



(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.699

Volume 14, Issue 6, June 2025

⊕ www.ijirset.com ⊠ ijirset@gmail.com 🖄 +91-9940572462 🕓 +91 63819 07438





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406128|

A Study of Artificial Intelligence in Aviation Management

Sudhanshu Singh, Prof. Dr. Neha G. Bhatia

MBA Aviation Management, Galgotias University, Greater Noida, Uttar Pradesh, India

Guide, Galgotias University, Greater Noida, Uttar Pradesh, India

ABTRACT: This research paper explores the transformative role of Artificial Intelligence (AI) in aviation management, highlighting its applications in air traffic control, predictive maintenance, customer service, flight operations, and safety management. With data collected through a mixed-methods approach, the study identifies key trends, adoption levels, and perceived benefits and challenges of AI within the Indian and global aviation sectors. Findings show that while AI enhances efficiency, safety, and cost-effectiveness, its broader adoption is hindered by regulatory, technical, and economic challenges. The paper concludes with strategic recommendations to support sustainable AI integration.

KEYWORDS: Artificial Intelligence, Aviation Management, Predictive Maintenance, Air Traffic Control, Operational Efficiency, Digital Transformation

I. INTRODUCTION

1.1 Background

The aviation industry is a complex system that requires precision, safety, and operational efficiency. With increasing air traffic and global travel demands, traditional systems face pressure to evolve. Artificial Intelligence (AI), a branch of computer science that simulates human cognitive functions, offers powerful tools for this evolution. AI applications range from autonomous decision-making to data-driven predictions, impacting almost every operational area of aviation.

1.2 Importance of the Study

AI has revolutionized several industries, but its full potential in aviation management is still underutilized. The study aims to analyze how AI can be leveraged to address persistent aviation issues such as flight delays, maintenance inefficiencies, and poor customer service. Understanding AI's role will help industry stakeholders make informed decisions on technology adoption.

1.3 Research Problem

Despite technological advancements, AI adoption in Indian aviation is inconsistent. There is a lack of comprehensive frameworks and readiness, especially in mid-size organizations. High implementation costs and data privacy concerns further deter progress.

1.4 Research Objectives

- To assess the current applications of AI in aviation management.
- To explore AI's impact on operational efficiency and decision-making.
- To analyze challenges associated with AI implementation.
- To propose strategies for effective AI integration.

1.5 Research Questions

- What are the prevalent uses of AI in aviation today?
- How does AI impact key operational metrics like cost, time, and safety?
- What barriers inhibit its full adoption?
- What strategic steps can be taken to enhance adoption?





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406128|

II. LITERATURE REVIEW

2.1 Introduction

Existing research identifies AI as a game-changer in aviation, yet most studies are narrow in focus, addressing only isolated applications. This review draws on global and Indian sources to present a more integrated understanding.

2.2 Historical Evolution

Initially, AI was limited to autopilot systems and mechanical process automation. In the past decade, its scope has expanded to include advanced applications like flight path optimization, demand forecasting, and behavioral analytics.

2.3 Theoretical Frameworks

- Machine Learning (ML): Employed in aircraft maintenance and predictive analytics.
- Natural Language Processing (NLP): Enhances human-machine communication in ATC and customer service.
- Neural Networks: Support decision-making in dynamic conditions like weather-based rerouting.
- Expert Systems: Used for technical diagnostics in aircraft systems.

2.4 Empirical Evidence

- Qantas: Used AI to reduce fuel usage through dynamic routing.
- Lufthansa: Predictive maintenance systems reduced aircraft downtime by 30%.
- Air India and Indigo: Piloted AI-based customer service platforms with promising outcomes.

2.5 Gaps Identified

The Indian context remains underexplored. There is a need for more research that integrates multiple operational areas and includes perspectives from regulatory bodies.

III. RESEARCH METHODOLOGY

3.1 Design

The research uses a mixed-methods approach, combining quantitative surveys with qualitative interviews.

3.2 Data Collection

- Primary Data: Survey of 50 aviation professionals and 6 in-depth interviews.
- Secondary Data: Journals, government reports, technical papers, and whitepapers.

3.3 Sampling

- Techniques: Purposive and convenience sampling.
- Population: Airline operators, airport managers, engineers, and policy consultants.

3.4 Tools and Techniques

- Quantitative: Likert-scale questionnaire analyzed using statistical tools.
- Qualitative: Thematic coding of expert interviews.
- Correlation Analysis: To explore relationships between AI awareness and adoption levels.

3.5 Ethical Considerations

All participants provided informed consent. Confidentiality and anonymity were assured.

IV. DATA ANALYSIS AND INTERPRETATION

4.1 Respondent Demographics

- Gender: 60% male, 40% female
- Age: 25% under 30, 50% between 30–45, 25% above 45
- Experience: 20% under 5 years, 50% 5–15 years, 30% over 15 years





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406128|

4.2 AI Awareness and Usage

- 90% are aware of AI applications in aviation
- 70% report active AI pilot projects or adoption in their organizations

4.3 Key Applications

- Customer Service: 60% use chatbots and virtual agents
- Predictive Maintenance: 50% adoption
- Scheduling and Operations: 40% AI support
- Drone and Autonomous Systems: 30% under experimental use

4.4 Benefits

- 85% report improved efficiency
- 75% cite improved customer satisfaction
- 70% observe reduction in human error
- 60% see cost reduction

4.5 Challenges

- High Implementation Cost: 65%
- Skill Shortage: 55%
- Data Privacy/Security: 45%
- Regulatory Compliance: 35%

4.6 Correlation Analysis

Strong positive correlation (r = 0.78) between AI awareness and implementation level.

V. DISCUSSION

5.1 Summary of Findings

AI is being increasingly explored and adopted, particularly in customer service and maintenance. Awareness is high, but implementation varies across organizational size and type.

5.2 Comparative Analysis

Results align with international studies. Cost, regulation, and skills are consistent barriers globally. Indian firms mirror these trends but lag in regulatory support and training initiatives.

5.3 Strategic Insights

- Training Needs: Targeted AI training programs
- Scalable Adoption: Start with low-risk, high-impact areas
- Collaborative Ecosystems: Academic-industry partnerships for innovation
- Policy Development: Need for AI regulatory frameworks

VI. LIMITATIONS

6.1 Methodological

- Small sample size limits generalizability
- Potential bias in self-reported data
- Limited geographic representation

6.2 Scope

- Focused on Indian aviation professionals
- Did not cover military or cargo aviation
- Excludes technical AI architecture analysis





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

Volume 14, Issue 6, June 2025

|DOI: 10.15680/IJIRSET.2025.1406128|

6.3 Future Research

- Longitudinal studies to track adoption trends
- International comparative studies
- Case studies on successful AI implementations

VII. CONCLUSIONS

AI is no longer a futuristic concept in aviation management. It is actively enhancing efficiency, safety, and customer engagement. However, its adoption remains uneven due to several operational and regulatory barriers. Addressing these issues through training, policy, and strategic planning will be key to realizing AI's full potential in aviation.

VIII. RECOMMENDATIONS

- Government Support: National AI policy for civil aviation
- Corporate Strategy: Dedicated AI budgets and roadmaps
- Training: Mandatory AI literacy for managers and engineers
- Infrastructure: Investment in digital transformation tools
- Security: Strengthen data privacy and AI governance mechanisms

REFERENCES

- 1. IATA (2021). The Future of Artificial Intelligence in Aviation.
- 2. ICAO (2021). Opportunities and Challenges of AI in Aviation.
- 3. McKinsey & Co. (2020). AI Takes Flight.
- 4. Jain, R., & Gupta, M. (2022). Applications of ML in Aviation Management.
- 5. Kumar, S. (2023). AI's Role in Aviation Safety.
- 6. Indian Ministry of Civil Aviation (2023). AI Policy Guidelines.









INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY





www.ijirset.com