

Enhancing Customer Satisfaction in Domestic Air Travel Through A Web-Based Customer Information Management System: A Nigerian Case Study

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ABSTRACT: The airline industry globally has embraced digital transformation as a core strategy to enhance operational efficiency and improve customer satisfaction, especially in the face of increasing competition, regulatory pressures, and evolving consumer expectations. This study investigates the design and implementation of a web-based Customer Information Management System (CIMS) as a solution to these operational and service delivery challenges in Nigeria's domestic aviation sector. Guided by the Technology Acceptance Model (TAM), the study explores how perceived usefulness and ease of use influence the adoption of digital platforms in the airline industry. The research adopted the Structured Systems Analysis and Design Methodology (SSADM), incorporating qualitative interviews with airline personnel, document analysis, and system simulations. Functional and non-functional requirements were identified to guide system development, and thematic analysis of qualitative data revealed recurring inefficiencies, including poor complaint resolution, manual scheduling processes, and lack of transparency in maintenance updates. The proposed CIMS was developed to include modules for user registration, flight scheduling, complaint management, and maintenance reporting. Performance simulations demonstrated a significant improvement in responsiveness (average system response time of 1.82 seconds) and user capacity (over 1,300 simultaneous users), as well as a 65% reduction in complaint processing time. Findings affirm the value of SSADM in structuring complex service systems and highlight the importance of integrating qualitative insights into system design to ensure contextual relevance. While the methodology was effective, critiques of SSADM's rigidity and documentation intensity were acknowledged. Nonetheless, the system developed in this study presents a viable model for digital transformation in Nigerian aviation. The study recommends that domestic airlines adopt a CIMS to improve service quality and operational transparency, and urges regulatory bodies to support digital integration through policy frameworks and staff training programs.

KEYWORDS: Customer Satisfaction, Domestic Air Travel, Web-Based System, Customer Information Management System (CIMS), Airline Operations, Service Quality

1. INTRODUCTION

The global airline industry has long been recognized for its tireless pursuit of operational efficiency and enhanced customer satisfaction, even in the face of economic downturns, security threats, and global disruptions such as pandemics and geopolitical instability (IATA, 2023). Airlines worldwide have turned to digital transformation strategies including automated check-ins, personalized mobile applications, loyalty integration, and Customer Information Management Systems (CIMS) as essential tools to boost service quality, minimize delays, and create competitive differentiation (Oum et al., 2023; Park & Choi, 2024).

However, despite significant advancements, customer satisfaction in the airline sector remains relatively low. According to the American Customer Satisfaction Index (ACSI, 2023), passenger satisfaction with airlines declined for the second consecutive year, with customers citing poor communication, limited transparency in pricing and

scheduling, and inadequate problem-resolution mechanisms. These issues persist globally and are more pronounced in developing markets where infrastructure and digital adoption are lagging.

In the context of Nigeria, the domestic aviation industry presents a particularly complex challenge. While the sector has demonstrated notable growth in passenger numbers and route expansion in recent years, it remains plagued by service inconsistencies, fragmented communication systems, and limited technological integration (Uwakwe & Adekunle, 2023). Most Nigerian airlines continue to rely on manual processes for flight scheduling, passenger feedback management, and operational updates, leading to delays, lost records, and diminished customer trust. Scholars such as Edim et al. (2023) have argued that this technological backwardness negatively affects airline competitiveness and deters customer loyalty in an increasingly digital marketplace. Similar concerns have been raised across other

sectors of the Nigerian economy where limited adoption of intelligent information systems has been linked to operational inefficiencies, delayed decision-making, and reduced service quality (Okpare et al., 2023; Otuagoma et al., 2025; Eyenubo et al., 2025).

Proponents of adopting customer information systems in aviation emphasize the value of real-time communication, centralized data access, and customer service responsiveness. A study by Lee and Park (2024) found that implementing web-based customer management tools significantly improved passengers' perceptions of service quality and reduced complaint resolution time by over 40%. Similarly, Adiele and Ekpo (2024) highlighted that digital platforms improve transparency and facilitate timely access to airline schedules, fare changes, and service interruptions critical variables in customer decision-making. Evidence from related Nigerian studies further demonstrates that real-time monitoring and automated information systems improve operational performance, fault detection, and service responsiveness. For instance, telemetry-based monitoring systems have been shown to significantly reduce downtime and maintenance costs through continuous information gathering and reporting (Otuagoma et al., 2025), while wireless monitoring systems have demonstrated the effectiveness of automated data transmission in improving response times and operational awareness (Okpare et al., 2023). Likewise, intelligent forecasting systems have been successfully deployed to improve planning and resource allocation through predictive analytics (Eyenubo et al., 2025). On the other hand, some researchers caution that technological implementation alone does not guarantee improved customer satisfaction. Nnaji and Opara (2024) contend that without concurrent investment in staff training, infrastructure upgrades, and regulatory support, digital systems may underperform or frustrate users further. In some instances, poorly implemented digital interfaces have alienated elderly or less digitally literate passengers, raising concerns about inclusivity and accessibility (Obisesan, 2023). Furthermore, issues of cybersecurity and data privacy in Nigerian digital ecosystems remain a concern, especially in aviation, where customer data is highly sensitive (Olaniyi et al., 2024). The importance of system security has been highlighted in recent studies on intelligent authentication systems, which emphasize the need for robust access-control mechanisms and secure user verification in modern digital platforms (Okpeki et al., 2026). Similarly, studies on communication networks reveal that service quality is strongly influenced by network reliability, latency, and information delivery performance, factors that directly affect user experience on web-based platforms (Gbigbidje et al., 2025; Oweh et al., 2026).

Despite this growing body of literature, there remains a significant gap in empirical studies that evaluate how a purpose-built, web-based Customer Information

Management System could transform service delivery in Nigeria's domestic airline market. Much of the existing research either focuses on general ICT adoption in aviation or explores customer satisfaction without evaluating the system-level mechanisms that enable better service outcomes (Ahmed, 2024; Olu-Steven, 2023). Few studies have systematically assessed the design, implementation, and performance outcomes of CIMS tailored to the Nigerian context particularly regarding customer feedback integration, schedule transparency, and operational data sharing across airline providers. Although studies in sectors such as telecommunications, manufacturing, energy management, and industrial automation have demonstrated the effectiveness of intelligent information systems, predictive analytics, telemetry, and centralized monitoring platforms in improving operational efficiency and user satisfaction (Peter et al., 2022; Ilori et al., 2025; Obuseh et al., 2025; Obuseh et al., 2026), similar investigations remain scarce within Nigeria's domestic airline industry.

Although the Nigerian domestic airline industry continues to grow in scale and significance, customer satisfaction remains critically low due to outdated manual processes, fragmented service channels, and poor information dissemination. The absence of a centralized, web-based Customer Information Management System (CIMS) has left passengers with limited access to real-time updates, feedback mechanisms, and maintenance or delay information leading to widespread dissatisfaction, inefficiency, and reputational damage for airline providers. Without a digital infrastructure that enhances communication, transparency, and service responsiveness, Nigerian airlines risk falling behind international standards and losing consumer confidence. Therefore, this study seeks to examine how the implementation of a web-based CIMS can address these shortcomings and contribute to both operational efficiency and improved customer experiences within Nigeria's domestic aviation sector.

2. LITERATURE REVIEW

This study is anchored on the Technology Acceptance Model (TAM) originally developed by Davis (1989) and still widely applied in contemporary digital service research. TAM posits that perceived usefulness and perceived ease of use are critical determinants of users' acceptance of new technology systems. In the context of Nigeria's domestic airline industry, the adoption and use of a Web-Based Customer Information Management System (CIMS) depends on how passengers perceive the system's value in enhancing service quality, ease of accessing flight data, and resolving complaints. Updated models of TAM also incorporate behavioral intention and user satisfaction, making it ideal for evaluating the integration of digital platforms in customer service (Venkatesh & Bala, 2023; Park & Choi, 2024). The theory supports this study's

goal of assessing both technological feasibility and user-centered outcomes of CIMS in the aviation sector.

Customer Satisfaction

Customer satisfaction in the airline industry is closely linked to service quality, convenience, and responsiveness (Parasuraman, Zeithaml, & Berry, 2024). The distinction between low-cost carriers (LCCs) and full network carriers (FNCs) is significant, with LCCs offering minimal service at reduced prices and FNCs providing comprehensive services (Zhang et al., 2024). Strategic alliances like Star Alliance and Oneworld expand service coverage and offer integrated service experiences (Lee & Park, 2024).

In Nigeria, customer service in aviation is hampered by outdated, manual systems. Obinna and Musa (2024) highlighted that the lack of real-time communication channels limits customer satisfaction. Furthermore, the absence of centralized data sharing contributes to inefficiencies and customer frustration (Adeyemi et al., 2024). Digital transformation through CIMS is proposed as a remedy.

Web-based portal and airline schedules and rates

Access to real-time flight schedules and pricing significantly enhances customer decision-making and satisfaction. According to Parasuraman, Zeithaml, and Berry (2024), service convenience and transparency are vital components of service quality, especially in service-heavy sectors like aviation. Web-based portals that provide updated flight information reduce uncertainty, help customers plan better, and foster trust in airline operations. However, Obinna and Musa (2024) argue that in Nigeria, most domestic airlines still depend on offline ticketing systems and lack integration with central databases, resulting in frequent overbookings, misinformation, and delays.

Globally, systems like Expedia and airline-specific apps (e.g., Lufthansa, Qatar Airways) allow customers to track fares, seat availability, and flight status, contributing to their competitiveness (Lee & Park, 2024). In Nigeria, replicating such transparency through a CIMS can significantly improve customer experiences and reduce operational disputes.

Digital access and Customer complaints and feedback

Digital complaint systems not only enable customers to voice dissatisfaction but also provide airlines with data to make operational adjustments. According to Zhang et al. (2024), responsiveness to customer feedback is a strong predictor of customer loyalty. Airlines that actively engage with digital feedback platforms outperform those with passive or no complaint management systems. Adeyemi et al. (2024) show that customers frequently complain about not receiving responses to service complaints, often leading to loss of patronage. Incorporating digital feedback mechanisms into the proposed CIMS would align with global best practices. Furthermore, Nnaji and Opara (2024) warn that merely

having a feedback option is insufficient if customer responses are not analyzed and acted upon. Thus, customer complaint portals must be coupled with data analysis modules for effective impact.

Flight maintenance data and Public awareness

Flight maintenance transparency is increasingly becoming a metric for passenger trust and safety perception. Although not commonly made public in many regions, maintenance delays and service issues do influence customer satisfaction. Oum et al. (2023) observed that timely communication about maintenance-related delays or safety checks led to higher satisfaction ratings, as passengers felt their safety was prioritized. In Nigeria, however, there is limited public access to flight maintenance or delay data. According to Olaniyi et al. (2024), the lack of transparency concerning the causes of flight delays contributes to customer dissatisfaction and fosters suspicion about operational integrity. By integrating maintenance and delay notifications into a public-facing CIMS, airlines can build trust and accountability, thus enhancing their service reputation.

Empirical Review

Edim et al. (2023) conducted a survey involving six domestic airlines in Nigeria to explore the adoption of Information and Communication Technology (ICT) and its impact on customer satisfaction. Their findings revealed a strong correlation between low ICT adoption and low levels of customer satisfaction. The study emphasized the need for full digital transformation in Nigeria's aviation sector to enhance competitiveness and service delivery.

Park and Choi (2024) applied the Technology Acceptance Model (TAM) to assess factors influencing mobile application usage among airline customers in Asia. Using a TAM-based survey of 500 users, the study identified that perceived ease of use and value significantly influenced user adoption of airline mobile applications. The authors concluded that TAM remains a reliable framework for understanding customer behavior towards service-related technologies in the airline sector.

Adeyemi et al. (2024) focused on customer complaints within the Nigerian aviation industry. Through content analysis of data retrieved from airline portals, the study found that most complaints were either unresolved or suffered from poor response times. Based on these findings, the authors recommended the implementation of integrated digital complaint management systems to streamline communication and improve customer relations.

Lee and Park (2024) explored the effectiveness of alliance-based digital platforms such as Oneworld. Through a case study and usability testing, they found that airlines participating in such alliances offered more unified and seamless services through shared technological platforms. The study concluded that inter-airline Customer Information Management Systems (CIMS) are essential in fragmented

markets to ensure operational efficiency and customer satisfaction.

Zhang et al. (2024) conducted a comparative survey across ten countries to assess differences in customer satisfaction between Low-Cost Carriers (LCCs) and Full Network Carriers (FNCs). Using satisfaction index mapping, the study found that FNCs outperformed LCCs in areas such as service personalization and issue resolution. The researchers highlighted the critical role of digital Customer Relationship Management (CRM) tools in improving LCC performance and customer experience.

Obinna and Musa (2024) examined the underlying causes of low customer loyalty among domestic airline passengers in Nigeria. Based on interviews and descriptive statistical analysis, the study identified the absence of real-time communication as a major contributing factor. The authors recommended the adoption of Customer Information Management Systems to enhance transparency in flight schedules and service updates.

Nnaji and Opara (2024) investigated the barriers to effective integration of customer feedback in airline operations. Through qualitative interviews with airline staff, they discovered that a lack of analytical tools often resulted in customer data being ignored. The authors advocated for the deployment of automated feedback dashboards to ensure that customer insights are analyzed and acted upon in a timely manner.

Olaniyi et al. (2024) evaluated transparency in aviation operations in Nigeria through a mixed-method study involving both customers and airline executives. The findings indicated that limited disclosure of operational information, such as flight delays and maintenance schedules, eroded passenger trust. Consequently, the study recommended the public display of maintenance data and delay logs as a means of rebuilding customer confidence and improving service transparency. Collectively, these empirical studies highlight the critical need for digital transformation, improved communication systems, and customer-centric information management to enhance satisfaction and loyalty in the airline industry.

3. METHODOLOGY

The Structured Systems Analysis and Design Methodology (SSADM) was employed as the guiding framework for developing the airline information system. This structured approach allowed for a comprehensive understanding of existing processes and facilitated the design of an efficient and user-centered solution. The initial phase of the methodology involved conducting interviews with airline personnel to gain insights into current reservation and complaint-handling procedures. These discussions helped uncover bottlenecks, redundancies, and areas lacking digital integration. In addition to interviews, a detailed analysis of ticketing documents, operational forms, and customer

interaction records was carried out to understand the workflow and data requirements of the system. Supplementing this, various written and online resources were reviewed to gather best practices and technical guidance relevant to the design and functionality of similar digital platforms.

The system was architected to include distinct modules addressing critical operational and customer service needs. These modules include user registration, flight scheduling, maintenance update notifications, complaint submission, and administrative control. A mathematical model was also integrated to calculate and summarize the number of flights operated by each airline, providing transparency and aiding in operational planning. Data Flow Diagrams (DFDs) were used to visualize how users interact with the platform, illustrating the movement of data between customers, administrative staff, and system databases. This ensured clarity in system operation and helped define the roles of different stakeholders in the data lifecycle. Data collected through qualitative interviews were systematically coded and analyzed to identify recurring themes, particularly those related to inefficiencies, such as delayed responses and manual tracking errors. These themes informed several design choices in the system, such as the inclusion of automated response features and real-time data sharing. Furthermore, simulations were conducted to evaluate system performance quantitatively. Results indicated a high level of efficiency, with an average system response time of under two seconds and the capability to handle over 1,000 simultaneous user queries. These performance metrics suggest that the proposed platform significantly enhances operational responsiveness and scalability, addressing key limitations identified in the existing airline systems.

4. ANALYSIS

Requirements Analysis

a. Functional Requirements Identified

- i. From interviews with airline staff and review of operational forms, the following key functional requirements were identified:
- ii. Need for a centralized reservation portal accessible to customers and staff.
- iii. Automated complaint tracking and resolution features to reduce manual response delays.
- iv. Real-time flight scheduling updates to minimize misinformation and passenger uncertainty.
- v. Visibility into flight maintenance records for enhanced transparency.

Non-functional Requirements Identified

- I. System response time should be less than 3 seconds.
- II. The platform must support high concurrency, handling 1,000+ simultaneous users.
- III. High system availability (99.9% uptime) is critical to ensure customer trust and usability.

Thematic Analysis From Qualitative Interviews

Interview transcripts were coded and analyzed to identify common inefficiencies. The following themes emerged:

Theme	Description
Lack of Digital Integration	Many operations are still paper-based, slowing response and accuracy.
Poor Complaint Resolution	Customers report long delays and lack of feedback on submitted complaints.
Manual Scheduling and Updates	Staff rely on manual input, leading to frequent inconsistencies.
Limited Public Access to Data	Maintenance and delay data are not publicly available, eroding customer trust.

System Simulation and Performance Analysis

A simulation of the designed system was carried out using standard metrics to evaluate how it would perform under real-world airline usage.

a. Performance Metrics (Quantitative Results)

Metric	Simulated Outcome
Average system response time	1.82 seconds per user request
Maximum concurrent users	1,300 users without system slowdown
Complaint processing time	Reduced by 65% compared to manual system
Flight schedule update delay	Reduced from 45 minutes to 2 minutes

Data Flow and System Modeling

Using Data Flow Diagrams (DFDs), interaction between users and system components was modeled.



The analysis confirms that the application of SSADM, supported by qualitative and quantitative methods, leads to a robust, efficient, and customer-friendly system. Interview data ensured that the system was tailored to real-world airline challenges. Document analysis helped define clear functional and non-functional requirements, while simulations validated system performance under load. Overall, the methodology and resulting analysis present a reliable blueprint for digitizing airline operations and enhancing customer satisfaction.

DISCUSSION OF FINDINGS

The findings from the analysis underscore the value of using the Structured Systems Analysis and Design Methodology (SSADM) in the development of a digital airline information system. The approach, when combined with qualitative

insights and quantitative testing, proved effective in producing a robust, efficient, and user-friendly platform. Okoro and Ahmed (2023) argue that structured methodologies like SSADM promote systematic planning, enabling developers to fully capture both functional and non-functional requirements of stakeholders, especially in service industries like aviation. Similarly, Ibrahim et al. (2024) assert that SSADM is particularly useful in environments where clarity, modularity, and traceability of system functions are essential for success. The interviews with airline personnel in this study reinforced this by revealing process inefficiencies that directly informed the system design aligning with Chukwuma and Adeyemi (2022), who emphasized that stakeholder engagement during system analysis leads to better alignment with operational realities. Furthermore, simulations showing fast response times and high

concurrency capabilities lend quantitative credibility to the design’s robustness. According to Park and Choi (2024), performance testing is critical in service-based applications where delays can negatively affect user trust and satisfaction. These simulation results, which showed response times under 2 seconds and simultaneous query handling beyond 1,000 users, validate the system’s readiness for real-world deployment.

However, the SSADM approach is not without criticism. Mbah and Eze (2022) contend that structured methodologies such as SSADM can be overly rigid, making them less adaptable in fast-changing technological contexts or agile development environments. This rigidity may slow down iterative development or responsiveness to rapidly shifting user requirements. Zhou and Tan (2023) further critique SSADM for its documentation-heavy process, arguing that it can be time-consuming and resource-intensive, especially for projects requiring quick deployment and flexible prototyping common traits in contemporary digital service development. Despite these critiques, the success of SSADM in this context can be attributed to the project’s structured needs, the criticality of reliability in airline operations, and the emphasis on customer-facing functionalities. The use of qualitative interview data to inform design decisions is particularly defensible, as highlighted by Akinwale and Musa (2023), who advocate for qualitative input in system development to ensure contextual relevance and stakeholder buy-in.

CONCLUSION AND RECOMMENDATIONS

In conclusion, the study demonstrates that implementing a Customer Information Management System (CIMS) has the potential to significantly enhance both service quality and operational efficiency within Nigeria's domestic airline sector. The system addresses key challenges such as poor communication, delayed complaint resolution, limited access to flight maintenance updates, and inefficient scheduling processes. By integrating digital modules that streamline customer interactions, automate feedback responses, and provide real-time operational data, airlines can foster greater transparency, responsiveness, and customer satisfaction. The simulation results and stakeholder interviews confirm that such a system not only improve performance metrics like response time and user capacity but also aligns with global best practices for airline customer service. Therefore, it is recommended that:

- i. Domestic airlines adopt a fully digitized Customer Information Management System that integrates flight scheduling, maintenance updates, and complaint tracking to ensure timely communication and accountability.
- ii. The Nigerian Civil Aviation Authority (NCAA) should develop digital transformation guidelines and provide regulatory support to encourage and monitor the

adoption of customer-oriented digital systems across airlines.

- iii. Airline operators should invest in staff training to ensure that administrative personnel can efficiently operate and manage the system, especially in terms of resolving complaints and maintaining accurate operational records.
- iv. Maintenance logs and delay records should be made publicly accessible on airline portals to build trust and reassure passengers about safety and reliability.
- v. Continuous performance evaluation of the CIMS should be conducted, using both user feedback and automated analytics to identify areas for improvement and ensure the system evolves with user needs and industry standards.
- vi. Collaboration among airlines through a shared or alliance-based digital platform (e.g., similar to Oneworld or Star Alliance) should be explored to improve inter-airline communication and offer seamless services to customers.

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