furthermore, airlines tend to attract environmentally conscious travelers by offering low-carbon meals and reusable products, thus enhancing the flying experience. Additionally, green loyalty programs allow passengers to convert miles into donations for environmental projects. Additionally, "cause marketing" strengthens brand image and sustainability impact through partnerships with environmental organizations, supporting initiatives, such as tree planting or wildlife conservation. Finally, educating passengers through in-flight magazines, entertainment systems, and social media raises awareness and encourages engagement in eco-friendly airline services (Lufthansa, n.d.; Hui, X., Jung, Y., & Kim, J., 2024).

In the Thai context, passengers have limited experience with actual eco-friendly aviation services, and they may rely heavily on promotional cues to form intentions. This differs from the European experience (e.g., Goding, 2016) where passengers can evaluate actual SAF programs and carbon offsetting options. The strong effect of 'promotion' in this study may therefore reflect passengers' uncertainty about what eco-friendly aviation means, making them particularly sensitive to marketing messages. As a result, Thai airlines are advised to implement this finding with caution; although promotion can play a significant role in influencing intentions, claims made, or messages in advertisements must be supported by actual environmental improvements to prevent passengers' mistrust and skepticism if expectations are not met.

2. Physical Evidence (β = .147)

'Physical evidence' emerged as the second-strongest predictor, indicating that passengers respond to clear and tangible indicators relating to environmental commitment. This finding supports Mayer et al.'s (2012) argument that "green labeling" on aircraft, eco-friendly cabin materials, and other sustainability features help passengers identify and choose environmentally responsible airlines. Additionally, 'Physical evidence' is essential in creating consumers' perceptions of an airline's willingness to support sustainability, such as aircraft design, labeling, airport operations, in-flight services, and branding strategies. Airlines are moving towards more eco-friendly planes, using hybrid-electric models and lightweight materials to reduce fuel consumption and emissions. This activity helps to improve their brand image and increases passengers' awareness of environmental efforts. Ground operations are also becoming "greener", with airports like Turin Airport in Europe switching to electric vehicles for handling baggage and for operating other equipment, while service providers like Dnata use electric machinery powered by renewable energy. In terms of on-board services, airlines provide eco-friendly meals, materials, and apply sustainable operations to attract environmentally friendly travelers. These activities further help to raise awareness among passengers (Mayer et al., 2012). In some studies, however, the 'physical evidence' is found to have a less significant impact when compared to the other elements of the marketing mix. For instance, in the study of Scoot Airlines, the 'physical evidence' was not found to have a significant effect on buying intentions (Saputri & Sari, 2019).

In practical terms, Thai Airlines should prioritize highly visible sustainability initiatives such as eco-labeled boarding passes, in-cabin recycling programs, sustainable meal packaging , and staff uniforms made from recycled materials. These allow for passengers to directly observe and evaluate sustainability efforts on behalf of the airline.

Interestingly, the study found that physical evidence had a stronger effect on passengers than the actual product features (which were not significant). This result suggests that external sustainability cues, such as green symbols, eco-friendly design, or visual messages, may be more important than the real eco-friendly functions of the service, especially when passengers do not have direct experience or enough knowledge about environmentally friendly aviation This finding supports the Elaboration Likelihood Model (Petty & Cacioppo, 1986), which explains that when people have low knowledge or low involvement, they focus more on external or surface cues (such as physical appearance or attractive presentation) rather than core product (such as technical product features).

For Thai airlines that are introducing eco-friendly services, this research suggests that investing in clear and visible sustainability symbols, for example, green logos, eco-friendly uniforms, reusable materials, or environmental messages, may create a stronger positive reaction from passengers than improvements that are not easily seen, such as fuel-saving technology or carbon offset programs.

3. Price (β = . 121)

'Price' was identified as a significant predictor of passengers' intentions to choose eco-friendly aviation services. Although most respondents in this study expressed a preference for low-cost carriers (67.9%), they expressed their willingness to pay higher fares for sustainable services (mean = 3.83). A mean score of 3.83 indicates a 'general agreement' but does not represent a strong willingness. This is rather a 'stated intention' and not an actual purchasing decision. Individuals' intent tends to be influenced by 'hypothetical biases', where they overstate their willingness to pay when no real financial commitment is required (Carson & Groves, 2007).

In the Thai context, where eco-friendly aviation services are still conceptual, passengers' willingness to pay more likely represents a positive environmental attitude rather than confirmed purchasing behavior. This aligns with the Theory of Planned Behavior (Ajzen, 1991), which suggests that positive attitudes toward sustainability increase willingness to pay higher fares. Similar patterns have been observed in European studies, such as Goding (2016) found that Swedish consumers are open to paying more for flights using sustainable aviation fuel (SAF), suggesting that green airlines may need to set higher prices to cover costs. Dynamic pricing thus plays a key role in airline pricing strategies, where fares are adjusted based on demand, seat availability, and competition. Business travelers tend to pay higher fares, while leisure travelers seek lower prices. A recent approach to promoting eco-friendly travel is "Green Fare", which includes carbon offsetting through sustainable aviation fuel (SAF) and other environmental projects, along with offered benefits such as extra miles and reward points, and free rebooking privileges (Aviation Business Consultants, 2010). However, these results imply that, while passengers conceptually accept higher prices for green airlines, their real decisions may differ once actual price differences become apparent. Previous research supports the importance of price sensitivity in airline consumers' behaviors. Abdelhady et al. (2018) found that price plays a crucial role in passengers' decision-making, particularly among low-cost carrier customers. Other studies suggest that environmental awareness and demographic characteristics influence willingness to pay for green services, consistent with Kotler et al. (2021) on consumer decision-making. For instance, Hui et al. (2024) found that environmentally conscious travelers are more likely to pay premium fares, and Hinnen et al. (2017) observed that younger passengers show greater willingness to pay for sustainable flights. In this study, 55% of respondents, aged 31–40, expressed their willingness to pay more for eco-friendly services, consistent with these findings.

For Thai Airlines, this result presents the need for 'balanced' pricing strategies that align environmental goals with consumers' expectations. For instance, introducing "Green Fare" options, where small visible surcharges for SAF contributions or carbon offset programs are added to the fare, could encourage voluntary participation without creating price resistance. Airlines may also consider 'differentiated pricing', where environmentally conscious or higher-income travelers are targeted with premium options, while leisure travelers are offered bundled promotions or loyalty incentives. These findings suggest that airlines could create pricing strategies according to their target consumers' environmental concerns.

4. People (β = .106)

The ‘People’ factor emerged as a significant predictor of passengers’ intentions to choose eco-friendly services, emphasizing the crucial role of employees in designing perceptions of sustainability. This component includes flight attendants, ground staff, and customer service representatives whose attitudes and behaviors directly influence passengers’ experiences and trust in the airline. This finding aligns with Sagittarius Agency's (2024) proposal, stating that the ‘people’ component can have a significant impact on customers’ satisfaction and loyalty. Employee engagement is essential for building a culture of sustainability within airlines, as it enhances commitment to environmental goals and empowers staff to reduce the airline's overall footprint. Sustainability training programs help employees to understand the importance of eco-friendly practices and their role in achieving organizational objectives (International Air Transport Association, 2024). In addition, environmentally conscious staff members can generate awareness among customers and travelers by elaborating on the airline's green operations to build trust and loyalty, while improving overall customers’ experience. This finding suggests that Thai airlines, which intend to develop sustainable aviation programs, should invest in staff engagement, sustainability training, and communication skills to ensure that people become a credible link between airlines’ environmental commitments and passengers’ perceptions.

Why are Product, Place, and Process not significant factors?

Firstly, if eco-friendly ‘Products’ (SAF, carbon offsets, emission reductions, hybrid-electric aircraft, etc.) represent the core substance of sustainable aviation, why didn’t the passengers' intentions respond to these substantive elements? In respect to the ‘Product’ component, one explanation could relate to terminology. Terms such as 'sustainable aviation fuel’, carbon offsetting’, and ‘hybrid-electric aircraft’ could be too technical or abstract for most travelers. If passengers cannot comprehend these products’ features, they cannot form any preferences. Moreover, as Barbosa (2024) notes, SAF currently accounts for only about 0.1% of global aviation fuel demand, making it a largely conceptual rather than experienced product. A second explanation relates to the hypothetical context of this study. Since eco-friendly services are not yet operational in Thailand, participants based their responses on ‘imagined scenarios’ rather than real experiences. Thus, airlines ought to educate passengers extensively at first, even before intending to influence their choices and behaviors. Once passengers have direct experience with sustainable flights, ‘Product’ features could play a stronger role in influencing their behavioral intentions.

The second and third non-significant factors, ‘Place’ (distribution, accessibility, convenience) and ‘Process’ (service delivery, booking, offset participation) are less tangible and emotionally significant to passengers, when compared to ‘direct’ promotional messages or visible environmental actions. This suggests that passengers recognize and respond more strongly to sustainability efforts that directly affect their behavioral intentions rather than those intangible or emotionally neutral elements. (Tandamrong & Laphet, 2025).

In the case of this study, the ‘R-squared’ value of 0.311 indicates that 31.1% of consumers’ purchasing decisions for eco-friendly airline services are influenced by the 7P variations. This suggests that the 7P variables have a measurable, yet not significant, impact on consumer choices. On the other hand, the remaining 68.9% is influenced by other factors

not examined in this study. This highlights the complexity of consumers' decision-making in the airline industry and suggests that additional factors, such as personal values, environmental awareness, and external influences, may also play significant roles (Saputri & Sari, 2019).

New Knowledge from the Research

This study contributes to both theoretical understanding and practical application of sustainable aviation marketing in three significant ways:

1. Theoretical Contribution

This research reveals that, when consumers evaluate hypothetical eco-friendly services, which they have not yet experienced, the marketing cues (Promotion, Physical Evidence, Price, and People) display a significantly stronger influence on their behavioral intentions compared to core product attributes. This finding extends the 'Elaboration Likelihood Model' (Petty & Cacioppo, 1986) to the sustainable aviation context and suggests that the hierarchy of marketing mix importance differs between 'established' versus 'emerging' service categories. For Thai Airlines, this implies that initial eco-friendly service launches should emphasize visible, tangible sustainability signals rather than technical operational details that passengers cannot directly observe or evaluate.

2. Contextual Contribution

This study provides the first empirical evidence of Thai domestic passengers' environmental behavioral intentions regarding aviation, filling a significant gap in the sustainable tourism and aviation literature, which mainly focuses on Western contexts. The findings demonstrate that Thai passengers traveling through Chiang Mai, a region experiencing severe seasonal air pollution, show high environmental awareness (mean = 4.19 for recognizing the necessity to choose eco-friendly airlines) and moderate willingness to pay premium fares (mean = 3.83). This contradicts the assumption that environmental concerns are primarily a Western consumer phenomenon and suggests significant market potential for eco-friendly aviation services in Thailand, if appropriately marketed.

3. Practical Contribution

The 4Ps Prioritization Framework for Eco-Friendly Aviation Services Implementation

Figure 3 The 4Ps marketing mix in a sustainability-oriented aviation model

Based on the empirical findings, this study proposes a prioritized 4Ps framework for Thai airlines' development of eco-friendly services:

1.) Price Strategy: Develop transparent tiered pricing (standard vs. eco-fare) with clear communication of where 'green premiums' go (SAF surcharges, carbon offset programs).

2.) Promotion Strategy: Create multi-channel sustainability communication emphasizing local environmental benefits (reducing Chiang Mai PM2.5); utilize social media campaigns with environmental ambassadors; implement green loyalty programs.

3.) People Strategy: Train all customer-facing staff on environmental initiatives, appoint sustainability champions, and ensure staff can articulate the airline's environmental commitments to passengers.

4.) Physical Evidence Strategy: Implement visible cabin-level sustainability features (recyclable meal packaging, sustainable amenity kits, visible recycling bins), use eco-labeling on boarding passes and aircraft exteriors, and design green-themed service areas in airports.

This framework shows 4 key factors that guide sustainable airline decisions, provides a practical starting point for airlines with limited sustainability budgets, and can be broadly applied to tourism and hospitality services.

Conclusion

This research examined how the 7Ps of service marketing mix influence Thai passengers' behavioral intentions to choose eco-friendly services at Chiang Mai International Airport. Using quantitative methods with 420 respondents across six major Thai airlines, passengers showed a high willingness to choose eco-friendly aviation services. The study revealed that four marketing mix factors, 'Promotion', 'Physical Evidence', 'Price', and 'People', significantly predict passengers' intentions to choose eco-friendly services, while 'Product', 'Place', and 'Process' factors showed no significant effect. These findings suggest that when eco-friendly aviation services are hypothetical rather than experientially known,

passengers rely more heavily on promotional communication and tangible sustainability signals than on core product features.

This study offers key contributions to the field: theoretically, it extends the 'Elaboration Likelihood Model' to sustainable service marketing; contextually, it provides first evidence of Thai passengers' environmental intentions in aviation; and practically, it offers a prioritized 4Ps framework for Thai airlines' initial eco-friendly service development. However, several important limitations must be acknowledged. First, this study measured behavioral intentions rather than actual behavior. The well-documented "attitude-behavior gap" in environmental research (Kollmuss & Agyeman, 2002) suggests that stated intentions often overestimate actual pro-environmental behaviors, particularly when these behaviors involve personal costs (higher fares, less convenient schedules). Future research should examine actual purchasing behavior once eco-friendly aviation options become available in Thailand.

Second, the moderate explanatory power of our model ($R^2 = 0.311$) indicates that 69% of the variance in passengers' intentions remains unexplained by marketing mix factors. Future research should incorporate additional predictors from the 'Theory of Planned Behavior' (environmental attitudes, subjective norms, perceived behavioral control) and examine demographic moderators.

Third, the use of a cross-sectional design limits the ability to make causal conclusions. Although regression analysis identified significant factors, it cannot prove that these factors directly cause the outcomes. Future studies using experimental designs, where marketing mix elements are changed or controlled, would give stronger and clearer evidence of causal effects.

Despite these limitations, the findings offer actionable guidance for Thai airlines considering eco-friendly service development and contribute to the broader understanding of sustainable aviation marketing in emerging market contexts where environmental services remain underdeveloped.

Recommendations

Based on the empirical findings, specific recommendations are proposed for three stakeholder groups:

1. For Thai Airlines

Airlines could consider the following strategies: adding carbon offsetting surcharges to fare prices based on consumers' willingness to pay (Price); emphasizing eco-awareness communications (Promotion); encouraging staff to adopt more environmentally conscious behaviors (People); and including sustainable Infrastructure design (Physical Evidence). These improvements would present a more innovative conceptual model for sustainable airline branding and could be applied to broader tourism and hospitality services.

1.1) Eco-friendly services should be introduced progressively in stages: Airlines should avoid comprehensive transformational changes toward sustainability; instead, they should focus on the four significant marketing mix factors, starting with 'Promotion' by developing clear sustainability communication campaigns. This should be followed by visible

'Physical Evidence' improvements (sustainable cabin materials, visible recycling programs), staff training (People factor), and clear eco-pricing (Price factor).

1.2) Develop Transparent Eco-Fare Pricing: Airlines should introduce optional "green fares" with clear itemized surcharges. For instance: "Standard Fare: 2,500 THB + Optional Green Supplement: 250 THB (includes 20% SAF blend, 100kg carbon offset)." Price transparency is crucial for maintaining passengers' trust.

1.3) Create Route-Specific Green Options: Airlines should launch eco-friendly services on high-visibility routes first, particularly flights to/from Chiang Mai during the PM2.5 season (February-April), when environmental awareness peaks. Market these as "Clean Air Flights" to directly address local environmental concerns.

1.4) Establish Green Loyalty Programs: Convert traditional frequent flyer points into carbon offset contributions, offer bonus miles for choosing eco-fares, and partner with environmental organizations for member benefits.

2. For Chiang Mai International Airport Authority

2.1) Develop Green Aviation Infrastructure: The Airport Authority should invest in electric ground support equipment, sustainable aviation fuel storage facilities, and dedicated "green gates" with enhanced environmental features (solar power, visible recycling stations).

2.2) Create Passenger Education Campaigns: The Airport Authority should install interactive displays explaining aviation environmental impacts and sustainable solutions, particularly during high PM2.5 months, when passengers are exposed to the elements in the air.

3. For Government/Policy Makers

3.1) Provide Regulatory Incentives: The authorities should offer reduced airport fees, tax incentives, or landing fee discounts for airlines operating eco-friendly services, particularly on domestic routes where the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) doesn't apply.

3.2) Requirement for Sustainability Reporting: The authorities should require Thai Airlines to publicly report domestic route emissions data, creating transparency that enables passengers' choices.

3.3 Support SAF Development: The authorities should invest in domestic sustainable aviation fuel production capacity to reduce costs and increase availability for Thai airlines.

Furthermore, the government might take this situation to position eco-friendly aviation services as contributors in promoting sustainable tourism.

Recommendations for future research

Future research should investigate actual purchasing behavior once eco-friendly services are implemented in Thailand, and qualitative methods can help provide in-depth insight into the attitude–behavior gap and the reasons behind passengers' decisions.

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