"Artificial Intelligence in Reforming General Aviation Operations at an Airport in Pasay City: A Focus on Enhancing Airline Staff Roles"

Sean Keriss S. Torres[1], Stephen Edrich S. Baclig[2], Vinson Lyle C. Bañas[3], Harvielou P. Gaayon[4], Jared Ian P. Gesmundo[5], Ken Roden L. Pangantihon[6]

BS Air Transportation Department, PATTS College of Aeronautics Lombos Avenue, Brgy.San Isidro, Parañaque City ATRN 417 - 4A Group 3

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ABSTRACT

An airport located in Pasay City, serving as the country's entry point, is considered the busiest airport, handling both international and domestic flights and making a great contribution to the air transportation network, but given its favorable standing, this airport still needs to modernize its aviation operations to ensure reliable and efficient service and to keep pace with the growing passenger volumes. This study addresses inefficiencies in general aviation operations through integrating Artificial Intelligence (AI), especially in the presence of resource allocation, manual workload during operational delays, and how inconsistencies in aviation management and a lack of standardized AI implementation slow technology adoption. To validate findings through triangulation and address questions from multiple angles, the researcher uses a mixed-method design by combining both qualitative and quantitative approaches upon conducting a survey and interviews among flight operational professionals at an airport in Pasay City. This study also highlights transformative technologies to address such shortcomings and enhance staff roles and operational efficiency by having AI-driven tools like predictive analytics, facial recognition, virtual queues, and machine learning. As for the results, it shows that AI integration indeed can significantly reduce manual workloads and help with managing complex flight operations while ensuring its effectiveness is being done smoothly since the majority of the respondents working at NAIA agreed to the adoption of AI, which shows that standardized AI implementation is key to maximizing operational benefits to prepare the airport for future demands because, after all, this study is all about Reforming General Aviation Operations: A focus on enhancing staff roles.

Keywords: Artificial Intelligence, General Aviation Operations, Staff Roles

INTRODUCTION

The aviation industry has long been at the forefront of technological innovation, continuously seeking advancements to improve safety, efficiency, and operational effectiveness. In recent years, the integration of artificial intelligence (AI) into flight operations has emerged as a transformative force, promising to revolutionize how aircraft are managed from pre-flight planning to in-flight decision-making and post-flight analysis. As AI technologies become increasingly integrated into aviation systems, they hold significant potential to transform not only commercial airlines but also the general aviation sectors. By integrating AI assistance into general aviation operations and management, this study specifically aims to support airline staff in understanding and improving operational processes, safety protocols, and decision-making frameworks. This research specifically focuses on reforming the general aviation operations of an airport located in Pasay City, to enhance the quality and efficiency of airline staff roles.

Artificial intelligence (AI) is profoundly transforming general aviation operations and management at major airports. By enhancing safety, operational efficiency, and process automation, AI is redefining the roles of airline personnel, shifting their focus from manual administrative tasks to strategic oversight and problem-solving. AI-driven tools streamline routine activities like flight planning, crew scheduling, and turnaround management, reducing manual workloads and enabling staff to concentrate on higher-level decision-making. Additionally, emerging AI advancements such as explainable AI increase transparency and trust in AI decisions, while digital

twin models and neural networks support predictive maintenance and resource optimization. AI-powered communication and automated reporting systems further enhance staff efficiency by reducing repetitive tasks and improving information exchange.

Overall, AI adoption is reshaping general aviation by fostering operational resilience and improving the passenger experience, positioning AI as a central driver of innovation, safety, and sustainability in aviation operations and management.

Background of the Study

General aviation has a crucial role not just in the Philippines' connectivity and economic growth but globally as well, and with the integration of artificial intelligence, managing complex flight operations while improving efficiency, safety, and operational effectiveness is being done smoothly. This study focuses on reforming general aviation operations mainly at an airport located in Pasay City, established in the 1960s, which was later on renamed in 1987 to commemorate the late senator Ninoy Aquino, who had been shot on its tarmac. The airport was originally a United States Air Force base handed over to the Philippine government in 1948 and developed by government agencies like the National Airport Corporation and the Manila International Airport Authority (MIAA) together with the Filipino aviation pioneers like Andres Soriano, Eugenio Lopez, and Juan Elizalde, who played a big part in shaping early Philippine aviation (MIAA, 2024). The country's primary entry point has struggled with congestion, delayed processing of passengers, and security concerns.

The airport has adopted digital solutions and Artificial Intelligence (AI) as part of a broader modernization program in response to these. Beginning in 2024, AI-powered applications like face recognition for digital identity validation were implemented in all terminals to expedite immigration and boarding. The Manila International Airport Authority (MIAA) is harnessing digital technologies to enhance services and operations at the airport (Pablo, R, 2023). Digital transformation with its initiatives also covers self-service kiosks, baggage handling systems, real-time analytics, and mobile applications delivering flight information and navigation. All these technologies are designed to enhance efficiency, security, and passenger convenience and position the airport with world-class standards. Digital technologies, including smart airport management systems and data analytics for business intelligence, are poised to transform it into a hub of innovation (OpenGov Asia, 2024). The transformation is realized through partnerships with international technology companies and by maximizing existing infrastructure for efficient service delivery. Making one of the worst airports into one of the most improved ones in the world.

THEORETICAL FRAMEWORK

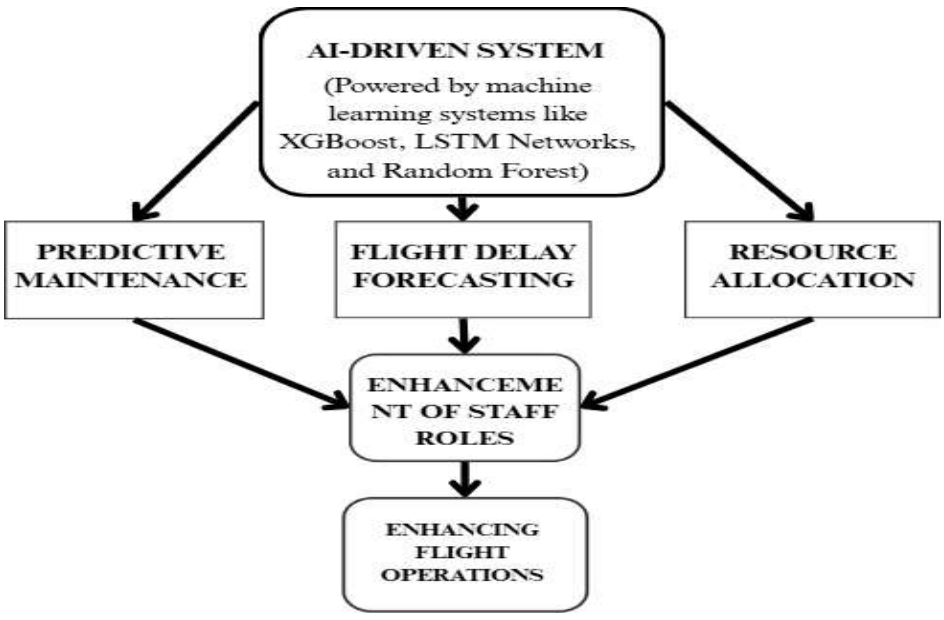

Fig. 1: A Theoretical Framework of the study entitled "Enhancing Flight Operation and Predictive Machine

Learning using Machine Learning and Generative AI"

The framework shows how machine learning models like XGBoost, LSTM, and Random Forest power an AI-driven system that supports predictive maintenance, flight delay forecasting, and resource allocation. These applications enable airline staff to make proactive, data-informed decisions, shifting their roles from operational responders to strategic planners. It shows how, by supporting staff in their work, the AI assistance creates flight operations that are more efficient, reliable, and adaptable. It positions AI not as a replacement but as a means of supporting the development of human knowledge in aviation.

CONCEPTUAL FRAMEWORK

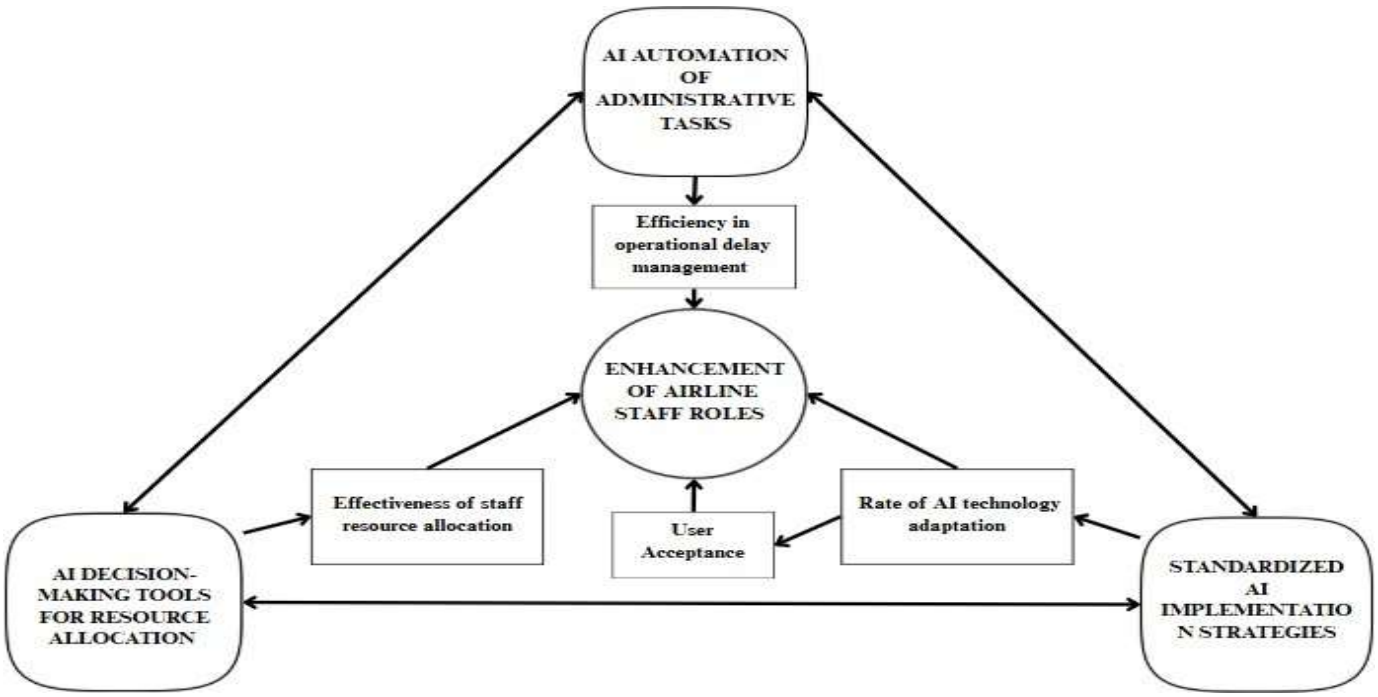

Fig. 2: A Modified Conceptual Framework of the study entitled "Artificial Intelligence in Reforming General Aviation Operations at NAIA: A focus on enhancing airline staff roles."

The theoretical framework highlights how machine learning models drive AI systems that support predictive maintenance, delay forecasting, and resource allocation—tools that directly enhance airline staff roles by enabling smarter, proactive decision-making. The conceptual framework, in relation,complements this by showing how automation, decision-making tools, and standardized implementation strategies influence staff role enhancement and ultimately shape user acceptance. Together, they demonstrate that technical capability and human-centered adoption must work in tandem for AI to truly elevate flight operations.

Statement of the Problem

The study aimed to reform the general aviation operations of an airport in Pasay City while focusing on enhancing staff roles with the assistance of artificial intelligence. Specifically, the study sought the answers to the following questions:

1. How does the lack of AI decision-making tools affect airline staff resource allocation, and how could AI improve it?

2. Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?

3. How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?

4. Is there a significant difference between respondents' perception of managing airline workload, considering the following factors:

a. Inconsistencies in aviation management

b. Lack of standardized AI implementation

5. How can AI integration enhance coordination and communication between ground and flight operations staff during flight disruptions or peak hours?

6. How can the integration of AI technologies redefine and enhance the roles and responsibilities of aviation staff to enable smarter, more adaptive, and efficient operational outcomes?

Hypothesis

Null: There is no significant difference between the respondents' perception of managing airline administrative workload, considering inconsistencies in aviation management and the lack of standardized AI implementation strategies.

Significance of the Study

Students - This can benefit the students by providing insights into how artificial intelligence can transform general aviation operations, offering practical knowledge on the integration of advanced technologies in the airline industry. This study could also open doors for joint research with other schools, bridging aviation and AI.

Flying Public - The study indirectly benefits passengers by creating smoother travel experiences, reducing waiting times, and improving service quality, resulting from empowered and technologically supported airline staff.

CAAP/MIAA/NAIA Authorities and Regulators - The study contributes to policy returns and modernization initiatives by presenting data-driven strategies on how AI can be adopted to enhance overall airport operations efficiency while addressing human resource challenges.

Future Researchers - This study is valuable for future researchers by laying a foundation for exploring the impact of artificial intelligence on aviation operations, encouraging further investigation into technology-driven improvements in the industry.

METHODOLOGY

Research Design

To allow data verification and deeper understanding, the researchers used a mixed-method research design by integrating both qualitative and quantitative approaches to comprehensively explore the problem of the study, wherein we have conducted a face-to-face survey with the aeronautical engineering students as part of our pilot testing phase, which was validated by the air transportation instructors to help us assess the feasibility and reliability of our survey questionnaire before administering it to our main target individuals who are involved in flight operations. Because in this way, we can be able to ensure a more systematic approach that captures both numerical trends and underlying meanings.

Respondents

The researchers' target respondents are those who are working in the aviation industry operating in Pasay City, primarily in general aviation employed by the airline. Slovin's formula determined the required sample size, targeting employees in general aviation airline operations at a major international airport in Pasay City. The survey and interview aimed to allow aviation professionals to freely share their views and ideas on the effect of Artificial Intelligence on their work experience and how they connect to this study. For the required data, the

researchers obtained a complete list of flight dispatchers based in Pasay City. The Civil Aviation Authority of the Philippines (CAAP) provided a total population count of 181 employees who are working in a major international airport in Pasay City. To determine the required number of respondents, Slovin's formula was applied, resulting in a sample size of 132. This number is sufficient to satisfy and proceed with the data analysis and results, as it is in the acceptable range of 10% - 15% for external respondents (Pandya, 2024). Out of the 181 employees, 18 responses were received, yielding a response rate ranging from 10% to 15%, which falls within the acceptable range for external surveys.

Age	**Frequency**	**Percentage**
22-27	14	77.78%
28-35	4	22.22%
Total	**18**	**100%**

Table 1: Respondents Profile Frequency Table by Age

According to the age range profile frequency table shown above, the majority of the respondents fall in the 22-27 age bracket. This notable concentration highlights the importance of examining factors that are especially relevant to individuals within this range, as these may affect the overall results of the study. Gaining a deeper understanding of the traits and viewpoints of respondents aged 22-27 can enhance the interpretation and context of the research outcomes.

Sex	**Frequency**	**Percentage**
Male	14	77.78%
Female	4	22.22%
Total	**18**	**100%**

Table 2: Respondents' Profile Frequency Table by Sex

The table above shows that male respondents outnumbered female respondents in the study. This gender imbalance underscores the need to consider gender-specific factors that may have influenced the results. Recognizing and analyzing these distinctions are essential for achieving a more comprehensive understanding of the research findings.

Occupation	**Frequency**	**Percentage**
Flight Operations	10	55.55%
Ground Operations	8	44.45%
Total	**18**	**100%**

Table 3: Respondents' Profile Frequency Table by Occupation

The table above shows that a greater number of respondents are from Flight Operations compared to Ground Operations. This distribution suggests a stronger representation from Flight Operations, prompting a closer look into the factors and perspectives unique to this group. Understanding their specific roles and contributions can provide deeper insights and add contextual depth to the interpretation of the research findings.

Settings

The study was conducted in an urban setting, specifically at an airport in Pasay City, during the period of October 5-12, 2025. This setting was chosen because it provides the appropriate context for examining artificial intelligence in reforming general aviation operations at the airport: a focus on enhancing airline staff roles, ensuring that the data collected would be relevant and reflective of real-world conditions pertinent to the research objectives.

Instrumentation

The researchers created a survey and crafted guide questions for the interview, whereas answers to such questions

will highlight the usage of AI assistance in enhancing flight operations in a major airport in the Philippines. The survey and interview consist of questions that aim to determine if the usage of AI can really help reform General Aviation Operations and can enhance flight operations at a major airport located in Pasay City.

Data Analysis

The collected data were analyzed using statistical methods. Frequency and percentage described the demographic characteristics of respondents, while the weighted mean assessed survey items measured on a linear scale. These analytical approaches facilitated an understanding of perspectives among aviation industry personnel in Pasay City. Slovin's formula determined the required sample size, targeting employees in general aviation airline operations at a major international airport in Pasay City. Convenience sampling was employed for accessibility through established contacts, and snowball sampling expanded participation via referrals. The T-test compared group means based on variables such as age, sex, position, and work shift. Analysis of Variance (ANOVA) was conducted to evaluate the acceptance or rejection of the null hypothesis. And to streamline the entire analysis workflow, the researcher used a Statistical Package for the Social Sciences (SPSS) to clean and code responses and to compute descriptive statistics.

Ethical Considerations

By ensuring the utmost confidentiality of respondent input and responses while the survey gathering process was unfolding, the researchers adhered to ethical research practices that demonstrate respect for the rights, dignity, and well-being of everyone engaged in survey completion while also supporting integrity and trust in the overall research practice. All grants of information, data, or ideas made use of in the conduct of this study were adequately cited to ensure the owners or rightful creators received appropriate credit, as well as the researchers' acknowledgment of academic honesty and integrity. Additionally, plagiarism or copying of research was verified with the use of plagiarism detection programs to introduce an additional element of institutionally sanctioned practices to affirm that when similarities occurred in the writing of the study, proper sources received citation. Ethics were also addressed in the conduct of the use of AI associated with the study in conjunction with ethical research practices, supporting only the analysis, wielding presentation, and flaring enhancements while ensuring appropriate oversight remained human, and participant confidentiality was endorsed. In summation, researchers' adherence to strict ethical research practices strengthens the credibility, responsibility, and advancement of AI-supported research into this particular field of study.

RESULTS & ANALYSIS

The lack of AI decision-making tools hinders efficient airline staff resource allocation by increasing operational inefficiencies and employee workload, while AI integration can optimize scheduling and real-time management to improve overall effectiveness and reduce staff burden.

Statement	Standard Deviation	Weighted Mean	Remarks
It is considered that the potential of AI with more sophisticated information systemsto provide decision-suppo rt for flight operations in decentralized platforms.	1.04319	2.5000	Disagree
It is considered that the need for AI to be relevant to education and training, competencies to meet the aviation industry's demand to improve operations, efficiency, and safety.	1.09216	2.3889	Disagree
AI could target operational efficiency in resource management in achieving sustainability goals in airport terminals	1.01782	2.7222	Agree

Having the absence of AI tools for decision-makin g adds a manual workload to the airline personnel.	1.04162	2.5556	Agree
TOTAL	0.88803	2.5417	Agree

Legend: 3.26 - 4.00 Strongly Agree; 2.51 - 3.25 Agree; 1.76 - 2.50 Disagree; 1.00 - 1.75 Strongly Disagree

Table 4: Assessment of AI Integration Impact on Airline Staff Resource Allocation and Workload

As shown in the table above, the lack of AI decision-making tools affects airline staff resources, and AI could improve it, resulting in a total weighted mean of 2.54, suggesting an agreed response. Furthermore, all the statements above are presented as agreed with a little percentage of disagreement.

The highlighted highest mean of 2.72, interpreted as an agreed response, was statement number 3: "AI could target operational efficiency in resource management in achieving sustainability goals in airport terminals." The lowest mean of 2.39, interpreted as a disagree response, fell under statement number 2: "It is considered that the need for AI to be relevant to education and training, competencies to meet the aviation industry's demand to improve operations, efficiency, and safety." Manual administrative workloads are more time-consuming for airline staff during operational delays due to increased complexity and volume of tasks, while AI implementation can significantly reduce this burden by automating routine processes and enhancing operational efficiency.

Statement	**Standard Deviation**	**Weighted Mean**	**Remarks**
AI-based simulations can helpproperly allocate resources such as staff during the various disruptions.	0.70479	2.5556	Agree
AI's virtual assistance in facilitating high demand to reduce crew's regular workload.	1.14903	2.5556	Agree
Machine learning-based facial recognition can mitigate time consuming passenger check-ins and improve detecting airline staff availability to prevent delays.	1.27443	2.7222	Agree
Implementing AI-driven virtual queues and smart queue management tools can enhance airline staff allocation and optimize airport operations.	0.90749	3.0000	Agree
AI canautomate repetitive manual tasks to enhance efficiency during operational delays.	0.97853	2.6111	Agree
AI can improve safety by reducing human errors in reporting and documentation.	0.98352	2.4444	Disagree
Using unsupervised learning in airline operations can improve efficiency and reliability compared to manual processes.	0.98352	2.4444	Disagree
Digital transformation efforts support smoother coordination between departments during delays.	1.13759	2.6667	Agree
Integrated Digital Technologies (e.g., smart kiosks, real-time dashboards) can provide faster and more accurate service.	0.83235	3.1111	Agree
TOTAL	0.79942	2.6296	Agree

Legend: 3.26 - 4.00 Strongly Agree; 2.51 - 3.25 Agree; 1.76 - 2.50 Disagree; 1.00 - 1.75 Strongly Disagree

Table 5: Summary of Agreement on AI Solutions Reducing Manual Administrative Workloads and

Enhancing Operational Efficiency for Airline Staff During Operational Delays

As shown in the gathered data, the majority of the respondents agree that AI can enhance operational efficiency and reduce time-consuming manual processes. The statement about the "Integrated Digital Technologies" has the highest weighted mean (3.1111), which indicates its effectiveness in improving operational delays, whereas the lowest weighted mean (2.4444) appeared for the "use of unsupervised learning" and "AI in improving safety by reducing human errors," which both suggest that while we acknowledge the potential of AI, the trust and reliability of it still concern airline staff.

Although the respondents had their own perceptions of AI's usefulness, the results show general consistency, as the total standard deviation (0.79942) indicates a moderate level of agreement, which means that AI enables real-time decision support while reducing human burden. That's why airlines should consider and prioritize AI-based digital technologies to alleviate such problems brought by manual/traditional administration as well as improve coordination during operational disruptions, because, after all, implementing AI ensures that inefficiencies can be minimized while maintaining safety and reliability standards in airline operations.

Inconsistencies in aviation management and the lack of standardized AI implementation strategies at an airport in Pasay City slow technology adaptation by causing fragmented decision-making, poor coordination, and delayed modernization, which impede the efficient integration of advanced AI systems for improved airport operations.

AI-powered automation and digital systems are revolutionizing airport management and operations to enhance service speed, efficiency, and competitiveness to maintain consistency.

Statement	**Standard Deviation**	**Weighted Mean**	**Remarks**
The capacity of AI to automate operations, analyze complex data, and improve outcomes makes it a game changer for businesses aiming to remain competitive.	0.89479	2.7222	Agree
Digital systems at the airport's Terminal 3, such as self-service kiosks, biometric check-ins, and real-time baggage tracking, have helped streamline routine administrative tasks for airline staff and improve service speed and organization during busy periods.	0.96338	3.1111	Agree
AI offers transformative potential by revolutionizing various aspects of airport management.	0.83235	2.8889	Agree
TOTAL	**0.81494**	**2.9074**	**Agree**

Legend: 3.26 - 4.00 Strongly Agree; 2.51 - 3.25 Agree; 1.76 - 2.50 Disagree; 1.00 - 1.75 Strongly Disagree

Table 6: Evaluation of AI-Powered Automation and Digital Systems in Enhancing Airport Management Efficiency and Service

The table reveals that professionals generally agree on the reliability of Artificial Intelligence (AI) to revolutionize airport management and operations to enhance service speed, efficiency, and competitiveness, to maintain consistency. overall operation efficiency, and safety, with a total weight mean of 2.9074. In particular, the highest-rated statement scored 3.1111, indicating the agreement that the combination of AI-powered automation and digital systems. The findings also reflect strong support for integrating AI with human expertise, which is crucial for enhancing operations and service accuracy in the airport. This consensus underscores the importance of adopting a multifaceted approach to maintain a reliable flow of operations and service. To tackle the challenges identified, it would be beneficial for aviation organizations to invest in training programs that blend AI technologies with professional insights, ultimately improving decision-making processes.

AI leverages natural language processing and standardized implementations to enhance customer experience, operational safety, technical support, and efficiency.

Statement	Standard Deviation	Weighted Mean	Remarks
Airlines use AI and natural language processing to analyze customer reviews and social media feedback to improve service, customer satisfaction, safety, and operational efficiency.	0.76696	3.0000	Agree
The diverse needs of airlines are addressed by focusing on aviation technical support services using advanced digitalization methods like artificial intelligence and the Internet of Things.	1.01782	2.7222	Agree
Using a standard form of AI implementation could increase the efficiency of operations at the airport.	1.01782	2.7222	Agree
TOTAL	**0.86487**	**2.8148**	**Agree**

Legend: 3.26 - 4.00 Strongly Agree; 2.51 - 3.25 Agree; 1.76 - 2.50 Disagree; 1.00 - 1.75 Strongly Disagree

Table 7: Impact of AI and Natural Language Processing on Airline Customer Experience, Operational Safety, and Technical Support

The table reveals that professionals generally agree on the reliability of Artificial Intelligence (AI) to improve airport and airline management customer service, overall operation efficiency, and safety. With a total weight mean of 2.8148. Notably, the highest-rated statement scored 3.0000, indicating agreement that the combination of Airlines leveraging AI, including natural language processing and standardized implementations, to enhance customer experience, operational safety, technical support, and efficiency. This finds that the industry's recognition of artificial intelligence's critical role in improving the accuracy of how useful AI is, especially in the context of operation and service. While professionals acknowledge AI's potential, they also identify challenges that can hinder predictive capabilities and raise concerns about data quality and privacy. Nevertheless, there is a consensus on the benefits of integrating AI technologies to enhance the flow of operations. This supports the notion that a comprehensive approach, combining AI with human expertise, is essential for reliable customer experience, operational safety, technical support, and efficiency. To tackle the identified challenges, aviation organizations are recommended to invest in training programs that blend AI technologies with professional insights, ultimately improving decision-making processes.

Significant Difference

Significant difference of the responses between two age groups (22-27 and 28-35) on how digital transformation enhances coordination between departments during delays.

Statement	Age	SD	Mean (M)	F	Sig. Diff.	Decision
Digital transformation efforts support smoother coordination between departments during delays.	22–27	3.194	0.926	6.462	0.022	Reject

Legend: < 0.05 is a significant difference/relation, > 0.05 is no significant difference/ relation,< 0.01 - very significant

Table 8: Significant Difference in Perceptions of Digital Transformation Enhancing Interdepartmental Coordination During Delays Between Age Groups 22-27 and 28-35

The table identified whether digital transformation efforts enhance coordination between departments during delays, focusing on differences between age groups 22-27 and 28-35. Responses, measured on a linear scale from strongly disagree to strongly agree, showed the younger group had a mean of 0.949 and the older group 0.000, indicating minimal agreement for the latter. Analysis using the T-test yielded a significant difference with F=6.463 and SIG=0.022, below the 0.05 threshold for significance. This result leads to the rejection of the null hypothesis, confirming a meaningful difference in perceptions between age groups. This means that age

significantly influences how digital transformation efforts are perceived to affect departmental coordination during operational delays. Significant difference of responses between male and female respondents on the potential and impact of AI in aviation operational tasks during delays regarding the administrative workloads of airline staff.

The result shows statistical data differentiating male and female responses related to the potential and impact of artificial intelligence in aviation operational tasks during delays, specifically focusing on the administrative workload of airline staff. The statistics identify various statements regarding AI capabilities and their relevance to operational efficiency, safety, and resource management in airline operations during disruptions. The variables include gender, mean responses, standard deviations, significance values, and decisions on acceptance or rejection of hypotheses. This clearly pinpoints the focal areas of the inquiry on how AI can potentially revolutionize and ease manual workloads in airline operations.

The statistics define the scope through acceptance or rejection of various propositions on AI's role, with most statements accepted, indicating consensus on AI's positive impact regardless of gender differences. Analysis reveals a generally favorable perception of AI's capacity to support decision-making, resource allocation, safety improvements, and task automation. The results provide numerical evidence on the statistical significance of differences between genders, mostly indicating no significant gender-based discrepancy in opinions. These results are evidence that AI implementation in aviation operations is broadly supported and should be pursued, especially emphasizing AI's role in automating repetitive tasks and improving operational efficiency during delays.

Significant difference of the responses between the occupations grouped as flight operations and ground operations on operational efficiency in resource management for airport terminals.

Statement	Occupation	Mean (M)	SD	F	Sig. Diff.	Decision
AI could target operational efficiency in resource management in achieving sustainability goals in airport terminals.	Flight Operations	2.4000	1.1737	6.0109	0.026	Reject

Legend: < 0.05 is significant difference/relation, > 0.05 is no significant difference/ relation,< 0.01 - very significant

Table 9: Significant Difference in Responses on AI Targeting Operational Efficiency for Resource Management Between Flight Operations and Ground Operations in Airport Terminals

The table identified the potential impact of AI on operational efficiency in resource management for airport terminals, comparing perceptions between flight operations and ground operations personnel. Respondents rated the statement on a scale where Ground Operations showed a higher mean agreement with 3.125 compared to Flight Operations with 2.400, with standard deviations of 0.64087 and 1.17379, respectively. Statistical analysis using the T-test gave a significant difference with an F-value of 6.010 and a significance level of 0.026, below the 0.05 threshold for significance. The null hypothesis was rejected, indicating a significant difference in views between the two occupational groups regarding the role of AI in achieving sustainability goals. This result highlights the importance of occupation-specific perspectives when assessing AI's contribution to operational improvements in airport terminals.

Thematic Framework of Interview Recommendations

Master Theme	Superordinate theme
AI Driven Workforce Efficiency	Real-time staff Monitoring
Technology-Enabled Operational Efficiency	Enhanced Coordination Systems

Table 10: Table for Thematic Framework of Interview Recommendations on Interview Question 1

Master Theme 1: AI-Driven Workforce Efficiency

Superordinate Theme 1.1: Real-Time Staff Monitoring

Informant 1: "... AI or machine learning can simply sort out in terms of the personnel who are going to exceed the duty period, persons who have enough rest period for the airline, or staffing personnel, and can easily distribute persons across departments based on their availability. "

Informant 2: "... facial recognition can be a big leap forward in regards to minimizing the lack of manpower especially to different uhh passenger processing counters and not just on the airline staffs also to the whole uhh airport processing staffs also, including the security."

Informant 3: "... I am currently working at the airport, and I've seen how crucial it is for everyone to be available on time. Even small delays in communication or coordination can affect departure times. When staff availability is tracked in real time through smart systems, it helps reduce stress and keeps the entire turnaround process running smoothly."

All three informants show how important Real Time Staff Monitoring is for aviation operations, where even the availability of one employee can cause a small delay in departure time if not handled properly. They endorse AI as real time staff monitoring solution that improves operational capability, which helps staff to be always on time, reducing communication or coordination delays

Master Theme 1.2: Technology-Enabled Operational Efficiency

Superordinate Theme 1.2: Enhanced Coordination System

Informant 1: "... AI or machine learning can simply sort out in terms of the personnel who are going to exceed the duty period, persons who have enough rest period for the airline, or staffing personnel, and can easily distribute persons across departments based on their availability.

Informant 2: "... facial recognition can be a big leap forward in regards to minimizing the lack of manpower especially to different uhh passenger processing counters and not just on the airline staffs also to the whole uhh airport processing staffs also, including the security."

Informant 3: "… These systems can automatically detect when staff check in and where they are located in the terminal, helping operations managers quickly fill any staffing gaps before they lead to delays…"

All three informants agree that combining AI as a facial recognition system for duty hours and security enables efficient operations where airline managers or staff can detect staffing gaps and improve passenger processes to reduce delays and lower staff manual processing.

Master Theme	**Superordinate Theme**
AI-Enhanced Coordination and Communication	Real Time Decision Support

Table 11: Table for Thematic Framework of Interview Recommendations on Interview Question 2

Master Theme 2: AI-Enhanced Coordination and Communication

Superordinate Theme 2.1: Real-Time Decision Support

Informant 1: "... I input refuelling delays so based on the key word, AI can now interpret on the system that the cause of the delay is because the fuel in trucks arrives either late or there are technical issues with the refueling…"

Informant 2: "... AI Support can contribute to smoother coordination … provide coordination between departments…"

Informant 3: "Yes, Integrated digital tools like smart kiosks for passengers and real-time dashboards for staff speed up communication and reduce the chance for errors … we can access real-time data, instantly generate load sheets, and communicate changes with the cockpit and ground staff without delays …"

All three informants agree that AI can help airline staff with real-time decisions, improving coordination and operations during delays or disruptions by accessing real-time data instantly to create solutions to problems through integrated digital dashboards, reducing manual errors, while also being cautious that AI must remain a supportive tool for air staff to use for critical situations.

Master Theme	Superordinate Theme
AI-Integrated Training and Competency Development	AI-Based Skill Enhancement

Table 12: Table for Thematic Framework of Interview Recommendations on Interview Question 3

Master Theme 3: AI-Integrated Training and Competency Development

Superordinate Theme 3.1: AI-Based Skill Enhancement

Informant 1: "... I've had to learn how to work with new systems that use AI to optimize weight distribution or predict loading issues. At first, it can feel overwhelming, but proper training really makes a difference. When we understand how these technologies work, we can use them confidently to improve efficiency and safety …"

Informant 2: "... we are already implementing uhh AI Programs in order to have a more efficient quality education and definitely training and improving the competencies of our students …"

Informant 3: "... AI will help you as a supporting tool for your learning process ..."

All these three informants agree that AI tools are valuable for future training and development. Where one of the informants stated that the only hard part is understanding how these technologies work, but after that, AI greatly benefited them when it comes to improving learning and training. It shows that AI can function as a supportive learning aid that increases efficiency and safety among aviation staff.

Thematic Analysis of Recommendations from Interview Transcripts

Recommendations from the transcripts about the first interview question.

Master Theme	Superordinate Theme
Recommendation	AI Staff Optimization

Table13: Table for Thematic Analysis of Recommendations from Interview Question 1

Master Theme 1: AI Integration for minimizing workload.

Superordinate Theme 1: AI Staff Optimization

Informant 1: "…Machine Learning and facial recognition can make a big difference in terms of time efficiency. These systems can automatically detect when staff check in and where they are located."

1nformant 2: "…AI or machine learning can simply sort out in terms of the personnel who are going to exceed the duty period, persons who have enough rest period for the airline, or staffing personnel, and can easily distribute persons across departments…"

Informant 3: "…facial recognition can be a big leap forward…minimizing the lack of manpower …also to the whole uhh airport processing staff…"

All informants spoke about the benefits of AI for real-time personnel monitoring, strategic allocation, and cross-department coverage, aiming for better efficiency and fewer operational bottlenecks. Implementation of

integrated AI solutions will enable real-time tracking, analysis, and optimal allocation of all airport and airline staff, minimizing delays, managing fatigue, and ensuring efficient coverage at all operational points.

Recommendations from the transcripts about the second interview question.

Master Theme	Superordinate Theme
Recommendation	Digital Operations Support

Table 14: Table for Thematic Analysis of Recommendations from Interview Question 2

Master Theme: Recommendation

Superordinate Theme: Digital Operations Support

Informant 1: "... using digital load planning systems…reduces our workload and improves the accuracy… faster turnaround contributes directly to on-time performance."

Informant 2: "…AI support on the current input of the personnel …smoothen the workflow …especially when it comes to delay …coordination with different teams…"

Informant 3: "…AI Support can contribute for smoother coordination…there should be limitations …" All informants' key ideas are grouped into a clear theme focused on digital operational support,

including AI and other tech enhancing efficiency, communication, and decision-making, balanced with human control for critical functions. Implementation of integrated digital systems like smart kiosks and

real-time dashboards to streamline staff workflows, improve accuracy, reduce workload, and enhance interdepartmental coordination while maintaining human oversight for critical decisions.

Recommendations from the transcripts about the third interview question.

Master Theme	Superordinate Theme
Recommendation	AI Training and Balance

Table 15: Table for Thematic Analysis of Recommendations from Interview Question 3

Master Theme: Recommendation

Superordinate Theme: AI Training and Balance

Informant 1: "... proper training really makes a difference… ongoing training and upskilling should be priority…"

Informant 2: …AI is a helpful tool …AI will help you as a supporting tool for your learning process…

Informant 3: …AI Programs…improving the competencies…programs can also help in keeping our training syllabus updated to the most current issues, events, most especially in the aviation industry.

The responses of the informants synthesize the emphasis on education, ongoing learning, and balancing AI support with human control as central themes for AI implementation success in aviation training. Prioritize continuous AI-related training and upskilling for aviation personnel to enhance technology adoption and operational safety while maintaining the essential role of human expertise and decision-making.

DISCUSSION

Conclusion

Based on the results and analysis, the following were concluded:

1. Overall results show that there is a positive level of approval on the lack of AI decision-making tools affecting airline staff resources, and AI could improve it. Artificial intelligence is a kind of complex machine learning technology that helps computers recognize problems, create solutions on their own, and apply those critical thinking skills. This kind of technology can help revolutionize the aviation industry, reducing the time to operate and detect any problems so that aviation staff can intervene early. The study presents a positive outlook regarding artificial intelligence by highlighting the potential of AI to improve the aviation industry, addressing that AI can help aviation staff ease their workload, improving more efficiency with less manpower.

2. Inefficiencies, an increased risk of errors, and slower decision-making are some of the burdens of not only the airline/airport itself but also their staff because of the heavy manual administration imposed by operational delays. Reflected in the gathered data was the importance of AI that enabled digital technologies such as the smart kiosks and real-time dashboards, which substantially reduced time-consuming tasks, facilitated real-time decision support, and smoothed coordination among departments during disruptions. All thanks to AI, because we can now be able to streamline workflows and shorten processing time to improve our daily operations.

3. Based on the data gathered from the professional respondents, the results show that they agreed on having and implementing artificial intelligence (AI) to identify and highlight that AI-powered automation and digital systems are revolutionizing airport management and operations to enhance service speed, efficiency, and competitiveness to maintain consistency. It also promotes that AI leverages natural language processing and standardized implementations to enhance customer experience, operational safety, technical support, and efficiency. This may improve and upgrade the operations and service significantly, which promotes safety and reliability that contribute to the performance and competitiveness of airports. Having the help of artificial intelligence makes the workloads of airline staff roles easier, which will increase the accuracy of operations and enable airports to have better preparation for high demand of flights or peak season. This results in improvements to the overall services and performance of airports, which ultimately enhance customer satisfaction.

4. The significant differences identified in the study highlight the varied perceptions across demographic and occupational groups regarding digital transformation and AI implementation in aviation operations. The age groups showed distinct views on how digital transformation efforts enhance coordination between departments during delays, with younger individuals perceiving more benefit. Gender differences revealed a consensus on the positive impact of AI in reducing administrative workloads and improving operational efficiency, emphasizing AI's role in automating repetitive tasks. Similarly, occupational perspectives between flight and ground operations personnel revealed significant differences in views on AI's contribution to sustainability and resource management at airport terminals. These results underscore the importance of considering demographic and professional contexts in the adoption and evaluation of digital innovations in aviation.

   Overall, the results suggest that successful digital transformation and AI integration in aviation require tailored approaches that address the unique concerns and expectations of different groups. The clear rejection of null hypotheses in multiple comparisons confirms that perception differences are statistically significant and meaningful. For practitioners, this means designing age-appropriate communication and training programs, gender-neutral support systems, and occupation-specific AI applications to maximize acceptance and effectiveness. This study reinforces the role of digital technologies in enhancing workflow coordination, operational efficiency, and sustainability objectives within the aviation sector. By acknowledging these diverse perspectives, stakeholders can better navigate the complexities of technological change to achieve smoother operational outcomes during delays.

5. AI integration significantly improves real-time coordination and communication among airline departments by providing timely and accurate data on staff availability, operational status, and task progress. Machine learning tools, such as facial recognition for personnel tracking and AI-powered digital dashboards, enable proactive management of staffing and resources, reducing delays caused by miscommunication or staffing gaps. AI systems support smoother workflows, especially during flight disruptions, by automatically detecting causes of delays and facilitating faster, more accurate information sharing between ground handlers, flight operations, maintenance, and other relevant teams. Additionally, AI integration is effective in optimizing turnaround times through predictive analytics and real-time monitoring of key activities, ultimately enhancing on-time performance. However, the successful implementation of AI depends on proper training and education, ensuring that staff can confidently use AI tools to complement rather than replace human decision-making. Human control remains essential, with AI serving as a supportive tool that amplifies efficiency and safety without overpowering experienced personnel. Thus, AI integration transforms how disruptions and peak operational challenges are managed, making coordination more responsive, efficient, and reliable.

6. The integration of AI technologies is transforming aviation staff roles by automating routine tasks, enhancing real-time data access, and enabling smarter resource management, which allows personnel to focus more on safety-critical and decision-support functions; this shift demands ongoing training and upskilling to build trust and competence in AI tools, ensuring a balanced collaboration where AI supports but does not replace human expertise, ultimately enabling aviation operations to become more adaptive, efficient, and safer while redefining traditional responsibilities across flight operations, ground handling, maintenance, and training sectors.

RECOMMENDATIONS

Based on the discussed conclusions, The recommendations are as follows:

7. It is recommended that aviation should prioritize the implementation of machine learning, such as AI decision-making tools, to address resource challenges. By applying personnel with the right knowledge and use of AI support, which can help the airline can reduce workloads and improve operational efficiency.

8. Ranging from the former to the latter of our statement of the problem, the researcher suggests that authorities of the airport should invest in and accelerate deployment of integrated AI-driven resource management platforms while emphasizing unsupervised learning and digital transformation to optimize both human and technology resources, but of course, as mentioned above, these efforts should be complemented with real-time dashboards and smart kiosks to reduce manual obstruction, minimize errors, and empower frontline staff to leverage AI for both immediate and long-term operational excellence. Alongside these is the significance of our study wherein students should participate in hands-on exposure to real-world AI applications and capstone opportunities, like, for instance, during their internship, to enhance their ability to apply AI responsibly in an aviation context. To enhance the flying public experience, the researcher also recommended proactive, personalized disruption communication; a streamlined check-in and boarding process; real-time journey visibility; and regularly collecting their feedback to ensure that this tool supports the needs of diverse passengers. As for the CAAP/MIAA/NAIA authorities and regulators, they should focus on implementing a streamlined, risk-based governance framework that mandates auditable AI decisions, data privacy by design, safety assurance across the lifecycle, transparent incident reporting, and a public explanation of AI to maintain trust while updating standards to address AI capabilities and threat models. Lastly, for future researchers on open studies that address core aviation AI challenges, prioritize sharing and collecting data sets and validating models across multiple airports. And for them to produce actionable insights, they should emphasize interdisciplinary work combining operations research, human factors, machine learning, policy analysis, and such.

9. CAAP/MIAA/NAIA should address the inconsistencies in aviation management within the context of implementing Artificial Intelligence in any aviation operations, it is recommended to establish a standardized framework for data collection and decision-making protocols that better clarifies the role of

AI as a decision tool, to adopt AI in a manner that complements rather than supplants human judgment, and to establish feedback loops that continually bring out enhancements of the system. These inconsistencies often arise from fragmented information systems, support staff competencies, and uneven adherence to operational procedures. By integrating with AI-powered analytics and machine learning algorithms, management can detect discrepancies in real-time, enabling proactive adjustments to workflows and resource allocation that are effective for any operation. Additionally, comprehensive training programs to enhance airline staff's digital literacy and AI interaction skills will promote uniformity in operational execution to help serve passengers. This dual approach will reduce management inefficiencies, foster clear communication channels, and ensure consistent service quality across all departments involved in general aviation operations at the airport. Therefore, AI will be integrated to a large extent and determine whether it is effective and trusted, thereby ensuring operational safety and efficiency. Also, CAAP/MIAA/NAIA should address the lack of AI implementation strategies in any aviation operations; it is recommended to develop a comprehensive, phased AI integration plan, rules, and guidelines that align with the specific needs of airline staff roles. This plan should begin with a thorough assessment of current operational gaps and staff capabilities, followed by the design of targeted AI applications that support routine and critical tasks. Establishing clear guidelines for AI adoption, including pilot testing, feedback mechanisms, and continuous improvement cycles, will ensure smooth deployment and acceptance among staff. Making guidelines and procedures for AI implementation can level and close the gaps on what operations are needed to ensure smooth and efficient operations. Additionally, management should prioritize investment in training programs to build AI literacy and foster a culture of innovation that levels up the security of data and the safety of passengers. By formalizing these strategies, the airport can systematically leverage AI technologies to enhance efficiency, accuracy, and decision-making in aviation operations while empowering airline personnel to maximize AI benefits to lessen the workloads and support serving passengers.

10. Future researchers should explore how AI integration can enhance coordination andcommunication between ground and flight operations staff during flight disruptions or peak hours by developing adaptive, real-time communication platforms powered by AI-driven predictive analytics. These platforms could anticipate airport traffic and provide proactive alerts, enabling staff to make informed decisions quickly. Future research should also investigate AI-facilitated workflow automation that will make tasks easy and status updates, reducing human error and information delays. Studying the role of natural language processing in creating intuitive, multilingual interfaces can improve clarity and reduce misunderstandings among diverse operations, by focusing on these AI capabilities. Future researchers can identify current or newstrategies to optimize collaborative responses, improve situational awareness, and maintain operational resilience in high-pressure scenarios.

11. Students should examine and assess how integrating AI technologies can transform aviation staff roles by shifting routine, repetitive tasks toward intelligent automation, allowing personnel to concentrate on strategic decision-making and problem-solving. Assessing and examining how AI-powered tools can equip staff with enhanced situational awareness, enabling quicker and more informed responses. Additionally, studying the impact of AI in fostering adaptive learning and continuous skill development will highlight how aviation professionals can evolve and adapt into agile operators who anticipate and manage operational complexities effectively. This study will demonstrate how AI integration redefines staff responsibilities to achieve smarter and more efficient operations.

12. While we redefine traditional responsibilities across general operations through AI technologies integration, it is recommended that students join industry engagement where they can learn the aviation operations domain that allows them to map where AI can add value and learn current trends, practices, and standards by attending seminars, webinars, or conferences focusing on AI in aviation. For the flying public to assess AI-driven services by participating in feedback channels and passenger surveys, where they can share their experiences to help operators refine tools. Alongside these are the authorities and regulators to develop a phased regulatory framework that covers everything for AI-enabled operations and lets their personnel have continuous training with the use of AI. Lastly, future researchers should develop strong competencies and identify high-impact aviation problems with AI resolutions. And as much as possible,

foster collaborations, building partnerships or connections to people who are involved in the operations to have their data gathering, surveys, interviews, and such be executed easily.

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APPENDIX

Related Literature and Studies	Statement of the Problem 1	Questions for the Survey Questionnaire
Geske, A. M., Herold, D., & Kummer, S. (2024) stated that "AI can enhance resource management in the aviation industry by integrating decision-support tools across hardware and software systems, facilitating real-time, data-driven decisions."	How does the lack of AI decision-making tools affect airline staff resource allocation, and how could AI improve it?	Did you consider the potential of AI with more sophisticated information systems to provide decision support for flight operations in decentralized platforms?
Abashkin, I., et al. (2023) stated that "from flight planning to aircraft maintenance, AI-driven tools like machine learning, natural language processing, and computer vision are being integrated across nearly every aspect of modern aviation. AI innovation holds great promise for augmenting human capabilities and enhancing safety and efficiency."	How does the lack of AI decision-making tools affect airline staff resource allocation, and how could AI improve it?	Did you consider the need for AI to be relevant to education and training competencies to meet the aviation industry's demand to improve operations, efficiency, and safety?
Anagnostopoulou et al. (2024) stated that "considering short-term initiatives for sustainability in airport terminals, optimizing resource allocation and improving operational efficiency may be among the most important goals of airport managers and relevant decision makers."	How does the lack of AI decision-making tools affect airline staff resource allocation, and how could AI improve it?	Did you consider how AI could target operational efficiency in resource management in achieving sustainability goals in airport terminals?
Authors on Explainable AI (XAI) indicated that Explainable AI has the potential to enhance trust, transparency, and decision-making through cognizance within the aviation domain.	How does the lack of AI decision-making tools affect airline staff resource allocation, and how could AI improve it?	Did you consider how the absence of AI tools for decision-making adds manual workload to airline personnel?

APPENDIX A: RRL MATRIX

Related Literature and Studies	Statement of the Problem 2	Questions for the Survey Questionnaire
Ziakkas et al. (2024) discussed AI's abilities to manage scheduling and adapt to weather disruptions while lowering the cognitive load placed on workers.	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Did you consider whether AI-assisted schedules could mitigate workload when staff are confronted with unexpected disruptions?
Xiong & Wang (2024) viewed digital twin technology as a tool used in aviation to simulate, predict, and optimize processes.	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Did you consider whether AI-based simulations could help properly allocate resources such as staff during various disruptions?
Kumar, M. (2022) stated that "there will be far-reaching effects of artificial intelligence technologies in the aviation industry."	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Did you consider the future of the aviation sector relying on artificial intelligence applications such as machine learning, machine vision, robotics, and natural language processing?
Al Qassabi, A. S. M., et al. (2020) stated that "the passenger check-in process is time-consuming, and	Why are manual workloads more time-consuming for airline staff during operational delays,	Did you consider how machine learning-based facial recognition can mitigate time-consuming

machine learning can help solve such issues using facial recognition algorithms."	and how could AI reduce them?	passenger check-ins and improve the detection of airline staff availability to prevent delays?
Amiri & Kuşakcı (2024) stated that "AI has emerged as a game-changer in airport management, particularly in predicting passenger traffic patterns."	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Did you consider how using AI to analyze various data sources could improve the accuracy of passenger traffic forecasts at airports?
Anagnostopoulou et al. (2024) stated that "virtual queues, buffer zones, and smart queue management tools could help flight managers optimize resource allocation and airport operations."	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Did you consider that implementing AI-driven virtual queues and smart queue management tools could enhance airline staff allocation and optimize airport operations?
Jiang et al. (2023) stated that "machine learning analyses massive amounts of data to identify patterns, predict threats, and detect anomalies."	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Have you considered that AI could enhance efficiency by automating repetitive manual tasks during operational delays?
Jiang et al. (2023) stated that "machine learning analyses massive amounts of data to identify patterns, predict threats, and detect anomalies."	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Did you consider that AI could improve safety by reducing human errors in reporting and documentation?
Le Clainche et al. (2023) stated that "unsupervised learning processes large amounts of unlabelled data and is highly relevant in aerospace applications."	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Did you consider that AI-driven systems could help predict or minimize disruptions, reducing manual administrative workload?
Le Clainche et al. (2023) stated that "unsupervised learning techniques are highly relevant in aerospace applications due to their ability to process large datasets efficiently."	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Did you consider that using unsupervised learning in airline operations could improve efficiency and reliability compared to manual processes?
Almario et al. (2024) stated that "NAIA Terminal 3 has embraced digital transformation to modernize operations and enhance passenger experiences."	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Did you experience smoother coordination between departments during delays, which you believe was supported by digital transformation efforts?
Almario et al. (2024) stated that "NAIA Terminal 3 has embraced digital transformation to modernize operations and enhance passenger experiences."	Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?	Did you consider that staff were able to provide faster and more accurate service thanks to integrated digital technologies (e.g., smart kiosks and real-time dashboards)?

Related Literature and Studies	Statement of the Problem 3	Questions for the Survey Questionnaire
Turikov, R. (2024) stated that "AI's application to administrative activities marks a new frontier and, as technology progresses, its ability to transform the aviation sector cannot be underestimated."	How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?	Did you consider how the capacity of AI to automate operations, analyze complex data, and improve outcomes makes it a game changer for businesses aiming to remain competitive?

Moghadasnian, S. A., & Rajo, M. (2025) stated that "the incorporation of AI in airline business management marks a significant paradigm shift and has emerged as a transformative force in airline business management."	How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?	Did you consider the possibility of AI revolutionizing industry norms through optimizing flight routes, predicting maintenance, and enhancing customer interactions?
Li, Z., et al. (2024) stated that social media platforms play a pivotal role as communication conduits between customers and airlines, providing valuable feedback for service quality assessment and strategic decision-making.	How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?	Did you consider how airlines use AI and natural language processing to analyze customer reviews and social media feedback to improve service, customer satisfaction, safety, and operational efficiency?
Kabashkin, I., et al. (2023) discussed the use of the Internet of Things, artificial intelligence, and predictive maintenance tools to enhance aviation technical support services and operational reliability.	How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?	Did you consider the diverse needs of airlines when focusing on maintenance service models and aviation technical support services using advanced digitalization methods such as artificial intelligence and the Internet of Things?
Seco et al. (2024), in the study "Analyzing Passenger Experience: A Study on Airline Mishandling Incidents at NAIA Terminal 3," examined the effects of airline mishandling incidents on passenger experiences.	How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?	Did you consider that service is faster and more organized at NAIA Terminal 3 due to the integration of advanced technologies in airport operations?
Seco et al. (2024), in the study "Analyzing Passenger Experience: A Study on Airline Mishandling Incidents at NAIA Terminal 3," examined the effects of airline mishandling incidents on passenger experiences.	How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?	Did you consider that digital systems at NAIA Terminal 3 have helped streamline routine administrative tasks for airline staff during busy periods?
Torens et al. (2022) underscored the absence of new or standardized AI/ML frameworks within the aviation domain and the limited adoption of AI across the industry.	How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?	Did you consider that using a standard form of AI implementation could increase the efficiency of operations at the airport?
Amiri & Kuşakcı (2024) stated that "AI offers transformative potential by revolutionizing various aspects of airport management."	How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?	Did you consider that AI offers transformative potential by revolutionizing various aspects of airport management?

Appendix B: Validation And Pilot Test Results

VALIDATION

4 - Useful; 3 - Useful with Revisions; 2 - Change statement; 1 - Remove Statement

Formatted table:

Statement	4	3	2	1
1. How does the lack of AI decision-making tools affect airline staff resource allocation, and how could AI improve it?				
1.1 Did you consider the potential of AI with more sophisticated information systems to provide decision support for flight operations in decentralized platforms?	3	0	0	0
1.2 Did you consider the need for AI to be relevant to education and training competencies to meet the aviation industry's demand to improve operations, efficiency, and safety?	3	0	0	0
1.3 Did you consider how AI could target operational efficiency in resource management in achieving sustainability goals in airport terminals?	2	1	0	0
1.4 Did you consider how the absence of AI tools for decision-making adds manual workload to airline personnel?	2	1	0	0
2. Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?				
2.1 Did you consider whether AI-assisted schedules could mitigate workload when the agent is confronted with unexpected disruption?	3	0	0	0
2.2 Did you consider whether AI-based simulations could help properly allocate resources such as staff during various disruptions?	2	1	0	0
2.3 Did you consider the future of the aviation sector relying on artificial intelligence applications such as machine learning, machine vision, robots, and natural language processing?	1	0	2	0
2.4 Did you consider how machine learning-based facial recognition can mitigate time-consuming passenger check-ins and improve detecting airline staff availability to prevent delays?	2	0	1	0
2.5 Did you consider how using AI to analyze various data sources could improve the accuracy of passenger traffic forecasts at airports?	2	0	1	0
2.6 Did you consider that implementing AI-driven virtual queues and smart queue management tools could enhance airline staff allocation and optimize airport operations?	3	0	0	0
2.7 Have you considered that AI could enhance efficiency by automating repetitive manual tasks during operational delays?	3	0	0	0
2.8 Did you consider that AI could improve safety by reducing human errors in reporting and documentation?	3	0	0	0
2.9 Did you consider that AI-driven systems could help predict or minimize disruptions, reducing manual administrative workload?	2	1	0	0
2.10 Did you consider that using unsupervised learning in airline operations could improve efficiency and reliability compared to manual processes?	1	1	1	0
2.11 Did you experience smoother coordination between departments during delays, which you believe was supported by digital transformation efforts?	2	1	0	0
2.12 Did you consider that staff were able to provide faster and more accurate service thanks to integrated digital technologies (e.g., smart kiosks, real-time dashboards)?	3	0	0	0
3. How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?				
3.1 Did you consider how the capacity of AI to automate operations, analyze complex data, and improve outcomes makes it a game changer for businesses aiming to remain competitive?	3	0	0	0
3.2 Did you consider the possibility of AI to revolutionize industry norms through optimizing flight routes, predicting maintenance, and enhancing customer interactions?	2	0	0	1
3.4 Did you consider how airlines use AI and natural language processing to analyze customer reviews and social media feedback to improve service, customer satisfaction, safety, and	3	0	0	0

operational efficiency?				
3.5 Did you consider the diverse needs of airlines when focusing on the maintenance service model and aviation technical support service using advanced digitalization methods like artificial intelligence and the Internet of Things?	2	1	0	0
3.6 Did you consider that service is faster and more organized at Airport Terminal 3 due to the integration of advanced technologies in airport operations?	2	1	0	0
3.7 Did you consider that digital systems at Airport Terminal 3 have helped streamline routine administrative tasks for airline staff during busy periods?	1	2	0	0
3.8 Did you consider that using a standard form of AI implementation could increase the efficiency of operations at the airport?	3	0	0	0
3.9 Did you consider that AI offers transformative potential by revolutionizing various aspects of airport management?	3	0	0	0

Pilot Test Results

4 - Strongly agree; 3 - Agree; 2 - Disagree; 1 - Strongly Disagree

Statement	**4**	**3**	**2**	**1**
1. How does the lack of AI decision-making tools affect airline staff resource allocation, and how could AI improve it?				
1.1 Did you consider the potential of AI with more sophisticated information systems to provide decision support for flight operations in decentralized platforms?	11	21	4	2
1.2 Did you consider the need for AI to be relevant to education and training competencies to meet the aviation industry's demand to improve operations, efficiency, and safety?	13	19	3	3
1.3 Did you consider how AI could target operational efficiency in resource management in achieving sustainability goals in airport terminals?	13	17	7	1
1.4 Did you consider how the absence of AI tools for decision-making adds a manual workload to airline personnel?	14	9	14	1
2. Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce it?				
2.1 Did you consider whether AI-based simulations could mitigate workload to properly allocate resources (such as staff) during various disruptions?	11	21	4	2
2.2 Did you consider AI's virtual assistance in facilitating high demand to reduce the crew's regular workload?	12	17	7	2
2.3 Did you consider how machine learning-based facial recognition can mitigate time and improve detecting airline staff availability to prevent delays?	13	16	8	1
2.4 Did you consider that implementing AI-driven virtual queues and smart queue management tools could enhance airline staff allocation and optimize airport operations?	12	21	3	2
2.5 Have you considered that AI could enhance efficiency by automating repetitive manual tasks during operational delays?	18	15	4	1
2.6 Did you consider that AI could improve safety by reducing human errors in reporting and documentation?	12	18	5	3
2.7 Did you consider that using unsupervised learning in airline operations could improve efficiency and reliability compared to manual processes?	9	15	11	3
2.8 Did you consider that AI support might have contributed to smoother coordination between departments during delays?	14	17	6	1
2.9 Did you consider that staff were able to provide faster and more accurate service thanks to integrated digital technologies (e.g., smart kiosks, real-time dashboards)?	15	15	5	3
3. How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?				
3.1 Did you consider how the capacity of AI to automate operations, analyze complex data, and improve outcomes makes it a game changer for businesses aiming to remain	13	22	1	2

competitive?				
3.2 Did you consider that digital systems at Airport Terminal 3—such as self-service kiosks, biometric check-ins, and real-time baggage tracking—have helped streamline routine administrative tasks for airline staff and improve service speed and organization during busy periods?	16	17	3	2
3.3 Did you consider that AI offers transformative potential by revolutionizing various aspects of airport management?	15	15	7	1
3.4 Did you consider how airlines use AI and natural language processing to analyze customer reviews and social media feedback to improve service, customer satisfaction, safety, and operational efficiency?	11	19	8	0
3.5 Did you consider the diverse needs of airlines when focusing on aviation technical support services using advanced digitalization methods like artificial intelligence and the Internet of Things?	12	18	6	2
3.6 Did you consider that using a standard form of AI implementation could increase the efficiency of operations at the airport?	10	22	5	1

Appendix C: Final Instruments (Survey)

PATTS College of Aeronautics
...where dreams take flight

Dear Respondents,

This survey focuses on usage of Artificial Intelligence Assistance in Enhancing Flight Operations in a known major airport in the Philippines. Therefore, we sincerely request for your cooperation to kindly honestly answer the survey questions by choosing the appropriate answers based on your experience. Your answers will be kept confidential and it would benefit future research endeavors.

Profile

Name (Optional): Age:

Gender:

☐ Male ☐ Female

Occupation:

☐ Flight Operations ☐ Ground Operations

Survey questions about the study entitled "Artificial Intelligence in Reforming General Aviation Operations at an airport in Pasay City: A Focus on Enhancing Airline Staff Roles."

4 - Strongly Agree 3 - Agree 2 - Disagree 1 - Strongly Disagree

Statement	4	3	2	1
SOP 1: How does the lack of AI decision-making tools affect airline staff resource allocation, and how could AI improve it?				
1.1 Did you consider the potential of AI with more sophisticated information systems to provide decision support for flight operations in decentralized platforms?				
1.2 Did you consider the need for AI to be relevant to education and training competencies to meet				

the aviation industry's demand to improve operations, efficiency, and safety?				
1.3 Did you consider how AI could target operational efficiency in resource management in achieving sustainability goals in airport terminals?				
1.4 Did you consider how the absence of AI tools for decision-making adds a manual workload to airline personnel?				
SOP 2: Why are manual workloads more time-consuming for airline staff during operational delays, and how could AI reduce them?				
2.1 Did you consider whether AI-based simulations could mitigate workload to properly allocate resources (such as staff) during various disruptions?				
2.2 Did you consider AI's virtual assistance in facilitating high demand to reduce the crew's regular workload?				
2.3 Did you consider how machine learning-based facial recognition can mitigate time and improve detecting airline staff availability to prevent delays?				
2.4 Did you consider that implementing AI-driven virtual queues and smart queue management tools could enhance airline staff allocation and optimize airport operations?				
2.5 Have you considered that AI could enhance efficiency by automating repetitive manual tasks during operational delays?				
2.6 Did you consider that AI could improve safety by reducing human errors in reporting and documentation?				
2.7 Did you consider that using unsupervised learning in airline operations could improve efficiency and reliability compared to manual processes?				
2.8 Did you consider that AI support might have contributed to smoother coordination between departments during delays?				
2.9 Did you consider that staff were able to provide faster and more accurate service thanks to integrated digital technologies (e.g., smart kiosks, real-time dashboards)?				
SOP 3: How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?				
3.1 Did you consider how the capacity of AI to automate operations, analyze complex data, and improve outcomes makes it a game changer for businesses aiming to remain competitive?				
3.2 Did you consider that digital systems at Airport Terminal 3—such as self-service kiosks, biometric check-ins, and real-time baggage tracking—have helped streamline routine administrative tasks for airline staff and improve service speed and organization during busy periods?				
3.3 Did you consider that AI offers transformative potential by revolutionizing various aspects of airport management?				
3.4 Did you consider how airlines use AI and natural language processing to analyze customer reviews and social media feedback to improve service, customer satisfaction, safety, and operational efficiency?				
3.5 Did you consider the diverse needs of airlines when focusing on aviation technical support services using advanced digitalization methods like artificial intelligence and the Internet of Things?				
3.6 Did you consider that using a standard form of AI implementation could increase the efficiency of operations at the airport?				

Validated by : Mr. Cyril Dela Calzada Mr. Adriel De Leon Ms. Jersey Leigh Pugay

APPENDIX C: FINAL INSTRUMENTS (INTERVIEW)

APPENDIX D: LETTERS

RD Form 22 (2024)

PATTS COLLEGE OF AERONAUTICS
Research and Development Center and the Research Ethics Committee

Ethics Review for Theoretical/Action Research

Directions: Researcher/s are required to complete the first section of this form and submit it, along with a hard copy of their proposal, to the Research and Development Center for assessment by a member of the Research Ethics Committee. The evaluation process will last for one week.

Research Title	:	Artificial Intelligence in Reforming General Aviation Operations at NAIA: A Focus on Enhancing Airline Staff Roles
Researcher/s Name	:	Torres, Sean Keriss S., Baclig, Stephen Edrich S., Banas, Vinson Lyle C. Gaayon, Harvielou P., Gesmundo Jared Ian P., Pangantihon, Ken Roden L.
Program/Department	:	Bachelor of Science in Air Transportation
Adviser	:	Dr. Marianne Shalimar Del Rosario
Program Chairperson	:	Mr. Cyril R. Dela Calzada, MEAM
Address	:	F2F4+VG2, Lombos Street, Paranaque, 1700 Metro Manila
Contact No.	:	09559714195
Email Address	:	seankeriss.torres@patts.edu.ph

Type of Submission :

- ☑ ~~Initial Submission~~
- ☐ Progress Report
- ☐ Resubmission
- ☐ Continuing Review

Nature and Type of Study

- ☑ ~~Undergraduate Thesis~~
- ☐ Masters Thesis
- ☐ Doctorate Dissertation
- ☐ Funded Research
- ☐ Others _____
- ☐ Basic Research
- ☐ Instructional Materials
- ☐ Social and Observational Research
- ☐ Community Extension

RD Form No. 17 (2024)

PATTS COLLEGE OF AERONAUTICS
Research and Development Center and the Research Ethics Committee

Informed Consent for Research

A. RESEARCH INFORMATION

Title of the Study: "Artificial Intelligence in Reforming General Aviation Operations at NAIA: A Focus on Enhancing Airline Staff Roles"

Purpose of the Study: This research specifically focuses on reforming general aviation operations at Ninoy Aquino International Airport (NAIA), with the aim of enhancing the quality and efficiency of Airline Staff Roles.

Department: BS in Air Transportation	Course Chairperson: Mr. Cyril R. Dela Calzada
Research Adviser: Ms. Marianne Shalimar G. Del Rosario, DEM	Researcher/s: Sean Keriss S. Torres, Stephen Edrich S. Baclig, Vinson Lyle C. Bañas, Harvielou P. Gaayon, Jared Ian P. Gesmundo, Ken Roden L. Pangantihon

B. PARTICIPANTS ARE EXPECTED TO:

1. You're invited to either answer a questionnaire or participate in an interview. You can join us in person or connect via video at a mutually convenient time for valuable input.
2. If you choose to opt-out or decide to discontinue your participation, please notify the researchers promptly. Your decision will not affect our relationship with you

C. CONFIDENTIALITY PROCEDURES, DATA USE, AND STORAGE

The respondents, participants, or informants, as well as their schools or affiliations, will be kept as anonymous as possible, along with ensuring the confidentiality of responses. By assigning codes instead of using names, we aim to protect your identity.

Rest assured that no respondent, participant, or informant will be identified in any reports or presentations stemming from the study.

Data collected from this study may be utilized in subsequent research and presented at scientific conferences, strictly for academic purposes. Upon completion of the project, you will have the option to request a summary of the results via mail or receive a hard copy of the complete manuscript.

Appendix E: Spss Tables/Meta-Analysis Tables

Frequency

AGE					
	AGE	**FREQUENCY**	**PERCENT**	**VALID PERCENT**	**CUMULATIVE PERCENT**
VALID	22-27	14	75.0	77.8	77.8
	28-35	4	25.0	22.2	100.0
	TOTAL	18	100.0		

GENDER					
	GENDER	**FREQUENCY**	**PERCENT**	**VALID PERCENT**	**CUMULATIVE PERCENT**
VALID	MALE	14	75.0	77.8	77.8
	FEMALE	4	25.0	22.2	100.0
	TOTAL	18	100.0		

OCCUPATION					
	PROFESSION	**FREQUENCY**	**PERCENT**	**VALID PERCENT**	**CUMULATIVE PERCENT**
VALID	Flight Ops	10	55.0	55.6	55.6
	Ground Ops	8	45.0	44.4	100.0
	TOTAL	18	100.0		

Descriptive Statistics

Statement of the Problem #1

How does the lack of AI decision-making tools affect airline staff resource allocation, and how could AI improve it?

Item	N	Minimum	Maximum	Mean	Standard Deviation
1.1 AI with more sophisticated information systems can provide decision support for flight operations in decentralized platforms.	18	1.00	4.00	2.5000	1.04319
1.2 AI should be relevant to education and training competencies to improve operations, efficiency, and safety.	18	1.00	4.00	2.3889	1.09216
1.3 AI can target operational efficiency in resource	18	1.00	4.00	2.7222	1.01782

management to achieve sustainability goals in airport terminals.					
1.4 The absence of AI tools for decision-making adds manual workload to airline personnel.	18	1.00	4.00	2.5556	1.04162
Valid N (listwise)	18				

Statement of the Problem #2

Why are manual workloads more time-consuming on airline staff during operational delays, and how could AI reduce them?

Item	N	Minimum	Maximum	Mean	Standard Deviation
2.1 AI-based simulations could mitigate workload by properly allocating resources during disruptions.	18	1.00	4.00	2.5556	0.70479
2.2 AI's virtual assistance could facilitate high demand and reduce crew workload.	18	1.00	4.00	2.5556	1.14903
2.3 Machine learning-based facial recognition can mitigate time and improve detection of staff availability.	18	1.00	4.00	2.7222	1.27443
2.4 AI-driven virtual queues and smart queue management tools can enhance staff allocation and optimize operations.	18	1.00	4.00	3.0000	0.90749
2.5 AI can enhance efficiency by automating repetitive manual tasks during delays.	18	1.00	4.00	2.6111	0.97853
2.6 AI can improve safety by reducing human errors in reporting and documentation.	18	1.00	4.00	2.4444	0.98352
2.7 Unsupervised learning in airline operations can improve efficiency and reliability compared to manual processes.	18	1.00	4.00	2.0000	0.97014
2.8 AI support may contribute to smoother coordination between departments during delays.	18	1.00	4.00	2.6667	1.13759
2.9 Integrated digital technologies can help staff provide faster and more accurate service.	18	1.00	4.00	3.1111	0.83235
Valid N (listwise)	18				

Statement of the Problem #3

How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?

Item	N	Minimum	Maximum	Mean	Standard Deviation
3.1 AI can automate operations, analyze complex data, and improve outcomes, making it a game changer for businesses.	18	1.00	4.00	2.7222	0.89479
3.2 Digital systems at Airport Terminal 3 have streamlined routine administrative tasks and improved service speed and organization.	18	1.00	4.00	3.1111	0.96338
3.3 AI offers transformative potential by revolutionizing various aspects of airport management.	18	1.00	4.00	2.8889	0.83235
3.4 Airlines use AI and natural language processing to analyze customer reviews and social media feedback to	18	1.00	4.00	3.0000	0.76696

improve service and efficiency.					
3.5 Aviation technical support services can benefit from advanced digitalization methods such as AI and the Internet of Things.	18	1.00	4.00	2.7222	1.01782
3.6 A standard form of AI implementation could increase the efficiency of airport operations.	18	1.00	4.00	2.7222	1.01782
Valid N (listwise)	18				

T-TEST

Table: Group Statistics by Age

Statement of the Problem #1

How does the lack of AI decision-making tools affect airline staff resource allocation, and how could AI improve it?

Item	Age	N	Mean	SD	SEM
1.1 AI decision support for flight operations in decentralized platforms	22–27	14	2.6429	1.08182	0.28913
	28–35	4	2.0000	0.81650	0.40825
1.2 AI relevance to education and training competencies	22–27	14	2.5000	1.16024	0.31009
	28–35	4	2.0000	0.81650	0.40825
1.3 AI for operational efficiency and sustainability goals	22–27	14	2.8571	1.02711	0.27451
	28–35	4	2.2500	0.95743	0.47871
1.4 Absence of AI tools adds manual workload	22–27	14	2.7143	1.06904	0.28571
	28–35	4	2.0000	0.81650	0.40825

Statement of the Problem #2

Why are manual workloads more time-consuming on airline staff during operational delays, and how could AI reduce them?

Item	Age	N	Mean	SD	SEM
2.1 AI-based simulations for resource allocation	22–27	14	2.7857	0.57893	0.15473
	28–35	4	1.7500	0.50000	0.25000
2.2 AI virtual assistance to reduce workload	22–27	14	2.6429	1.21574	0.32492
	28–35	4	2.2500	0.95743	0.47871
2.3 Facial recognition to prevent delays	22–27	14	2.9286	1.32806	0.35494
	28–35	4	2.0000	0.81650	0.40825
2.4 AI-driven virtual queues and smart queue management	22–27	14	3.0714	0.99725	0.26653
	28–35	4	2.7500	0.50000	0.25000
2.5 AI automation of repetitive tasks	22–27	14	2.7857	0.97496	0.26057
	28–35	4	2.0000	0.81650	0.40825
2.6 AI reduces human errors in reporting	22–27	14	2.5714	1.01635	0.27163

	28–35	4	2.0000	0.81650	0.40825
2.7 Unsupervised learning improves efficiency	22–27	14	2.1429	1.02711	0.27451
	28–35	4	1.5000	0.57735	0.28868
2.8 AI support improves coordination during delays	22–27	14	2.9286	1.07161	0.28640
	28–35	4	1.7500	0.95743	0.47871
2.9 Integrated digital technologies improve service	22–27	14	3.1429	0.94926	0.25370
	28–35	4	3.0000	0.00000	0.00000

Statement of the Problem #3

How do inconsistencies in aviation management and the lack of standardized AI implementation strategies at the airport slow technology adaptation?

Item	Age	N	Mean	SD	SEM
3.1 AI as a game changer for competitiveness	22–27	14	2.7143	0.99449	0.26579
	28–35	4	2.7500	0.50000	0.25000
3.2 Digital systems streamline administrative tasks	22–27	14	3.2143	0.89258	0.23855
	28–35	4	2.7500	1.25831	0.62915
3.3 AI revolutionizes airport management	22–27	14	3.0000	0.78446	0.20966
	28–35	4	2.5000	1.00000	0.50000
3.4 AI and NLP improve customer service and efficiency	22–27	14	3.1429	0.66299	0.17719
	28–35	4	2.5000	1.00000	0.50000
3.5 AI and IoT for aviation technical support	22–27	14	2.7857	1.05090	0.28087
	28–35	4	2.5000	1.00000	0.50000
3.6 Standard AI implementation increases efficiency	22–27	14	2.7857	1.05090	0.28087
	28–35	4	2.5000*	1.00000	0.50000

Statement of the Problem #1 – Group Statistics by Gender

Item	**Gender**	**N**	**Mean**	**SD**	**SEM**
1.1 AI decision support for flight operations	Male	14	2.3571	1.00821	0.26945
	Female	4	3.0000	1.15470	0.57735
1.2 AI relevance to education and training	Male	14	2.2857	0.99449	0.26579
	Female	4	2.7500	1.50000	0.75000
1.3 AI for operational efficiency and sustainability	Male	14	2.5714	1.01635	0.27163
	Female	4	3.2500	0.95743	0.47871
1.4 Absence of AI tools adds manual workload	Male	14	2.5000	0.94054	0.25137
	Female	4	2.7500	1.50000	0.75000

Statement of the Problem #2 – Group Statistics by Gender

Item	**Gender**	**N**	**Mean**	**SD**	**SEM**
2.1 AI-based simulations for resource allocation	Male	14	2.5000	0.65044	0.17384
	Female	4	2.7500	0.95743	0.47871
2.2 AI virtual assistance reduces workload	Male	14	2.5714	1.15787	0.30945
	Female	4	2.5000	1.29099	0.64550
2.3 Facial recognition improves staff availability detection	Male	14	2.6429	1.27745	0.34141
	Female	4	3.0000	1.41421	0.70711
2.4 AI-driven virtual queues and smart queue management	Male	14	3.0000	0.78446	0.20966
	Female	4	3.0000	1.41421	0.70711
2.5 AI automates repetitive manual tasks	Male	14	2.5714	0.93761	0.25059

	Female	4	2.7500	1.25831	0.62915
2.6 AI reduces reporting and documentation errors	Male	14	2.4286	0.93761	0.25059
	Female	4	2.5000	1.29099	0.64550
2.7 Unsupervised learning improves efficiency	Male	14	1.9286	0.99725	0.26653
	Female	4	2.2500	0.95743	0.47871
2.8 AI support improves coordination during delays	Male	14	2.5000	1.16024	0.31009
	Female	4	3.2500	0.95743	0.47871
2.9 Integrated digital technologies improve service	Male	14	3.1429	0.66299	0.17719
	Female	4	3.0000	1.41421	0.70711

Statement of the Problem #3 – Group Statistics by Gender

Item	Gender	N	Mean	SD	SEM
3.1 AI as a game changer for competitiveness	Male	14	2.6429	0.74495	0.19910
	Female	4	3.0000	1.41421	0.70711
3.2 Digital systems streamline administrative tasks	Male	14	3.0000	1.03775	0.27735
	Female	4	3.5000	0.57735	0.28868
3.3 AI revolutionizes airport management	Male	14	2.7857	0.80178	0.21429
	Female	4	3.2500	0.95743	0.47871
3.4 AI and NLP improve customer service and efficiency	Male	14	2.8571	0.77033	0.20588
	Female	4	3.5000	0.57735	0.28868
3.5 AI and IoT for aviation technical support	Male	14	2.6429	0.92878	0.24823
	Female	4	3.0000	1.41421	0.70711
3.6 Standard AI implementation increases efficiency	Male	14	2.6429	0.92878	0.24823
	Female	4	3.0000	1.41421	0.70711

Statement of the Problem #1 – Group Statistics by Occupation

Item	Occupation	N	Mean	SD	SEM
1.1 AI decision support for flight operations	Flight Ops	10	2.2000	1.13529	0.35901
	Ground Ops	8	2.8750	0.83452	0.29505
1.2 AI relevance to education and training	Flight Ops	10	2.3000	1.05935	0.33500
	Ground Ops	8	2.5000	1.19523	0.42258
1.3 AI for operational efficiency and sustainability	Flight Ops	10	2.4000	1.17379	0.37118
	Ground Ops	8	3.1250	0.64087	0.22658
1.4 Absence of AI tools adds manual workload	Flight Ops	10	2.5000	1.08012	0.34157
	Ground Ops	8	2.6250	1.06066	0.37500

Statement of the Problem #2 – Group Statistics by Occupation

Item	Occupation	N	Mean	SD	SEM
2.1 AI-based simulations for resource allocation	Flight Ops	10	2.6000	0.84327	0.26667
	Ground Ops	8	2.5000	0.53452	0.18898
2.2 AI virtual assistance reduces workload	Flight Ops	10	2.2000	1.13529	0.35901
	Ground Ops	8	3.0000	1.06904	0.37796
2.3 Facial recognition improves staff availability detection	Flight Ops	10	2.3000	1.25167	0.39581
	Ground Ops	8	3.2500	1.16496	0.41188
2.4 AI-driven virtual queues and smart queue management	Flight Ops	10	2.8000	0.78881	0.24944

	Ground Ops	8	3.2500	1.03510	0.36596
2.5 AI automates repetitive manual tasks	Flight Ops	10	2.4000	0.96609	0.30551
	Ground Ops	8	2.8750	0.99103	0.35038
2.6 AI reduces reporting and documentation errors	Flight Ops	10	2.3000	0.94868	0.30000
	Ground Ops	8	2.6250	1.06066	0.37500
2.7 Unsupervised learning improves efficiency	Flight Ops	10	2.1000	0.87560	0.27689
	Ground Ops	8	1.8750	1.12599	0.39810
2.8 AI support improves coordination during delays	Flight Ops	10	2.2000	1.22927	0.38873
	Ground Ops	8	3.2500	0.70711	0.25000
2.9 Integrated digital technologies improve service	Flight Ops	10	3.1000	0.73786	0.23333
	Ground Ops	8	3.1250	0.99103	0.35038

Statement of the Problem #3 – Group Statistics by Occupation

Item	Occupation	N	Mean	SD	SEM
3.1 AI as a game changer for competitiveness	Flight Ops	10	2.7000	0.94868	0.30000
	Ground Ops	8	2.7500	0.88641	0.31339
3.2 Digital systems streamline administrative tasks	Flight Ops	10	2.8000	1.13529	0.35901
	Ground Ops	8	3.5000	0.53452	0.18898
3.3 AI revolutionizes airport management	Flight Ops	10	2.8000	0.91894	0.29059
	Ground Ops	8	3.0000	0.75593	0.26726
3.4 AI and NLP improve customer service and efficiency	Flight Ops	10	2.8000	0.91894	0.29059
	Ground Ops	8	3.2500	0.46291	0.16366
3.5 AI and IoT for aviation technical support	Flight Ops	10	2.6000	1.07497	0.33993
	Ground Ops	8	2.8750	0.99103	0.35038
3.6 Standard AI implementation increases efficiency	Flight Ops	10	2.7000	1.05935	0.33500
	Ground Ops	8	2.7500	1.03510	0.36596

Appendix F: Interview Transcript

Researcher: Good morning, Ms. [confidential]

Informant 1: Good morning.

Researcher: We are fourth year students taking up Bachelor of Science in Air Transportation. Today, we request to conduct a face to face interview with you. Are you ready?

Informant 1: Yes, in answering your question, should I use English?

Researcher: You can answer our questions in English, Tagalog, or Taglish. It is up to you where you are most comfortable.

Informant 1: Okay.

Researcher: For our first question, Did you consider how machine learning-based facial recognition can mitigate time and improve detecting airline staff availability to prevent delays?

Informant 1: Yes, definitely. Because Machine learning and facial recognition can make a big difference in terms of time and efficiency. These systems can automatically detect when staff check in and where they are located in the terminal, helping operations managers quickly fill any staffing gaps before they lead to delays.

Researcher: And it's really effective?

Informant 1: Yes. I am currently working at the airport, and I've seen how crucial it is for everyone to be available. Even small delays in communication or coordination can affect departure times. When staff availability is tracked in real time through smart systems, it helps in reducing stress and keeps the entire turnaround process running smoothly.

Researcher: Okay, for our next question, did you consider that AI support might have contributed to smoother coordination between departments during delays?

Informant 1: Yes, integrated digital tools like smart kiosks for passengers and real-time dashboards for staff, speeding up communication and reducing the chance for errors.

Researcher: So, it helped you daily at work?

Informant 1: Yeah, because for me, this is something I personally experience every day. As a load controller, using digital load planning systems has made a huge difference. Before, everything was more manual, from calculating the weight and balance to printing documents. Now, we can access real-time data, instantly generating load sheets, and communicating changes with the cockpit and ground staff without delay. It reduces our workload and improves the accuracy of every flight plan. This allows us to focus more on safety and less on paperwork, and the faster turnaround contributes directly to on-time performance.

Researcher: For our last question Ms. [Confidential], did you consider the need for AI to be relevant to education and training, competencies to meet the aviation industry's demand to improve operations, efficiency, and safety?

Informant 1: Absolutely. As AI and automation become more common in aviation, it's important that we're trained not only on how to use the tools but also how to understand and trust them. I've had to learn how to work with new systems that use AI to optimize weight distribution or predict loading issues.

Researcher: So, AI must be practiced and applied at work or school?

Informant 1: Yes, because at first, it can feel overwhelming, but proper training really makes a difference. When we understand how these technologies work, we can use them confidently to improve efficiency and safety. I believe ongoing training and upskilling should be a priority in the aviation industry. AI can't replace our experience or decision-making, but it can support us, and with the right knowledge, we can get the best out of both human expertise and digital technology.

Researcher: That is the end of our interview. We would like to express our gratitude for allowing us to interview you, Ms. [Confidential]. Your insights will surely contribute to our thesis study. See you soon in the field.

Informant 1: I hope I was able to answer all of your questions. See you around, and best of luck with your thesis.

Researcher: Again, thank you, Ms. [Confidential].

Researcher: Hello sir (Confidential), thank you for taking your time to meet with us today. Since you're one of our study validators, we have prepared 3 selective questions for you.

Informant 2: Good afternoon, and thank you for the opportunity to speak with you. I feel a bit overwhelmed due to many recent events, but I am ready to proceed whenever you are.

Researcher: Okay sir, no pressure. We just want to have a candid conversation with you and your instance, so to begin with

Researcher: Did you consider how machine learning-based facial recognition can mitigate time and improve airline staff availability detection to prevent delays?

Informant 2: Yes, I do consider that machine learning in terms of facial recognition can mitigate the issues or

problems within the airlines to properly trace what is the primary cause of the delays or what is affecting the delays, especially when we are pertaining to our airline staff availability, which is good because AI or machine learning can simply sort out in terms of the personnel who are going to exceed the duty period, persons who have enough rest period for the airline, or staffing personnel, and can easily distribute persons across departments based on their availability.

Researcher: For our next question, did you consider that AI support might have contributed to smoother coordination between departments during delays?

Informant 2: Ok so you are pertaining during the delays, AI could definitely help because for example personnel or employees going to enter specific data on their entry and AI is already integrated to that system so when it comes to querying for example regarding for the status of the or in flight so the ground personnel or the airline personnel can easily look for the info that they need based on the AI support on the current input of the personnel performing let's say the tasks to smoothen the workflow of each aviation personnel especially when it comes to delay because AI can be or you can set a specific instruction for example I input refuelling delays so based on the key word, AI can now interpret on the system that the cause of the delay is because the fuel in trucks arrives its either late or there is a technical issues with the refueller so yeah it helps when it comes to coordination with different team because we all know in airlines, there is a different departments, there is a ramp agents, maintenance department, flight ops departments so yes it definitely helps

Researcher: Hold your breath, sir, because this is our last question for you. Did you consider the need for AI to be relevant to education and training competencies to meet the aviation industry's demand to improve operations, efficiency, and safety?

Informant 2: Ok so regarding for your question on what's the importance of AI in terms of education, I do believe at some point that AI is a helpful tool but if we're going to replace the natural way of learning for example in a classroom set up and there's an instructor teaching the modules so I think that's different when it comes to AI because AI will help you as a supporting tool for your learning process but let say, changing or replacing the instructor over AI for your education or training in the company, I think it is for now good to consider because there are factors as well to consider about data privacy and something like that so for now, it is a great tool to support but if we're going to replace traditional way, I think think that is not doable as of this moment.

Researcher: I think that's the end of our interview, sir. We are so grateful for the insights you have shared with us, and we'll see you at our next subject, sir.

Informant 2: thank you as well, guys. Be certain that my answers are based on my direct experience during my flight operation officer era and as an instructor of our institute.

Researcher: Good morning, Sir! Kindly state your name, age, sex and occupation.

Informant 3: I'm [Confidential], 29, Male and I am a consultant in [Confidential], also a consultant in [Confidential], consultant in [Confidential], and chairperson at [Confidential].

Researcher: For our first question, Did you consider how machine learning-based facial recognition can mitigate time and improve airline staff availability detection to prevent delays?

Informant 3: Well, of course I think I would agree with this one. So, definitely uhh facial recognition can be a big leap forward in regards to minimizing the lack of manpower especially to different uhh passenger processing counters and not just on the airline staffs, also to the whole uhh airport processing staffs, including the security.

Researcher: For our next question, did you consider that AI support might have contributed to smoother coordination between departments during delays?

Informant 3: Yes! Definitely, I agree with the AI support however, there should be a limitation. Uhh incorporating AI procedures or AI programs and flight operations for example. There should always be a

limitation. AI should never be given a privilege to aeronautical decision making, uhh humans should also have the control over AI. So, yes AI Support can contribute for smoother coordination however, there should be limitation especially to uhh critical documents, and only just to provide coordination between departments, especially in the airlines, we are talking about a lot of departments, we have the maintenance, we have the marketing, we have the flight operations, we have the ground handling and so on and so forth. So, implementing AI programs can support coordination however, there should always be a limitation.

Researcher: For our last question, did you consider the need for AI to be relevant to education and training competencies to meet the aviation industry's demand to improve operations, efficiency, and safety?

Informant 3: Implementing AI relevant to education and training competencies, we are already doing that most especially here at [Confidential] we are already implementing, uhh, AI Programs in order to have a more efficient quality education and definitely training and improving the competencies of our students. However, regarding the aviation industry, programs can also help in keeping our training syllabus updated to the most current issues, events, most especially in the aviation industry.

Researcher: Thank you, Sir! We are so grateful for the insights you have shared with us. Thank you for your time!

Appendix G: Plagiarism Check

DrillBit

The Report is Generated by DrillBit Plagiarism Detection Software

Submission Information

Author Name	2022-1-1302 Torres, Sean Kerlss S.
Title	Artificial Intelligence in Reforming General Aviation Operations at an airport in Pasay City: A Focus on Enhancing Airline Staff Roles
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Result Information

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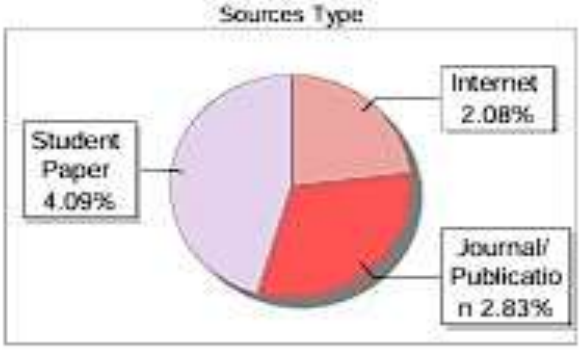

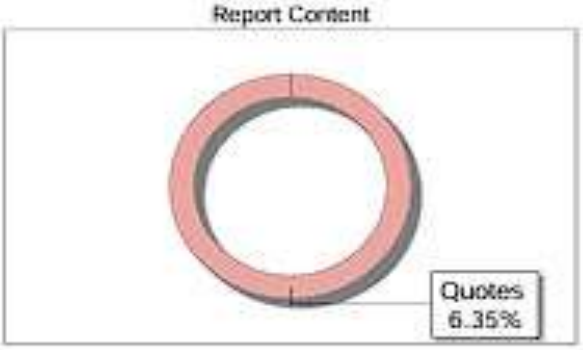

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DrillBit Similarity Report

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3	Submitted to PATTS College of Aeronautics Philippines on 2024-11-26 08-45 2589684	1	Student Paper
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5	www.ijraset.com	1	Publication
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11	www.ijrdo.org	<1	Publication
12	econpapers.repec.org	<1	Internet Data

Appendix H: Bionote

Sean Keriss S. Torres was born on December 04, 2003, in the City of Cavite. She studied elementary at Saint Augustine School, High School at Tanza National Comprehensive High School, and graduated from Senior High School at Tanza National Comprehensive Senior High School with a STEM Program. In addition to her academic pursuits, she is an avid researcher since she is from a Special Science Class throughout her whole high school time and has been conducting experimental research studies ever since. Throughout her academic journey, she has demonstrated great skill in leadership. Keriss actively

enhances her college experience by participating in diverse organizations alongside her coursework.She excels at mastering complex terminology, with a particular focus on safety, meteorology, and specialized training programs such as Visual Vectoring and Enroute Training (VVET) and Maintenance, Repair, and Overhaul Training (MROT). She is enthusiastic about contributing meaningfully to team projects and remains steadfast in her pursuit of excellence, aiming to excel in the aviation industry.

Stephen Edrich S. Baclig was born in the big city of Binan, Laguna. He is an optimistic individual who is working toward his goals. Stephen finished his senior year of high school at Colegio San Agustin Southwoods Interchange, setting the foundation for his professional life. Stephen is now pursuing his dream of becoming a flight operations officer and reaching greater heights by studying aeronautics at PATTS College of Aeronautics. His enthusiasm for aviation drives him to pursue this goal. Along with his coursework, Stephen often

engages in a variety of groups that heighten his college experience. He is very excellent at studying and memorizing terms, prioritizing safety, meteorology, and specialized training programs like Visual Vectoring and Enroute Training (VVET) and Maintenance, Repair, and Overhaul Training (MROT). Stephen's commitment to both individual and group development is further shown by his membership in GATS. He is a dedicated and studious student with a passion for aviation. With a strong academic background and a knack for memorizing and problem-solving, he is eager to contribute to team projects. He is committed to excellence and strives to achieve his goal, to thrive in the field of aviation.

Vinson Lyle C. Bañas was born on March 2, 2004, in Mandaluyong City and studied at Paco Catholic School from Pre-School up to Senior High School, and pursued a Bachelor of Science in Air Transportation at PATTS College of Aeronautics. He has a solid foundation in air traffic operations thanks to his practical experience and training at PATTS College of Aeronautics. He specializes in flight planning, meteorology, and flight operations. In addition to his academic background, he attended various seminars, specialized programs, and training, including

Virtual Vectoring and Enroute Training, Maintenance and Repair, and Overhaul Training. He is a Motivated and detail-oriented aviation enthusiast with a strong foundation in Air Transportation. He is known for his strong problem-solving abilities and excellent communication skills, and He is committed to upholding safety and efficiency standards while contributing positively to a team environment.

Harvielou P. Gaayon, born on the 2nd day of March 2004, in Tabuk City, Kalinga, is a proud alumnus of the STEM program at Saint William's Academy, graduated with an academic excellence award, and is one of the qualifiers of the 2022 DOST-SEI scholarship. He also passed the Civil Service Examination (Professional Level) during his 2nd year of college. And throughout his stay in the province, Harvielou has actively engaged in community outreach programs, which help him see the beauty of helping with a sense of social

responsibility. Now, he is currently pursuing a Bachelor of Science in Air Transportation at PATTS College of Aeronautics, where he is gaining in-depth knowledge of the aviation industry through hands-on training and practical experience. Harvielou also took part in various seminars and specialized training programs to broaden his personal and professional skills. He is a committed and collaborative team player who places great importance on continuous learning and development. Harvielou is driven to apply his skills to improve the safety and efficiency of aviation operations while further deepening his expertise in the field.

Jared Ian P. Gesmundo was born on August 20, 2003, in San Pablo City, Laguna. He graduated from the STEM program at Canossa College of San Pablo, actively competing in outside school activities and competitions. He is currently pursuing a Bachelor of Science in Air Transportation at PATTS College of Aeronautics, where he gained in-depth skills through training and practical experience, developing teamwork, good communication, adaptability, flexibility, critical thinking, and time management. He practiced these skills to broaden

the knowledge that he can use in his field of work. Jared actively engages in seminars and specialized training programs, including Visual Vectoring, route operations, and Maintenance, Repair, and Overhaul (MRO) Technical Training. Committed and collaborative, a dynamic team player who engages in all aspects of activities and is willing to learn from his field, he places great importance on continuous learning and professional development. He is driven to apply his learning to improve his knowledge and skills while further deepening his expertise in the future to gain experience. He is ready to apply the knowledge he learned in the field of aviation.

Ken Roden L. Pangantihon was born on November 22, 2003, in Quezon City. He completed the Science, Technology, Engineering, and Mathematics (STEM) course at the Far Eastern University (Manila) before attaining a Bachelor of Science in Air Transportation at PATTS College of Aeronautics. This education provides him with a solid foundation and practical experiences in air traffic processes. He specializes in essential operational areas, including flight planning, meteorology, and weight and balance calculations, with additional

exposure to training such as Visual Vectoring Enroute Training and a Maintenance, Repair and Overhaul Technical Training seminar. He is a conscientious and self-directed thinker who will utilize his experience and passion for ongoing learning in an organization. He is dedicated to the safety and efficiency of saviation.