Operational Factors Influencing Passenger Satisfaction at CAAP-Managed Airports

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ABSTRACT

Passenger satisfaction has become a critical performance indicator in airport management, particularly in government-operated airports striving to meet global standards of safety, sustainability, and service excellence. This study examined operational factors influencing passenger satisfaction at Civil Aviation Authority of the Philippines (CAAP)–managed commercial airports, focusing on three key dimensions: security measures, environmental sustainability, and service quality. Using a quantitative descriptive–correlational research design, data were collected from 385 passengers across the five busiest CAAP-managed airports in the Philippines: Davao International Airport, Iloilo International Airport, Laguindingan Airport, Bohol-Panglao Airport, and Bacolod-Silay Airport. Descriptive statistics were used to determine the levels of the operational variables, while Pearson product–moment correlation and multiple regression analysis were applied to examine the relationships between operational factors and passenger satisfaction. Results indicated that passengers perceived high levels of security measures, environmental sustainability initiatives, and service quality across the airports studied. Correlation analysis revealed significant positive relationships between passenger satisfaction and all three operational factors. Among these variables, service quality demonstrated the strongest association with passenger satisfaction, followed by environmental sustainability and security measures. These findings highlight the importance of strengthening frontline service delivery, maintaining efficient security procedures, and advancing sustainability initiatives to enhance passenger experience in government-operated airports. The study contributes empirical evidence that may guide operational improvements, policy development, and strategic planning for CAAP-managed airports and other public aviation systems seeking to improve passenger-centered service performance.

Keywords: passenger satisfaction, airport service quality, airport security, environmental sustainability, airport management, CAAP airports, aviation service performance

INTRODUCTION

Airports today are not only transportation hubs but also service environments where passengers evaluate performance based on safety, comfort, efficiency, and overall experience. Recent industry reports indicate that travelers increasingly expect strong security, better service, and greater attention to well-being and sustainability (International Air Transport Association [IATA], 2024; Airports Council International [ACI], 2024). For airport managers, passenger satisfaction is now a key indicator of operational success.

Passenger satisfaction is strongly linked to service quality, particularly the condition of facilities, staff responsiveness, and reliable service delivery, consistent with the SERVQUAL framework (Parasuraman et al., 1988). Studies confirm that higher airport service quality improves satisfaction, airport image, and even passengers' airport and destination choices (Adeniran & Fadare, 2018; Halpern & Mwesiumo, 2021; Prentice & Kadan, 2019; Usman et al., 2023). Similar findings have been reported in the Philippine context, where better airport services and infrastructure were associated with higher passenger satisfaction (Roxas & Ylagan, 2025).

Security is another essential operational factor that shapes satisfaction. Passengers are more satisfied when screening is efficient, personnel are competent, and safety procedures are implemented without causing unnecessary delays (Gkritza et al., 2006; Sakano et al., 2016). Research also shows that security service

performance and personnel competence significantly influence passengers' confidence and overall airport experience (Güreş et al., 2017; Billa & Dewantari, 2023; Majid et al., 2022; Sariva et al., 2024).

Environmental sustainability is increasingly important to passengers. Green airport practices – such as energy efficiency, waste management, and eco-design – can enhance passenger perceptions, well-being, and satisfaction (Greer et al., 2020; Raimundo et al., 2023; Han et al., 2020; Abdel-Gayed et al., 2023; Wibowo et al., 2022). Studies also show that sustainable energy and waste management strategies strengthen airport operations and improve the passenger experience (Baxter, 2022, 2023).

In the Philippines, CAAP-managed airports continue modernization efforts, yet local evidence remains limited on how security, sustainability, and service quality jointly influence passenger satisfaction (Francisco & Lim, 2022; Rodolfo, 2024). Guided by the Theory of Constraints, which emphasizes identifying key operational bottlenecks (Goldratt, 1984), this study examines how these factors relate to passenger satisfaction in CAAP-managed airports and provides evidence to guide operational and policy improvements.

THEORETICAL AND CONCEPTUAL FRAMEWORK

This study is grounded in the Theory of Constraints (TOC) and SERVQUAL to explain how operational performance shapes passenger satisfaction in CAAP-managed airports. TOC treats airport operations as an interdependent system in which overall performance is constrained by the most critical bottleneck; thus, improving passenger satisfaction requires identifying and strengthening the operational constraint rather than improving isolated areas (Goldratt, 1984). Complementing this, SERVQUAL explains how passengers judge service quality through tangibles, responsiveness, and reliability, which strongly shape satisfaction and airport image (Parasuraman et al., 1988; Adeniran & Fadare, 2018; Halpern & Mwesiumo, 2021). Guided by these theories, the study positions security measures (screening efficiency, personnel competence, emergency preparedness) as an operational domain that affects perceived safety and satisfaction (Gkritza et al., 2006; Sakano et al., 2016; Majid et al., 2022), and environmental sustainability (energy efficiency, waste management, green infrastructure) as a growing determinant of passenger perceptions, well-being, and experience evaluation (Greer et al., 2020; Han et al., 2020; Abdel-Gayed et al., 2023; Baxter, 2022). In this framework, security measures, environmental sustainability, and service quality are treated as key operational factors expected to influence passenger satisfaction, as reflected in passengers' overall experience, perceived value, and willingness to return or recommend, consistent with prior airport satisfaction research emphasizing the predictive value of operational service performance and customer outcomes (Bakır et al., 2022; Robertson et al., 2023).

Statement of the Problem

This study examined the operational factors influencing passenger satisfaction at CAAP-managed commercial airports. It focused on assessing security measures, environmental sustainability initiatives, and service quality, as well as evaluating passenger satisfaction in government-operated airports.

Specifically, the study determined the levels of (1) security measures, including screening efficiency, personnel competence, and emergency preparedness; (2) environmental sustainability, including energy efficiency, waste management, and green infrastructure; (3) service quality, including tangibles, responsiveness, and reliability; and (4) passenger satisfaction, including overall experience, perceived value, and willingness to return or recommend. Furthermore, it examined (5) whether a significant relationship exists between passenger satisfaction and the operational factors of security measures, environmental sustainability, and service quality.

Significance of the Study

This study provides empirical evidence on how security measures, environmental sustainability, and service quality affect passenger satisfaction at CAAP-managed airports. The findings offer a practical basis for strengthening operational performance and enhancing the passenger experience in government-operated airport systems.

For the Civil Aviation Authority of the Philippines (CAAP), the results provide data-driven insights to support policy refinement, performance monitoring, and resource prioritization. For airport authorities and management offices, the study serves as a guide to improving screening efficiency, personnel competence, sustainability initiatives, and frontline service delivery. Aviation stakeholders, including airlines and service providers, may use the findings to enhance operational coordination and service reliability. The flying public may benefit from improved safety, service standards, and environmental practices resulting from evidence-based operational enhancements. Finally, the study provides a conceptual and empirical reference for future researchers examining operational performance and passenger satisfaction in airport settings, particularly within government-managed aviation systems.

Scope and Delimitation of the Study

This study investigated the operational factors that influence passenger satisfaction at selected CAAP-managed commercial airports. It focused on three operational domains – security measures (screening efficiency, personnel competence, emergency preparedness), environmental sustainability (energy efficiency, waste management, green infrastructure), and service quality (tangibles, responsiveness, reliability) – and examined their relationships with passenger satisfaction, as measured by overall experience, perceived value, and willingness to return or recommend. Data were collected from passengers at the top five CAAP-managed airports using a quantitative research design.

The study focused on passengers' perceptions and did not include objective operational data such as processing time, energy use, or financial performance indicators. It covered only CAAP-managed airports and excluded privately operated or international hub airports. Therefore, the findings are interpreted in the context of government-operated airports in the Philippines.

REVIEW OF RELATED LITERATURE

Security Measures

Airport security influences how safe and comfortable passengers feel. Studies show that passengers are more satisfied when security screening is efficient and does not cause unnecessary delays (Gkritza et al., 2006; Sakano et al., 2016). Research also indicates that security outcomes improve when processes are well managed and queues are controlled (Skorupski & Uchroński, 2016; Naji et al., 2020). In addition, passengers value competent and professional security personnel, which increases trust and satisfaction (Güreş et al., 2017; Faoziah, 2022). Emergency preparedness is also important because clear response plans and readiness improve passenger confidence in airport safety (Price & Forrest, 2016a, 2016b; Stambaugh et al., 2009).

Environmental Sustainability

Sustainability is now integral to airport performance and can influence passenger perceptions. Airports that implement energy-saving programs and sustainable energy management improve environmental performance (Ortega Alba & Manana, 2016; Baxter et al., 2018a; Baxter, 2023). Effective waste management strategies, such as recycling and proper segregation, support green airport goals and reduce environmental impact (Baxter, 2022; Sebastian & Louis, 2021; Sangnok et al., 2023). Green infrastructure and eco-design also matter because they improve environmental outcomes and enhance passenger well-being and experience (Shi et al., 2015; Monteiro et al., 2020; Han et al., 2020; Abdel-Gayed et al., 2023).

Service Quality

Service quality is consistently linked to passenger satisfaction. SERVQUAL identifies tangible facilities, staff responsiveness, and service reliability as key dimensions through which passengers evaluate airport service (Parasuraman et al., 1988). Studies confirm that higher service quality leads to greater satisfaction among airport passengers (Adeniran & Fadare, 2018; Halpern & Mwesiumo, 2021; Farah & Hacioglu, 2024). Service quality also shapes airport image and passengers' willingness to recommend (Mainardes et al., 2021; Robertson et al., 2023).

Passenger Satisfaction

Passenger satisfaction reflects how travelers judge their airport experience. It is commonly reflected through overall experience, perceived value, and willingness to return or recommend. Studies emphasize that satisfaction is shaped by the entire airport journey, not just a single service point (Ahmed, 2017; Dimitriou et al., 2021). Perceived value also matters because passengers compare what they receive with the time, effort, and inconvenience involved (Caber et al., 2020). Positive experiences increase recommendation behavior, especially when service delivery is strong (Robertson et al., 2023; Kim et al., 2024).

Relationship of Operational Factors and Passenger Satisfaction

Research indicates that passenger satisfaction is influenced by multiple operational factors. Service quality is often the strongest contributor to satisfaction and airport choice (Prentice & Kadan, 2019; Usman et al., 2023). Security performance also matters, as passengers value safety and efficient screening (Gkritza et al., 2006; Sakano et al., 2016). Sustainability practices increasingly shape passenger perceptions and well-being, affecting overall evaluations of airports (Han et al., 2020; Abdel-Gayed et al., 2023; Antwi et al., 2022). Data-driven studies further show that satisfaction outcomes typically result from combined operational conditions rather than a single factor alone (Bakır et al., 2022; Du, 2024). In the Philippine context, improving airport services and facilities is associated with higher passenger satisfaction, underscoring the need for operational assessments in government-managed airports (Francisco & Lim, 2022; Roxas & Ylagan, 2025).

METHODOLOGY

Research Design

This study employed a **quantitative, descriptive-correlational research design** to examine the levels of operational factors and their relationship with passenger satisfaction in CAAP-managed airports. The design was appropriate for assessing perceptions and determining whether significant relationships exist among the identified variables.

Research Setting and Participants

The study was conducted at the top five CAAP-managed commercial airports in the Philippines, namely**: Davao International Airport, Iloilo International Airport, Laguindingan Airport, Bohol-Panglao Airport, and Bacolod-Silay Airport**, selected based on passenger volume. The respondents were departing and arriving passengers who had used airport services during the data collection period. A total of **385 passengers** participated in the survey, with the sample size determined using standard recommendations for correlational studies to ensure statistical reliability.

Research Instrument

Data were collected using a structured survey questionnaire divided into four sections:

1. Security Measures (screening efficiency, personnel competence, emergency preparedness),
2. Environmental Sustainability (energy efficiency, waste management, green infrastructure),
3. Service Quality (tangibles, responsiveness, reliability), and
4. Passenger Satisfaction (overall experience, perceived value, willingness to return or recommend).

Items were measured on a five-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree). The instrument was content-validated by experts in airport management and pilot-tested to ensure clarity and reliability.

Instrument Reliability

Before the full survey was conducted, the questionnaire was pilot tested to assess the reliability and internal consistency of the measurement scales. The pilot involved 30 respondents, including six passengers from each of the five selected CAAP-managed airports. To determine how consistently the survey measured its items, Cronbach's alpha was calculated. A score of 0.70 or higher indicated that the instrument was sufficiently reliable for research purposes.

The reliability analysis demonstrated very high internal consistency across all constructs. Cronbach's alpha values were .946 for screening efficiency, .955 for personnel competence, and .937 for emergency preparedness under the security measures variable. For environmental sustainability, the alpha values were .945 for energy efficiency, .961 for waste management, and .959 for green infrastructure. Under service quality, reliability coefficients were .980 for tangibles, .952 for responsiveness, and .950 for reliability. For passenger satisfaction, the alpha values were .959 for overall experience, .973 for perceived value, and .976 for willingness to return or recommend.

All coefficients significantly exceeded the recommended threshold, indicating excellent reliability and strong internal consistency, making the survey instrument suitable for use in the main study.

Data Collection Procedure

Permission was obtained from the relevant airport authorities prior to data collection. Respondents were approached in designated public areas of the terminals and provided informed consent. Participation was voluntary, and anonymity and confidentiality were assured.

Data Analysis

Descriptive statistics (mean and standard deviation) were used to assess the levels of operational factors and passenger satisfaction (Problems 1–4). For Problem 5, Pearson product–moment correlation and multiple regression analysis were used to evaluate the significance and strength of relationships between operational factors and passenger satisfaction. Statistical analysis was performed using standard statistical software, with $p < 0.05$ as the significance threshold.

Presentation, Analysis, And Interpretation Of Data

This chapter presents the study's empirical findings in relation to the research questions stated in the Statement of the Problem. The analysis is structured to address: (1) the level of security measures, including screening efficiency, personnel competence, and emergency preparedness; (2) the level of environmental sustainability initiatives, including energy efficiency, waste management, and green infrastructure; (3) the level of service quality, including tangibles, responsiveness, and reliability; (4) the level of passenger satisfaction, including overall experience, perceived value, and willingness to return or recommend; and (5) the significance of the relationships between passenger satisfaction and the three operational factors.

Descriptive statistics, including means and standard deviations, were used to summarize each construct. Pearson's product-moment correlation assessed the strength and direction of associations among variables, and multiple regression assessed the predictive influence of security measures, environmental sustainability, and service quality on passenger satisfaction. All statistical tests were conducted at the 0.05 level of significance. The findings are presented systematically and interpreted to provide a clear, objective understanding of how operational factors affect passenger satisfaction at CAAP-managed airports.

What is the level of security measures implemented in the airport in terms of screening efficiency, personnel competence, and personnel preparedness?

Overall Mean Summary of the Participants' Level of Security Measures

Sub-constructs	Mean	SD	Description	Interpretation
Screening efficiency	4.28	.614	Agree	High
Personnel competence	4.32	.630	Agree	High
Emergency preparedness	4.23	.636	Agree	High
OVERALL	4.27	.578	Agree	High

Passengers exhibited a high level of perceived security measures (M = 4.27, SD = 0.578). Personnel competence obtained the highest mean, followed by screening efficiency, while emergency preparedness showed a slightly lower but still high rating. Overall, the results indicate that passengers perceive airport security systems as effectively implemented and consistently practiced.

Problem 1. What is the level of environmental sustainability initiatives in the airport in terms of energy efficiency, waste management, and green infrastructure?

Overall Mean Summary of the Participants' Level of Environmental Sustainability

Sub-constructs	Mean	SD	Description	Interpretation
Energy Efficiency	4.16	.679	Agree	High
Waste management	4.18	.692	Agree	High
Green Infrastructure	4.10	.728	Agree	High
OVERALL	4.15	.644	Agree	High

Passengers reported a high level of perceived environmental sustainability initiatives (M = 4.15, SD = 0.644). Waste management had the highest mean, followed by energy efficiency, while green infrastructure had a slightly lower but still high rating. Overall, the results indicate that passengers recognize and positively evaluate the airport's sustainability efforts.

Problem 2. What is the level of quality of services in the airport in terms of tangibles, responsiveness, and reliability?

Overall Mean Summary of the Participants' Level of Service Quality

Sub-constructs	Mean	SD	Description	Interpretation
Tangibles	4.21	.686	Agree	High
Responsiveness	4.26	.665	Agree	High
Reliability	4.24	.688	Agree	High
OVERALL	4.24	.624	Agree	High

Passengers reported a high level of perceived service quality (M = 4.24, SD = 0.624). Responsiveness had the highest mean, followed closely by reliability, while tangibles received a slightly lower but still high rating. Overall, the results indicate that passengers consistently perceive airport services as dependable, prompt, and well-maintained.

Problem 3. What is the level of passenger satisfaction in terms of overall experience, perceived value, and willingness to return or recommend?

Overall Mean Summary of the Participants' Level of Passenger Satisfaction

Sub-constructs	Mean	SD	Description	Interpretation
Overall experience	4.19	.713	Agree	High
Perceived value	4.09	.746	Agree	High
Willingness to return or recommend	4.17	.712	Agree	High
OVERALL	4.15	.690	Agree	High

Passengers reported high overall satisfaction (M = 4.15, SD = 0.690). Overall experience was the highest mean, followed closely by willingness to return or recommend, while perceived value was slightly lower but still high. Overall, the results indicate that passengers are generally satisfied with the airport's performance and are likely to recommend or revisit the airport.

Problem 4. Is there a significant relationship between the passengers' satisfaction and security measures, environmental sustainability, and service quality?

Pearson Correlation of Passenger Satisfaction with Security Measures, Environmental Sustainability, and Service Quality

Variables	**Pearson r**	**P-value**	**Interpretation**
Security Measures	**.753****	**.000**	**Significant**
Screening Efficiency	.654**	.000	Significant
Personnel Competence	.711**	.000	Significant
Emergency Preparedness	.719**	.000	Significant
Environmental Sustainability	**.822****	**.000**	**Significant**
Energy Efficiency	.753**	.000	Significant
Waste Management	.762**	.000	Significant
Green Infrastructure	.755**	.000	Significant
Service Quality	**.872****	**.000**	**Significant**
Tangibles	.793**	.000	Significant
Responsiveness	.794**	.000	Significant
Reliability	.814**	.000	Significant

Legend: p<.05 the relationship is significant (*)

All correlations were positive and statistically significant ($p < .001$). Service quality showed the strongest association with passenger satisfaction ($r = .872$), followed by environmental sustainability ($r = .822$) and security measures ($r = .753$).

At the dimensional level, strong positive correlations were also observed between passenger satisfaction and reliability ($r = .814$), responsiveness ($r = .794$), tangibles ($r = .793$), waste management ($r = .762$), green infrastructure ($r = .755$), energy efficiency ($r = .753$), emergency preparedness ($r = .719$), personnel competence ($r = .711$), and screening efficiency ($r = .654$).

These findings indicate that higher levels of security, environmental sustainability, and service quality are consistently associated with higher passenger satisfaction. Therefore, the null hypothesis is rejected.

CONCLUSION

This study examined the levels of security measures, environmental sustainability, service quality, and

passenger satisfaction at selected CAAP-managed commercial airports in the Philippines and analyzed the relationships among these operational factors. The findings revealed consistently high levels across all variables, indicating that passengers generally perceive airport operations as safe, environmentally responsible, and service-oriented.

Correlation analysis revealed significant positive relationships between passenger satisfaction and all three operational factors studied. Among these, service quality showed the strongest link to passenger satisfaction, followed by environmental sustainability and security measures. These findings indicate that passengers' overall airport experience is heavily influenced by the quality and reliability of services, as well as visible sustainability efforts and efficient security protocols.

The findings highlight the importance of maintaining a balanced operational approach that integrates safety, sustainability, and service excellence to support a positive passenger experience. Improving frontline service, ensuring efficient, unobtrusive security measures, and expanding sustainability initiatives can lead to higher passenger satisfaction and better operational performance at government-operated airports.

While the study relied on passenger perception data, future research may include objective operational indicators – such as passenger processing time, service turnaround efficiency, and sustainability performance metrics – to further enhance empirical assessments of airport performance.

Overall, the study provides empirical evidence that operational factors significantly influence passenger satisfaction in CAAP-managed airports. The findings offer valuable insights to guide policy updates, operational planning, and ongoing improvement efforts to elevate service quality and passenger-focused airport management.

RECOMMENDATION

Based on the study's findings and conclusions, the following recommendations are proposed to improve passenger satisfaction at CAAP-managed airports.

The **Civil Aviation Authority of the Philippines (CAAP)** may consider reinforcing policies and standards that enhance security, environmental sustainability, and service quality across all airports it operates. Continuous training for security personnel, improved screening efficiency, strengthened emergency preparedness, expanded energy and waste management programs, and standardized service quality benchmarks for tangibles, responsiveness, and reliability may further improve passenger satisfaction.

Airport Authorities are encouraged to sustain high operational performance by ensuring efficient checkpoint operations, maintaining clean, functional facilities, improving service reliability, and strengthening staff responsiveness. Investments in sustainability programs, such as energy-saving systems and effective waste management, may also positively influence passenger perceptions.

Aviation Stakeholders, including airlines, security agencies, and concessionaires, are encouraged to maintain coordinated operations to ensure consistent service across all passenger touchpoints. Compliance with security standards and support for environmental initiatives may help sustain positive passenger evaluations.

For the flying public, passengers are encouraged to provide constructive feedback through available evaluation platforms to support continuous service improvement. Compliance with airport procedures and responsible environmental practices may also contribute to smoother airport operations.

Future researchers may replicate the study in other airport settings or explore additional operational factors that influence passenger satisfaction. Further studies may also apply advanced statistical techniques to deepen the understanding of the relationships among operational variables and passenger outcomes.

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