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Optimization of Information Services at Minangkabau International Airport Through the Design of WhatsApp Chatbot-Based E-Customer Service

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Abstract

Airports require fast and accurate information to provide passengers. To facilitate and expedite information delivery, the author proposes the development of an E-Customer Service using a WhatsApp chatbot. This research aims to design a WhatsApp chatbot information service system at Minangkabau International Airport in Padang to provide fast, easy, efficient, and interactive responses for service users. This research utilizes Sugiyono's Level 1 Research and Development (R&D) method, which focuses on design without creating or testing the product. The author utilizes the WhatsApp platform and artificial intelligence (AI) technology through a no-code chatbot from Landbot. Information services at Minangkabau Airport lack two-way communication technology, necessitating innovation. With this chatbot, Customer Service Officers can provide automated and rapid responses, thereby improving the efficiency and quality of customer service by providing instant answers

1 INTRODUCTION

Information service is a vital aspect of airport operations to ensure passenger comfort and satisfaction. In today's digital era, the use of information technology has become a strategic tool for improving the quality of public services, including in the aviation sector. Minangkabau International Airport in Padang, as one of the main air transportation gateways in West Sumatra, faces its own challenges in providing fast, accurate, and responsive information services.

According to the Regulation of the Minister of Transportation of the Republic of Indonesia Number PM 41 of 2023 [2], information service is part of the mandatory airport service standards that must be provided by airport operators. However, based on observations, the current information services at Minangkabau International Airport are still one-way and have not yet utilized interactive technology that supports real-time two-way communication. This condition may hinder the effectiveness of services, especially in emergency situations or urgent information needs.

Given the high penetration of WhatsApp usage in Indonesia, leveraging WhatsApp Chatbot technology offers a promising solution to develop an E-Customer Service system. Through this system, airport users can easily and quickly access various

types of information independently such as flight schedules, terminal facility locations, or submit feedback without needing direct interaction with customer service staff.

This study aims to design an information service system based on WhatsApp Chatbot using the no-code platform Landbot.io, which can assist both users in accessing information and customer service officers in improving work efficiency. The method applied is Research and Development (R&D) level 1, focusing on system design without full-scale implementation [1]. It is expected that this design can serve as an initial step toward the digital transformation of information services at Minangkabau International Airport, leading to more modern and optimal services.

2 METHOD

This study employed a Level 1 Research and Development method as proposed by Sugiyono (2023), focusing primarily on the design and conceptual development of the system without proceeding to full-scale product implementation and testing [1]. This research does not involve the creation of a final product, but emphasizes on designing a WhatsApp-based e-customer service chatbot tailored for Minangkabau International Airport.

Research Flow

The procedural model used is descriptive in nature, illustrating a series of stages required to achieve a design-based outcome. The research procedure includes the following steps:

1. Problem and Potential Identification

An observation was conducted in the terminal area of Minangkabau International Airport to identify the lack of interactive digital information services. This led to the initiative to propose a WhatsApp-based E-Customer Service solution.

2. Data Collection

Data were gathered through observations, interviews with relevant stakeholders (e.g., airport supervisors and service users), and literature studies to strengthen the theoretical foundation and system requirements.

3. Product Design

The chatbot prototype was developed using the Landbot.io no-code platform, which enabled the creation of an interactive, automated WhatsApp chatbot interface without programming skills. The design included user interface components and pre-scripted responses for common airport service inquiries.

Figure 1. chatbot design process

4. Design Validation

The initial design was validated by domain experts, including two airport customer service officers and one information technology expert. Feedback was collected to assess the chatbot's responsiveness, relevance, and usability.

Chatbot Architecture

The system design comprises two interfaces:

- **User Interface:** Accessible via QR code that connects to WhatsApp chat, providing users with structured menu-based options.
- **Admin Interface:** Managed through Landbot.io where customer service officers configure, update, and monitor chatbot interactions.

Tools and Components

- **Hardware:** A laptop for design and development, and an Android phone for personal testing.
- **Software:** WhatsApp for communication, and Landbot.io for chatbot creation.

Testing Technique

Black-box testing was conducted by the researcher to ensure that each functional element performed according to design specifications. This testing approach focused on input and output validation without accessing internal code structures.

Data Analysis

Data analysis followed the R&D framework, focusing on:

- **Need assessment** from stakeholders,
- **Evaluation of the designed flow** in the Landbot.io platform,
- **Effectiveness review** through limited validation sessions.

3 RESULTS

The development of the WhatsApp-based E-Customer Service chatbot for Minangkabau International Airport resulted in a fully functional system capable of delivering interactive and structured information to passengers. The chatbot prototype was built using the Landbot.io platform and integrated seamlessly into WhatsApp, allowing users to access various services via scanning a QR code.

Chatbot Features and Workflow

The chatbot features a menu-based navigation system that enables users to select specific service information, such as flight schedules, baggage details, airport facilities, and answers to frequently asked questions. The interface is designed with simplicity in mind to ensure accessibility and ease of use for passengers with varying levels of digital literacy.

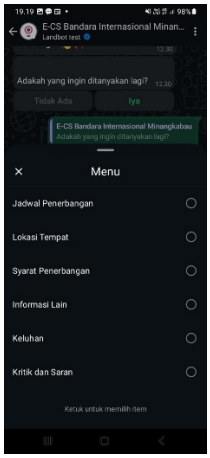
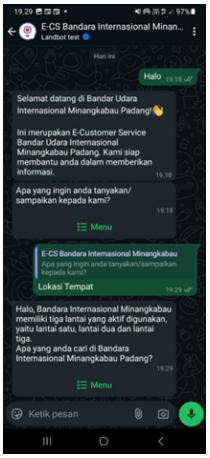


Figure 2. Welcome Option Response Display



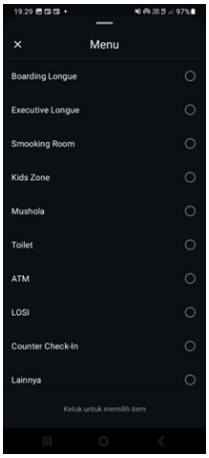


Figure 3. Location Options Response View

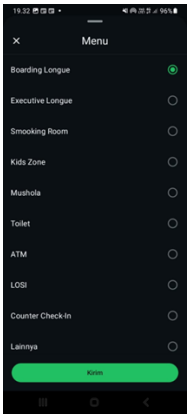


Figure 4. Boarding Lounge Response Display

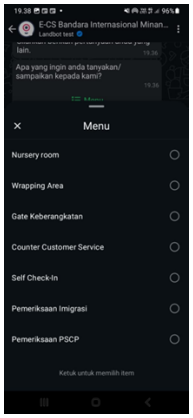
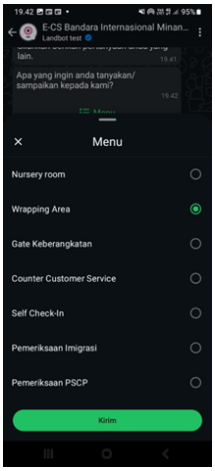


Figure 5. More Options Response Display



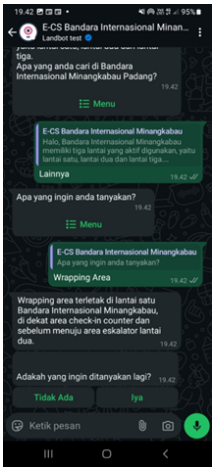
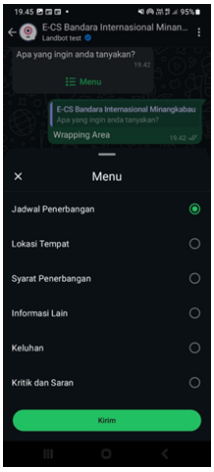


Figure 6. Wrapping Area Response Display



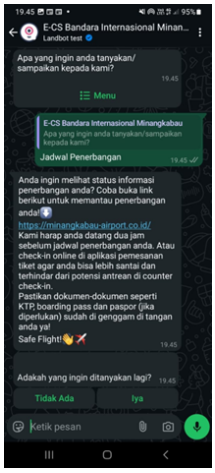


Figure 7. Flight Schedule Response Display

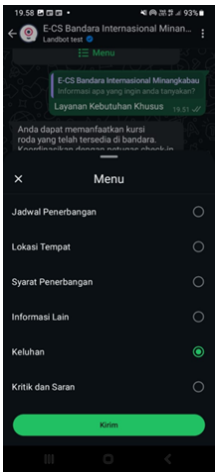


Figure 8. Complaint Option Response Display

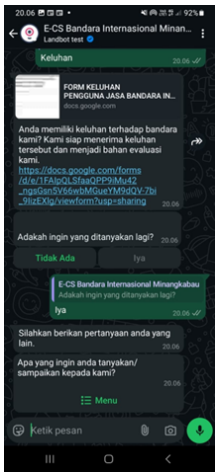


Figure 9. "No/Yes" Option Response Display

System Testing

System functionality was validated through black-box testing to confirm that all features operated according to the design specifications. The testing process included key functions such as:

- QR code scanning and proper redirection to the WhatsApp chatbot
- Service menu selection with correct display of corresponding options
- Input handling of user queries with accurate, pre-scripted chatbot responses
- Navigation back to the main menu

- Administrative capability to update chatbot content through the Landbot.io platform
- Chatbot response time within ≤ 3 seconds

All tests successfully met the expected results, leading to the system being declared functionally validated.

Table 1. System Testing Using Blackbox Testing

No.	Test Item	Expected Result	Actual Result	Conclusion
1	Scan QR Code	Successfully directs the user to the WhatsApp chatbot	Successfully directs the user to the WhatsApp chatbot	Passed
2	Select Service Menu	Displays options according to the selected service menu	Displays options according to the selected service menu	Passed
3	Input Service Inquiry	Responds according to the pre-set answer in the chatbot	Responds according to the pre-set answer in the chatbot	Passed
4	Return to Main Menu	Successfully returns the user to the main menu	Successfully returns the user to the main menu	Passed
5	Admin Update Information	Successfully updates chatbot content through the Landbot.io platform	Successfully updates chatbot content through the Landbot.io platform	Passed
6	Chatbot Response Speed	Responds within ≤ 3 seconds	Responds within ≤ 3 seconds	Passed

Expert Validation

The initial design was reviewed by two airport customer service officers and one information technology expert. Their feedback was used to evaluate the chatbot's responsiveness, relevance, and usability. Recommendations focused on refining menu wording and optimizing navigation flow for faster access to information.

Discussion

The results show that the integration of a WhatsApp-based chatbot can significantly improve the speed and accessibility of passenger information services at airports. Compared to traditional service counters, the chatbot provides instant responses and is available 24/7, reducing dependency on human operators for routine inquiries. This aligns with findings from previous studies on chatbot effectiveness in service industries, indicating that automation enhances efficiency while maintaining service quality.

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