

DEVELOPMENT OF A MOBILE-BASED TRANSPORTATION AND HOTEL TICKET BOOKING INFORMATION SYSTEM AT TIKET EXTRA

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Abstract

The development of information and communication technology has had a major impact on various aspects of human life, including transportation and tourism. This study aims to develop a mobile-based transportation and hotel ticket booking information system integrated through the Tiket Extra application. This application is designed to make it easier for users to search for travel schedules, compare prices, and make transactions efficiently without time and place restrictions. The research method used is Research and Development (R&D) with a Waterfall model, which includes needs analysis, system design, implementation, and testing to produce an optimal and functional system. The system is integrated with Midtrans as a payment gateway to support secure, fast, and accurate digital payment processes. Testing using the Blackbox Testing and Usability Testing methods showed that all functions worked well and were responsive. Overall, the Tiket Extra application has proven to be effective in significantly improving user convenience, agent operational efficiency, and system service quality.

Keywords: Information System-1; Ticket Booking-2; Mobile Apps-3; Waterfall Model-4; Blackbox Testing-5

Abstrak

Perkembangan teknologi informasi dan komunikasi telah memberikan dampak besar terhadap berbagai aspek kehidupan manusia, termasuk bidang transportasi dan pariwisata. Penelitian ini bertujuan untuk mengembangkan sistem informasi pemesanan tiket transportasi dan hotel berbasis mobile yang terintegrasi melalui aplikasi Tiket Extra. Aplikasi ini dirancang untuk mempermudah pengguna dalam mencari jadwal perjalanan, membandingkan harga, serta melakukan transaksi secara efisien tanpa batasan waktu dan tempat. Metode penelitian yang digunakan adalah Research and Development (R&D) dengan model Waterfall, yang mencakup analisis kebutuhan, perancangan sistem, implementasi, serta pengujian untuk menghasilkan sistem yang optimal dan fungsional. Sistem diintegrasikan dengan Midtrans sebagai payment gateway guna mendukung proses pembayaran digital yang aman, cepat, dan akurat. Pengujian menggunakan metode Blackbox Testing dan Usability Testing menunjukkan seluruh fungsi berjalan baik dan responsif. Secara keseluruhan, aplikasi Tiket Extra terbukti efektif meningkatkan kemudahan pengguna, efisiensi operasional agen, serta kualitas pelayanan sistem secara signifikan.

Kata kunci: Sistem Informasi-1; Pemesanan Tiket-2; Aplikasi Seluler-3; Model Waterfall-4; Blackbox-5

INTRODUCTION

The rapid development of information and communication technology has had a significant impact on various aspects of human life. Technology is now not just a tool, but also an important part of supporting daily activities, including in the fields of transportation and tourism (Susanti, 2024). Advances in mobile technology have enabled people to perform various activities online, including booking transportation tickets and hotels through mobile-based applications

(Aryo Prasojo & Kontesta, 2023). The use of integrated information system in mobile applications makes it easier for users to search for travel schedules, compare prices, and make transactions without any space or time limitation.

The ticket booking application is a practical solution for users who want to book tickets online easily and quickly. The features offered by this application can provide benefits and convenience for users. (Mohsa, Voutama, & Nugraha, 2023). A travel information and ticket booking application that can provide clear



information without being limited by distance and time using a website or mobile media. This study aims to develop an Android-based travel information and ticket booking application. (Sari, Sari, & Fairuzabadi, 2022).

In the research on the development of a Web-Based Online Travel Ticket Booking Information System, the data sources in this study were obtained from Tiket Extra, a travel ticket sales agent that provides ticket booking services directly or through simple online media such as WhatsApp or social media. Tiket Extra provides ticket booking services for flights, trains, ships, and hotels. Data was collected through direct interviews with the agency to understand the workflow, customer service processes, recording methods, and obstacles that often arise in ticket booking operations. From the interview results, it was found that the system currently in use is still manual or semi-digital, and there is a need for a more structured and efficient system (Resmiati & Ardan, 2023).

In the system development process, we use the Waterfall method, which includes several stages: requirements analysis, system design, system implementation, and system testing. The system will be integrated with Midtrans' payment gateway system to process payments (Radharani Dyatmika, Nugraha Putra, & Pramono, 2021). The research methodology used is waterfall, starting from needs analysis to obtain the functional and non-functional requirements of the system (Muhammad Syahputra & Purnomo, 2023).

The blackbox method is used to examine application functions from the user's perspective without examining the details of the source code implementation or internal structure of the application (Halawa & Saifudin, 2023).

This research is important to answer questions about how to design and develop a mobile-based transportation and hotel ticket booking information system that is integrated with a digital payment system and has efficient search, booking, and customer data management features (Yudi Sobari, Purwantoro, & Susilo Yuda Irawan, 2024). The main objective of this research is to produce the Tiket Extra application, which is capable of providing convenience for users in making online transportation and hotel ticket reservations, while also helping agents improve their operational effectiveness and quality of service to customers (Saepulloh, 2023).

RESEARCH METHODS

In developing this mobile-based transportation and hotel ticket booking system, the research applied several methods. The methods used include the following:

Types of research

This research uses a research and development method. This method was chosen because it aims to develop a mobile-based information system that can make it easier for users to place integrated transportation and hotel tickets orders through the Tiket Extra application. The development model used is the waterfall model, because it has systematic stages that are easy to apply in the software development process (Erlina, Pratama Simamora, Rasjid, & Basyah, 2023).

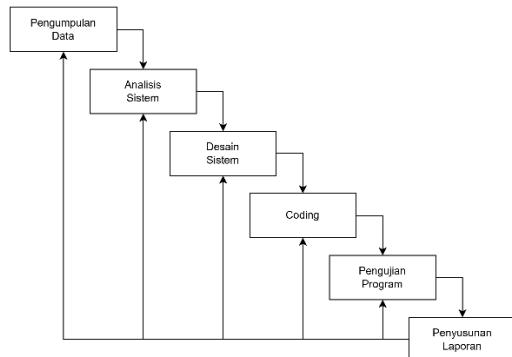


Figure 1. Model Waterfall

The Waterfall model is a method of system development that is carried out sequentially from the initial stage to the final stage. The first stage is data collection, which is carried out through observation and direct data collection such as interviews or literature studies to determine user needs and existing problems. The next stage is system analysis, which is analysing the data results to determine the needs and solutions for the system to be created (Maulana Misbah & Murdiani, 2021). Next, system design is carried out to design the appearance, flow, and structure of the system. The coding stage is the process of translating the design into a program using a programming language. After that, program testing is carried out to ensure that the system runs according to requirements and is free from errors. The final stage is report preparation, which contains documentation of the entire development process and the final results of the system (Rante, Pongdatu, & Palelleng, 2022).

Research Stage

The research stages in developing this system include the following steps:

1. Observation

The observation was conducted by directly observing the ticket booking system on the Tiket Extra application. The purpose of this observation was to evaluate the performance, appearance, and usage flow of the system, as well as to identify weaknesses and development needs in the application. The result of this observation became the basis for the mobile-based transportation and hotel ticket booking information system to make it more effective and easier to use.

2. Interview Method

The interview method was conducted by involving the managers and users of the Tiket Extra application to obtain relevant information related to the transportation and hotel ticket booking system. Data collection through interviews was carried out in April 2025 with an estimated duration of 1 to 2 days. Interviews were conducted directly with agency managers at operational locations to obtain accurate data in accordance with conditions in the field.

The interview process was conducted in a structured manner using a question guide that covered important aspects such as the ticket booking process, customer data management, types of services available, and obstacles encountered in the application's operations. In addition, the researchers also observed the activities of the Tiket Extra service directly to understand the booking process from the perspective of users and managers. The results of these interviews were used as a basis for identifying system requirements and designing application development to be more effective, efficient, and in line with user needs.

3. Literature Review

A literature study was conducted by reviewing various scientific journals and related references discussing information system development, mobile-based ticket booking, and the integration of transportation of transportation and hotel services. This activity aimed to obtain a theoretical basis and previous research result that could be used as a reference in designing an information system for the Tiket Extra application to be more effective and in line with user needs.

System Analysis

System analysis is an important stage in the process of developing a mobile-based transportation and hotel ticket booking application, which aims to

understand user needs and workflows comprehensively.

Table 1. System Analysis

No	User	Description
1.	Admin	The admin acts as the main manager of the system who is responsible for organizing and maintaining all the data in the application.
2.	Customer (user)	The customer is the end user who uses the app to book transport tickets and hotels.

System Architecture Design

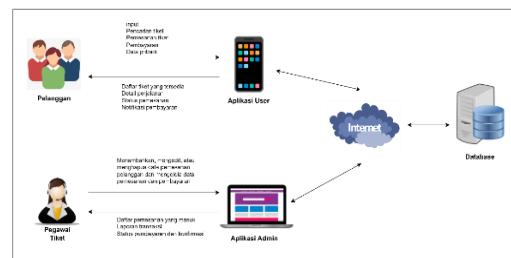


Figure 2. System Architecture Design

In figure 2 which is about architecture this model shows the workflow of an online ticket booking system, which involves interactions between users, devices, internet networks, servers, databases, and administrators. Through this system, users can book tickets practically, efficiently, and flexibly through the application, without having to come directly to the ticket sales location.

This article proposes an approach to improve the consistency of system architecture by utilizing Devops system descriptors. The basic idea is that architecture diagrams often deviate from the reality of the original software system, e.g. architecture documentation is not updated as code changes or deployments (Nicacio & Petrillo, 2022).

Context Diagram

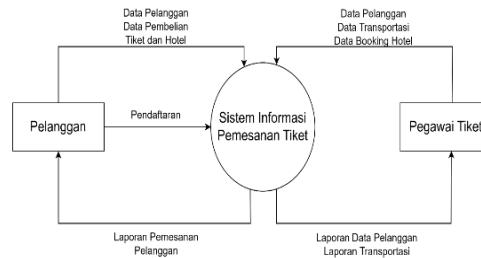


Figure 3. Context Diagram

In figure 2, this diagram is a level 0 data flow diagram (DFD) of the ticket ordering information system. This diagram illustrates the flow of data exchange between customers and ticket officers with the system, customers can register, enter booking data, and obtain information related to schedules and ticket status. Meanwhile, ticket officers have access to add customers data and manage reports related to booking transactions.

This article introduces conceptual data system architecture (CDSA), which is an information system architecture approach that prioritizes the use of conceptual models as the centre of system data development and management. The goal is to maintain consistency, accuracy, and alignment between what is modelled (data concepts, logic, interface) and what is implemented in real system over time (Jonsson, 2023).

Blackbox Testing

Blackbox testing is a software testing method that focuses on the inputs given to the system and the resulting output, without looking at the internal structure or source code (Pradipta Wistika, Pramana, & Setiashih, 2023). The tester only knows the functional specifications of the system, and checks whether the system meets those specifications.

RESULTS AND DISCUSSION

In this section will be explained the result of the application display. The application view is divided into two types based on user roles, namely the customer view and the ticket employee view. This division is done so that each user can access features according to their needs.

Admin Page View

This dashboard system is able to improve the effectiveness of supervision and time efficiency in the reporting process. Data that previously had to be compiled manually can now be visualized automatically in the form of interactive graphs and tables. That way, the monitoring process becomes more transparent and accountable (Kurniawan, Mulyono, Informasi, & Bangsa, 2023).

The admin view is one of the important components in the ticket and hotel booking information system. This page serves as a central management of all activities and data entered into the system. Through this view, the admin has a major role in ensuring that all operational

processes run well, from managing booking data, payment confirmation, to updating ticket status and hotel bookings.

Data Transportasi								
+ Tambah Transportasi								
ID	Jenis	Nama	Rute	Harga	Pelanggan	Status	Aksi	
0vvCQXhHTT2yjBjwCY	Kereta	sejati utama	clinton	Rp 150.00	d'mos impure	Tersedia	 	
SeuqSI0TlvwSXuKDx2	Pesawat	batik air	beli	Rp 350.00	regie aule	Tersedia	 	
Ukem0BvewPvU0DNe	Kereta	tegal bahari	puncakjaya	Rp 275.00	jaka	Tersedia	 	
MrnHQK0T5cBllwYt	Bus	princejaya	surabaya	Rp 200.00	laron	Tersedia	 	
MJLBjRfP0n1vDn8	Pesawat	airasia	surabaya	Rp 600.00	iran	Tersedia	 	

Figure 4. Transport Data Page

Data Booking Hotel									
+ Tambah Booking									
ID	Pelanggan	Nama Hotel	Lokasi	Cek-in	Cek-out	Jumlah Kamar	Total Harga	Status	Aksi
EDyGWHhMUKQzH	rita pratiwi	vitra bawang	bandung	10 Apr 2024	11 Apr 2024	1	Rp 1.800.00	Ditambah	 
24eN8Rk009r009r009r009	bina regina	the sora hotel	surabaya	2 Feb 2024	3 Feb 2024	1	Rp 1.500.00	Ditambah	 
3422p009r009r009r009	Rul Alfar	vitra bawang	bandung	6 Apr 2024	7 Apr 2024	1	Rp 1.800.00	Ditambah	 
uH3GJUwaz009r009r009	lily regina	vitra bawang	bandung	4 Feb 2024	5 Feb 2024	1	Rp 1.800.00	Ditambah	 
4CD7U0N9r009r009r009	putri regina	vitra bawang	jakarta	17 Jan 2024	18 Jan 2024	1	Rp 1.500.00	Ditambah	 

Figure 5. Hotel Booking Data

Ticket Booking Page View

Display of ticket reservations and hotel bookings is an important part of the mobile-based booking information system (Ilmandha & Sugiarso, 2023). This page is designed so that users can make the process of booking transportation and hotels in a practical, fast, and integrated in a single system. Through this view, customers can choose the type of transportation such as planes, trains, or buses, then proceed with the selection of departure schedules, destination routes, and filling in personal data according to official identity. In addition, customers can also book lodging according to travel schedules through the hotel booking feature which is directly connected to room availability data in the system.

On this display, the system display information in an interactive and real-time manner, including the ticket price, the number of seats or rooms available, as well as the estimated total cost of the reservation. The interface design is made simple and intuitive to make it easy for users to navigate each step of ordering. The booking confirmation process is done by displaying a summary of the booking data before the user completes the payment. Here's how it looks.



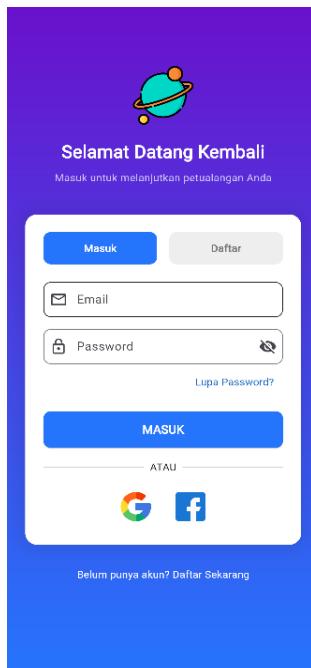


Figure 6. Login View

In figure 6, the login screen is used to log in to an account by entering an email address and password, and there are option to register and reset a forgotten password.

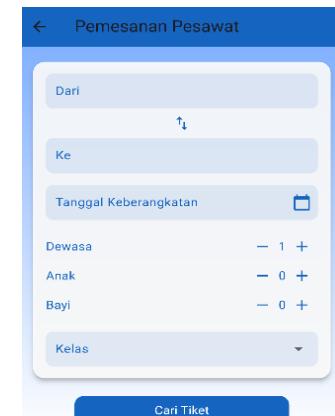


Figure 8. Transportation Booking Page

In figure 8, this display is used to book airline tickets by filling in the origin, destination, departure date, number of passengers, and flight class before searching for tickets.



Figure 7. Homepage View

In figure 7, the new account display is used to register users by filling in personal data and creating a password before using the application.

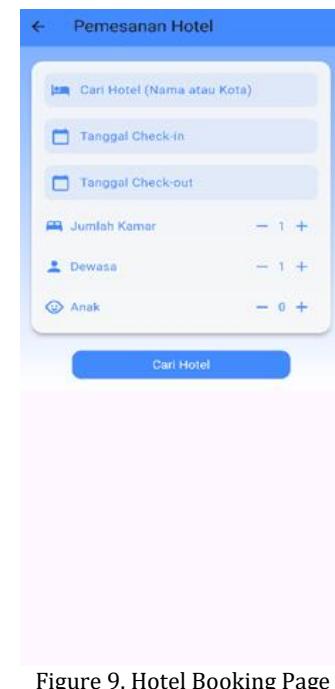


Figure 9. Hotel Booking Page

In figure 9, the display shows a simple hotel reservation form containing fields for filling in the hotel name, check-in date, check-out date, number of rooms, and guest details.

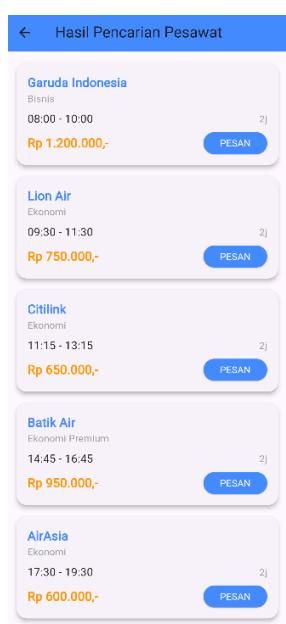


Figure 10. Ticket Search Page

In figure 10, the display shows a list of flight ticket search results from various airlines, complete with flight schedules and prices.



Figure 11. Hotel Search Page

In figure 11, the display shows a list of hotel search results and their prices.

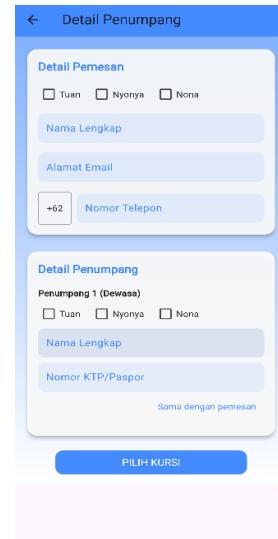


Figure 12. Passenger Details Page

In figure 12, the display is a form for filling in passenger details. It includes full name, email, address, phone number, and date of birth.



Figure 13. Seat Selection Display

In figure 13, the display allows passengers to select seats directly from the aircraft cabin layout.

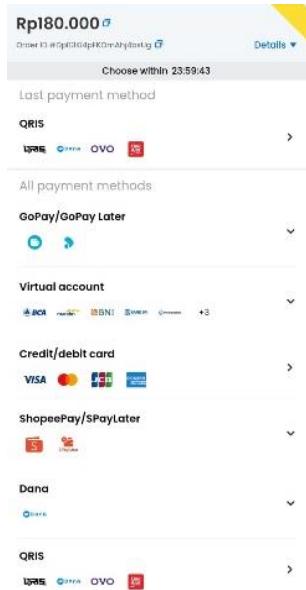


Figure 14. Payment Page

In figure 14, the display shows various payment methods that users can choose from to complete transactions, where the payment process is carried out through midtrans.



Figure 15. Ticket Page

In figure 15, this screen display the e-tickets containing travel details, booking code, and passenger information.

Testing Usability

Usability testing was conducted to determine the extent to which the Tiket Extra application is easy to use and provides experience for users. Testing was conducted twice, namely initial testing and final testing after improvements were made to the interface and system speed. The method used was the USE questionnaire, which consists of four main parameters namely, usefulness, ease of use, ease of learning, satisfaction (Sriyeni, Ilham, & Veronica, 2022).

$$\begin{aligned}
 \text{Skor usability} &= \frac{(\text{usefulness} + \text{ease of use} + \text{ease of learning} + \text{satisfaction})}{4} \\
 &= \frac{(80.2 + 84.7 + 86.5 + 88.1)}{4} = 84.9\%
 \end{aligned}$$

a. Comparison of usability testing values

The table in the usability test score comparison shows that the Tiket Extra application increased from 69.3% in the initial testing to 84.9% in the final testing, an increase of 22.5%. These results indicate that after improvements were made to the interface and system, the application became easier to use, faster, and provided a better user experience.

Table 2. Comparison of Usability Testing Values

Usability Test Results	Initial Testing	Final Testing	Improvement
Average Value	69.3%	84.9%	22.5%

b. Usability value of each parameter

The table on usability values for each parameter shows an improvement in all aspects of the Tiket Extra application's usability. The usefulness value increased by 13.7%, which means the application is more useful for users. Ease of use increased by 17.4%, indicating that the application is easier to use. Ease of learning rose by 25.6%, showing that new users can understand how to use the application more quickly. Meanwhile, satisfaction increased the most, by 33.9% indicating that users are more satisfied with the appearance and performance of the application after the improvements.

Table 3. Usability Value of Each Parameter

Usability Test Results	Initial Testing	Final Testing	Improvement
Usefulness	70.5%	80.2%	13.7%
ease of Use	72.1%	84.7%	17.4%
Ease of Learning	68.9%	86.5%	25.6%
Satisfaction	65.8%	88.1%	33.9%

System Testing

System testing process is done by applying blackbox testing method. This method is used to evaluate all major functions on the system to ensure that each feature runs according to the specifications that have been set (Ding, Qamar, & Liu, 2023).

Table 4. System Testing

No.	Scenario	Expected Results	Test Results
1.	Login	The system successfully logs in if the data is correct and rejects it if it is incorrect.	Successful
2.	Registration	The system adds a new account if the data is valid and rejects incorrect data.	Successful
3.	Transportation tickets booking	The system displays details and saves booking data.	Successful
4.	Hotel booking	The system displays hotel details and saves bookings.	Successful

5.	Payment process	The system displays confirmation and updates order status.	Successful
6.	Ticket list view	The system displays a list of tickets that have been booked.	Successful

Based on the test result using the blackbox testing method shown in the table above, all the main functions in the application run well and as expected.

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the results of research and testing that has been done, it can be concluded that the development of mobile-based transportation and hotel ticket booking information system in ticket extra has been successfully carried out in accordance with user needs. This application is able to simplify the process of booking transportation tickets such as planes, trains, and buses, as well as hotel reservations in one integrated platform. The development system provides convenience for users in making reservations, payments, and checking tickets efficiently anytime and anywhere. In addition, the results of blackbox testing show that all the main features such as login, registration, ticket booking, hotel booking, payment, and ticket list display have run well without any system errors.

Suggestion

In terms of appearance, user interface design (UI/UX) also needs to be developed to be more interactive and easy to use by various groups. End-user testing should be done more broadly to get more diverse input, so that applications can be adapted to real needs in the field. And the security of user data needs to be continuously improved with the implementation of encryption and two factor authentication to prevent information leakage.

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