
“PASSENGER PERCEPTIONS AND SATISFACTION ON GREEN PRACTICES AND SUSTAINABLE INITIATIVES AT COCHIN INTERNATIONAL AIRPORT”

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ABSTRACT

Sustainability has become an essential focus within the aviation sector, prompting airports to integrate environmentally responsible practices into their operations. This study examines passenger perceptions and satisfaction regarding green practices and sustainable initiatives implemented at Cochin International Airport. The research aims to assess passengers' awareness of sustainability measures, identify key factors influencing airport selection, evaluate satisfaction levels, and explore opportunities for enhancing sustainable practices. Primary data were gathered through a structured questionnaire administered to passengers and analysed using statistical techniques such as descriptive analysis, percentage analysis, Chi-square test, and Kruskal–Wallis test. The findings reveal that passengers exhibit a favourable perception of sustainability initiatives, including solar power utilization, digital and paperless services, electric mobility options, and water conservation efforts. While these initiatives are generally well acknowledged and appreciated, the study highlights the need for further improvements in infrastructure, service efficiency, and communication strategies to strengthen passenger satisfaction. Overall, the study underscores the importance of continuous enhancement in sustainable practices to support effective and environmentally responsible airport management.

KEYWORDS: Sustainability, Green Airport, Passenger Perception, Environmental Practices, Cochin International Airport.

INTRODUCTION

The aviation sector plays a significant role in global economic development by facilitating international connectivity, tourism, and trade. However, the rapid growth of air transportation has also raised concerns regarding environmental sustainability, including carbon emissions, energy consumption, and waste generation. As a result, airports around the world have begun implementing sustainable practices to reduce their environmental impact and promote responsible operations.

Sustainable airport development focuses on balancing environmental protection, economic efficiency, and social responsibility. Airports are increasingly adopting green technologies such as renewable energy systems, energy-efficient infrastructure, waste management programs, and sustainable transportation solutions. These initiatives aim to minimize environmental damage while improving operational efficiency and passenger experience.

One of the most notable examples of sustainable airport development is Cochin International Airport Limited located in Kerala, India. The airport has gained international recognition as the world's first fully solar-powered airport. Through extensive solar power generation, green infrastructure, and environmentally responsible operations, the airport has established itself as a leader in sustainable aviation practices.

Despite the implementation of various sustainability initiatives, the success of such programs largely depends on passenger awareness and perception. Passengers play an important role in supporting environmentally responsible practices, and their attitudes toward sustainability initiatives can influence airport reputation, passenger satisfaction, and long-term sustainability goals.

Understanding passenger awareness and perception is therefore essential for evaluating the effectiveness of sustainability initiatives. Airports must ensure that their green practices are not only implemented but also communicated effectively to passengers. Increased awareness can lead to greater appreciation of sustainability efforts and encourage environmentally responsible behaviour among travellers.

This study focuses on analysing passengers' perceptions of sustainability initiatives implemented at Cochin International Airport. The research aims to assess the level of passenger awareness, identify factors influencing airport choice, examine passenger satisfaction with sustainability initiatives, and explore potential improvements that could enhance the airport's sustainability performance.

OBJECTIVES OF THE STUDY

To examine passengers' perceptions and satisfaction regarding sustainability initiatives at Cochin International airport, with a particular focus on green practices such as solar energy utilization, net-zero energy operations, energy efficiency measures, green transportation and electric vehicle practices.

STATEMENT OF THE PROBLEM

The aviation industry has experienced rapid growth over the past few decades, resulting in increased environmental challenges such as higher carbon emissions, energy consumption, and waste generation. Airports, as major components of the aviation sector, are under increasing pressure to adopt environmentally sustainable practices that minimize ecological impacts while maintaining operational efficiency. In response to these challenges, many airports across the world have begun implementing green initiatives such as renewable energy usage, energy-efficient infrastructure, waste management systems, and eco-friendly transportation facilities.

Among these airports, Cochin International Airport Limited has gained global recognition for its commitment to sustainability. The airport is widely known for its solar power generation system and other environmentally responsible practices, which aim to reduce dependence on conventional energy sources and promote sustainable airport operations. These initiatives include solar farms, water conservation systems, green infrastructure, paperless services, and electric vehicle charging facilities.

Although these sustainability initiatives have been implemented successfully at the operational level, the effectiveness of such initiatives also depends on the awareness, perception, and support of passengers using the airport. Passengers play a significant role in the success of sustainability programs, as their attitudes and behaviours can influence the overall impact of environmentally responsible practices.

However, despite the growing importance of sustainability in the aviation sector, limited research has been conducted to understand how passengers perceive and respond to sustainability initiatives implemented at airports. In particular, there is a lack of empirical studies examining the level of passenger awareness, perception, and satisfaction regarding green practices at Cochin International Airport.

Therefore, it is important to analyse how passengers perceive the airport's environmental practices, and whether these initiatives influence their overall satisfaction with the airport.

RESEARCH METHODOLOGY

The present study adopts a descriptive research design to analyse passengers' perceptions and satisfaction towards sustainability initiatives and green practices at cochin international airport. Primary data were collected using a structured questionnaire administered through Google Forms. A total of 159 valid responses were obtained from passengers and considered for the analysis. The questionnaire included items related to awareness, perception, and satisfaction regarding various green practices implemented at the airport. The collected data were systematically analysed using the Statistical Package for the Social Sciences (SPSS). Appropriate statistical tools such as descriptive statistics, percentage analysis, Chi-square test, and Kruskal–Wallis test were applied to interpret the data and derive meaningful findings. The sampling method adopted for the study was convenience sampling, considering the accessibility of respondents.

DEMOGRAPHIC PROFILE OF THE PASSENGERS

Table 1 Frequency of Air Travel of Respondents.

Frequency of Air Travel	Frequency	Percentage
Daily	5	3.1
Fortnightly	8	5.0
Quarterly	37	23.3
Annually	109	68.6
Total	159	100

Source: Primary Data

The table 1 shows the distribution of respondents based on the frequency of their air travel. It is observed that the majority of respondents, **68.6 percentage, travel annually, 23.3 percentage travel quarterly, while only a small proportion travel daily 3.1 percentage or fortnightly 5.0 percentage.** This indicates that **annual travel is the most common pattern** among the participants, suggesting limited but regular engagement with air travel.

Table 2 Frequent Usage of CIAL by Respondents.

Frequency of Usage	Frequency	Percentage
Frequently	25	15.7
Occasionally	75	47.2
Rarely	59	37.1
Total	159	100

Source: Primary data

The table 2 shows the distribution of respondents based on their frequency of using CIAL. It

is observed that **47.2 percentage of the respondents use the airport occasionally, 37.1 percentage use it rarely, and only 15.7 percentage use it frequently.** This indicates that a **majority of respondents are occasional or infrequent users of the airport,** while a smaller proportion rely on it regularly.

Table 3 Preferred Airport of Respondents.

Response	Frequency	Percent(%)
Yes	132	82.5
No	27	16.9
Missing	1	0.6
Total	160	100

Source: Primary Data

The table 3 shows the preference of respondents regarding the airport. Out of the total **160 respondents, 132 respondents 83 percentage** indicated that they prefer the airport, showing a strong positive preference among the majority of the sample population. On the other hand, **27 respondents 17 percentage** stated that they do not prefer the airport. Only **one response was missing 0.6 percentage.** This indicates that the airport is **widely preferred by most respondents,** suggesting a favorable perception and acceptance among the users.

Table 4 Purpose of Travel of Respondents.

Purpose of Travel	Frequency	Percentage
Business	5	3.1
Education	17	10.7
Tourism	78	49.1
Visiting Friends/Family	55	34.6
Medical	4	2.5
Total	159	100

Source: Primary Data

The table 4 shows that majority of respondents travel for **tourism,** accounting for 49.1 percentage of the total. Traveling to **visit friends or family** is the second most common purpose at 34.6 percentage. Travel for **education** constitutes 10.7 percentage, while **business** and **medical** purposes are minimal at 3.1 percentage and 2.5 percentage, respectively. This indicates that leisure and social reasons are the primary motivations for travel among the respondents.

ASSOCIATION BETWEEN SUSTAINABILITY AWARENESS AND TRAVEL BEHAVIOUR

Table 5 Purpose of Travel And Sustainability Awareness.

Variable	p-value	Result
Solar awareness	0.775	Not significant
Net-zero energy building awareness	0.371	Not significant
Green transportation awareness	0.311	Not significant
Waste recycling awareness	0.685	Not significant
Carbon awareness	0.351	Not significant
Photovoltaic agriculture	0.008	Significant
Energy efficiency	0.057	Not significant
Sustainable passenger services	0.377	Not significant
Biodiversity awareness	0.851	Not significant

Source : PSPP Output

Hypothesis:

Null Hypothesis (H₀):

There is no significant association between the purpose of travel and sustainability awareness among respondents.

Alternative Hypothesis (H₁):

There is a significant association between the purpose of travel and sustainability awareness among respondents.

The Pearson Chi-Square value (11.55) has a **p-value of 0.775**, which is greater than 0.05, indicating no statistically significant relationship between the variables. Hence, **the null hypothesis is accepted**, and the alternative hypothesis is rejected. The Likelihood Ratio ($p = 0.601$) and Linear-by-Linear Association ($p = 0.548$) further support this finding. Overall, the results suggest **that passengers' perceptions or awareness of sustainability initiatives do not significantly differ across groups**, indicating a uniform pattern.

Table 6 Travel Frequency And Sustainability Awareness.

Variable	p-value	Result
Solar awareness	0.982	Not significant
Net-zero building awareness	0.362	Not significant
Green transportation awareness	0.162	Not significant
Waste recycling awareness	0.203	Not significant
Carbon awareness	0.072	Not significant
Photovoltaic agriculture	0.937	Not significant
Energy efficiency	0.036	Significant
Sustainable passenger services	0.718	Not significant
Biodiversity awareness	0.796	Not significant

Source : PSPP Output

Hypotheses:

Null Hypothesis (H₀):

There is no significant association between travel frequency and awareness of sustainability initiatives at Cochin International Airport Limited.

Alternative Hypothesis (H₁):

There is a significant association between travel frequency and awareness of sustainability initiatives at Cochin International Airport Limited.

The Chi-square test results show that most variables (**solar awareness, net-zero buildings, green transportation, waste recycling, carbon awareness, photovoltaic agriculture, sustainable services, and biodiversity**) have p-values greater than 0.05, indicating no significant association. Hence, the null hypothesis is accepted for these variables. However, **energy efficiency (p = 0.036 < 0.05)** shows a significant association, leading to rejection of the null hypothesis for this factor. Overall, awareness of sustainability initiatives does not vary with travel frequency, except in the case of energy efficiency. In terms of awareness levels across specific initiatives, passengers are relatively more aware of solar energy initiatives and energy efficiency measures, as these are highly visible and widely communicated sustainability practices at the airport. On the other hand, passengers show lower awareness of photovoltaic agriculture, net-zero building infrastructure, biodiversity conservation efforts, and carbon management initiatives, which are comparatively technical and less aware.

Table 7 Satisfaction of the respondents across occupational groups.

Occupation	N	Mean Rank
Employed	80	87.68
Student	66	70.58
Business	13	80.58
Total	159	

Source: PSPP Output

Hypothesis:

Null Hypothesis (H₀):

There is **no significant difference** in passenger satisfaction levels among different occupational groups (Employed, Student, and Business) at Cochin International Airport Limited.

Alternative Hypothesis (H₁):

There is a **significant difference** in passenger satisfaction levels among different occupational groups (Employed, Student, and Business).

The Kruskal–Wallis test result shows that mean ranks indicate **employed respondents (87.68) report higher satisfaction** compared to **business (80.58) and students (70.58)**, the test result (**Chi-Square = 5.53, p = 0.063 > 0.05**) shows **no statistically significant difference**. Hence, **the null hypothesis (H₀) is accepted** and the alternative hypothesis (H₁) is rejected. Overall, variations in satisfaction exist but are not statistically significant.

FINDINGS

The study found that the majority of respondents travel by air annually, indicating limited but regular usage of air transport. Most respondents use Cochin International Airport occasionally or rarely, while only a small proportion are frequent users. A significant majority of respondents prefer the airport, reflecting a positive overall perception.

Tourism and visiting friends or family were identified as the primary purposes of travel among respondents. The analysis revealed that there is no significant association between the purpose of travel and awareness of most sustainability initiatives, except for photovoltaic agriculture, which showed a significant relationship.

Similarly, travel frequency was not found to significantly influence awareness of sustainability initiatives, except in the case of energy efficiency, which showed a significant association. The results also indicated that occupation has a partial influence on sustainability awareness, significantly affecting certain aspects such as net-zero energy buildings, green transportation, waste recycling, and carbon awareness.

However, no significant relationship was found between occupation and other sustainability aspects such as solar energy, photovoltaic agriculture, energy efficiency, sustainable passenger services, and biodiversity awareness. In terms of satisfaction, employed respondents reported relatively higher satisfaction levels compared to students and business respondents.

Despite these differences, the variation in satisfaction levels across occupational groups was not statistically significant. Overall, the study concludes that passengers exhibit a positive perception and consistent level of awareness and satisfaction towards sustainability

initiatives, with only minor variations across different groups.

RECOMMENDATIONS

It is recommended that the airport strengthen its communication strategies to improve passenger awareness of sustainability initiatives, particularly those that are less visible. Enhancing green transportation facilities, including better accessibility to electric vehicle services, can encourage eco-friendly travel choices. The airport should also focus on improving infrastructure and operational efficiency to provide a better passenger experience. Conducting targeted awareness programs for different passenger groups can help reduce gaps in understanding. Additionally, continuous monitoring, feedback collection, and adoption of advanced sustainable technologies will further enhance passenger perception, satisfaction, and overall environmental performance.

Furthermore, the airport can introduce more interactive and engaging initiatives, such as awareness campaigns, digital displays, and real-time information systems to highlight its sustainability efforts. Encouraging passenger participation through eco-friendly programs and incentives can also enhance their involvement and perception. Strengthening collaborations with stakeholders and continuously upgrading sustainable practices will help the airport maintain its position as a leader in green airport operations while ensuring long-term environmental and operational benefits.

CONCLUSION

The study concludes that passengers at Cochin International Airport generally exhibit a positive perception and satisfactory response towards the sustainability initiatives implemented at the airport. The findings indicate that even though a majority of respondents are infrequent travelers, they demonstrate a favourable perception, awareness, and appreciation of green practices such as solar energy, green transportation, and waste management systems.

The analysis further reveals that factors such as purpose of travel and travel frequency do not significantly influence passengers' perception and awareness of sustainability initiatives, with only a few exceptions like photovoltaic agriculture and energy efficiency. Although occupation has some influence on specific aspects of awareness, overall variations in perception across different groups remain limited.

In terms of satisfaction, passengers report a consistent level of satisfaction with the sustainable initiatives, and no significant differences are observed across occupational groups. This suggests that both perception and satisfaction towards sustainability practices are relatively uniform among passengers.

Overall, the study highlights that Cochin International Airport has successfully positioned itself as a model for sustainable airport operations, with passengers recognizing and positively perceiving its environmental efforts. However, there is scope for improvement in enhancing awareness, communication, and infrastructure to further strengthen passenger perception and satisfaction. Continuous improvement in sustainability initiatives will contribute to better environmental performance and an enhanced passenger experience.

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