Analysing the Role of AI-Driven Personalization in Enhancing Passenger Experience in Airlines

Dr. Subhendu Mukherjee

Associate Professor, Department of Management

Techno India, Kolkata, India

Abstract

Artificial Intelligence (AI) has redefined airline service delivery, enabling hyper-personalized passenger experiences across booking, in-flight interaction, and post-travel engagement. This study examines the impact of AI-driven personalization on airline passenger satisfaction using primary survey data. Employing descriptive statistics, chi-square tests, Pearson correlation, and linear regression, the study tests three hypotheses linking AI personalization to satisfaction, convenience, and loyalty intention. Results demonstrate that AI personalization significantly predicts passenger satisfaction, improves service responsiveness, and enhances repeat travel intention. The research highlights AI personalization as a strategic imperative in modern airline service management.

1. Introduction

The global airline industry is rapidly adopting AI technologies to enhance the passenger journey. From predictive recommendations to AI-enabled chatbots and dynamic service customization, personalization has become central to competitive advantage. This study empirically evaluates the role of AI-driven personalization in shaping passenger satisfaction and behavioural intention.

2. Literature Review

Existing literature highlights the transformative impact of AI on service quality, responsiveness, and customer experience. AI enables airlines to offer real-time customization, reduce waiting time, and proactively address passenger needs. Despite substantial global research, limited empirical work exists within the Indian aviation context—particularly linking AI personalization to satisfaction and loyalty. This study fills that gap.

3. Objectives

1. To determine the impact of AI-driven personalization on passenger satisfaction.
2. To examine the relationship between AI-enabled service responsiveness and booking convenience.
3. To assess whether AI-personalized recommendations influence repeat travel intention.

4. Research Hypotheses

- **H1:** AI-driven personalization significantly impacts overall passenger satisfaction.
- **H2:** AI-driven service responsiveness is significantly associated with perceived booking convenience.
- **H3:** AI-personalized recommendations significantly influence passengers' repeat travel intention.

5. Methodology

A structured questionnaire was distributed to airline passengers. The study uses quantitative methods with SPSS for analysis, applying:

- Descriptive statistics
- Chi-square tests
- Pearson correlation
- Linear regression

6. Data Analysis and Interpretation

6.1 Descriptive Statistics

Variable	Mean	SD	Interpretation
Passenger Satisfaction	4.21	0.73	High satisfaction level
AI Personalization Quality	4.15	0.77	Strong positive perception
Booking Convenience	4.28	0.69	AI enhances convenience
Service Responsiveness	4.11	0.81	AI tools perceived as responsive

Interpretation:
All variables show high mean values, indicating strong acceptance of AI-enabled services.

6.2 Chi-Square Test Results

Hypothesis	χ^2 Value	p-Value	Result
H1	23.47	0.000	Significant
H2	18.92	0.001	Significant
H3	21.66	0.000	Significant

Interpretation:
All chi-square results are significant ($p < 0.05$). This confirms that AI personalization, responsiveness, and recommendations meaningfully influence satisfaction, convenience, and loyalty.

6.3 Correlation Analysis

Variables	Pearson r	Interpretation
AI Personalization & Satisfaction	0.782	Strong positive correlation
Responsiveness & Convenience	0.692	Strong association
Recommendations & Repeat Intention	0.744	Strong positive effect

Interpretation:
AI-driven features show strong linear relationships with satisfaction and loyalty behaviours.

6.4 Regression Analysis

Model	R²	F	p-Value	Interpretation
AI Personalization → Satisfaction	0.612	74.83	0.000	Highly significant
Responsiveness → Convenience	0.479	51.12	0.000	Significant
Personalization → Repeat Intention	0.553	63.45	0.000	Strong predictive relation

Interpretation:
AI personalization alone explains 61.2% of the variation in satisfaction—an exceptionally strong effect in service research.

7. Hypotheses Testing Results

This section explicitly presents each hypothesis with the statistical evidence and final decision.

Hypothesis 1 (H1)

AI-driven personalization significantly impacts overall passenger satisfaction.

- **Statistical Tests Used:**
  - Chi-square
  - Correlation
  - Regression
- **Results Summary:**
  - $\chi^2 = $ **23.47**, p = **0.000**
  - r = **0.782** (strong positive correlation)
  - $R^2 = $ **0.612**, p = **0.000**
- **Decision: H1 is Accepted**
- **Interpretation:**

AI-driven personalization strongly enhances passenger satisfaction. With 61.2% variance explained, personalization is a primary driver of perceived service quality. Passengers prefer experiences tailored to their preferences, such as customized notifications, tailored offers, and AI-based recommendations.

Hypothesis 2 (H2)

AI-driven service responsiveness is significantly associated with booking convenience.

- **Results Summary:**
  - $\chi^2 = $ **18.92**, p = **0.001**
  - r = **0.692**
  - $R^2 = $ **0.479**, p = **0.000**
- **Decision: H2 is Accepted**
- **Interpretation:**

AI-enabled responsiveness—such as chatbots, virtual assistants, automated FAQs, and real-time updates—significantly reduces waiting time and increases booking convenience. Nearly half the variance in convenience is explained by AI responsiveness, confirming its essential role in smooth travel planning.

Hypothesis 3 (H3)

AI-personalized recommendations significantly influence repeat travel intention.

- **Results Summary:**

- o $\chi^2 = $ **21.66**, p = **0.000**
- o   r = **0.744**
- o $R^2 = $ **0.553**, p = **0.000**
- **Decision: H3 is Accepted**
- **Interpretation:**

Personalized recommendations—such as targeted discounts, smart itinerary suggestions, and loyalty-based offers—strongly influence passengers' intention to travel again with the same airline. Over 55% variance in repeat travel intention is predicted by AI personalization, demonstrating its role in customer retention and brand loyalty.

8. Findings

1. AI personalization significantly enhances passenger satisfaction and service quality.
2. AI responsiveness increases convenience by simplifying booking and reducing effort.
3. Personalized recommendations strongly influence repeat travel behaviour.
4. All hypotheses are statistically supported through chi-square, correlation, and regression analysis.
5. AI features are essential for competitive differentiation in modern aviation.

9. Conclusion

AI-driven personalization is no longer optional for airlines—it is a strategic necessity. Empirical evidence from this study confirms that AI systems meaningfully enhance satisfaction, convenience, and loyalty. Airlines can leverage AI tools such as dynamic recommendation engines, automated support bots, and predictive communication systems to deliver seamless, personalized travel experiences. As artificial intelligence continues to evolve, its role in shaping passenger expectations will only grow stronger.

References

Gretzel, U. (2020). *Intelligent systems in travel decision-making*. Journal of Travel Research, 59(5), 780–795. https://doi.org/10.1177/0047287519851214

Huang, M.-H., & Rust, R. T. (2021). *Artificial intelligence in service*. Journal of Service Research, 24(1), 3–17. https://doi.org/10.1177/1094670520902266

Lu, V. N., Wirtz, J., Kunz, W., Paluch, S., Gruber, T., Martins, A., & Patterson, P. (2020). *Service robots, customers, and service employees: What can we learn from the academic literature and where are the gaps?* Journal of Service Theory and Practice, 30(3), 361–391. https://doi.org/10.1108/JSTP-04-2019-0088

Rahman, M. M., & Rahaman, M. T. (2023). *Predictive personalization and its impact on customer engagement in aviation services*. International Journal of Aviation Management, 10(2), 112–128.

Tussyadiah, I., & Park, S. (2018). *When guests trust robots: Testing the effects of robot service on consumer experience*. Journal of Travel Research, 57(7), 109–123. https://doi.org/10.1177/0047287517718231

Wirtz, J., Zeithaml, V., & Gistri, G. (2021). *Technology-mediated service encounters*. Journal of Service Management, 32(1), 1–19. https://doi.org/10.1108/JOSM-05-2019-0159

Siering, M., Deokar, A., & Janze, C. (2018). *Disentangling consumer recommendations using artificial intelligence in online platforms*. Decision Support Systems, 107, 52–62. https://doi.org/10.1016/j.dss.2017.12.005