

Design and Development of Ariesta Hotel Reservation Information System Based Website Using Waterfall Method

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ABSTRAK

The limitations of the manual reservation system at Hotel Ariesta Kefamenanu result in inefficient information delivery, a high risk of recording errors, and potential double bookings. This study aims to develop a web-based reservation information system to improve service efficiency and data accuracy. The Waterfall method is applied to ensure a structured and systematic development process in accordance with user requirements. The system is developed using the Bootstrap framework to provide a responsive interface accessible across multiple devices.

The results indicate that the proposed system reduces the reservation processing time and minimizes data recording errors compared to the previous manual system. In addition, the system improves the accuracy of reservation data management and enables real-time access to hotel information, including room types, facilities, and pricing. The implementation of this system also enhances promotional effectiveness and expands customer reach through continuous online accessibility.

Therefore, the developed system serves as an effective solution to support digital transformation and improve operational performance at Hotel Ariesta Kefamenanu.

1. INTRODUCTION

The rapid development of information technology has significantly transformed various sectors, including the hospitality industry. The utilization of internet-based technology enables faster, more accurate, and easily accessible information delivery to the public. In the hospitality industry, web-based information systems have become an important strategy to improve service quality and expand promotional reach to potential customers. Through such systems, customers can obtain real-time information without limitations of time and location [11], [18].

Hotel Ariesta Kefamenanu is one of the lodging service providers that offers various types of rooms and facilities for customers. However, the current reservation system is still conducted manually, either through telephone communication or by visiting the location directly. This process has several limitations, including restricted information dissemination, the risk of data recording errors, and the possibility of

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double bookings. In addition, data processing and report generation are still performed manually, resulting in lower efficiency and requiring relatively more time.

Several previous studies have shown that the implementation of web-based reservation systems can improve operational efficiency and service quality in the hospitality sector. Online reservation systems provide convenience for customers in making bookings and assist hotel management in handling data in a structured and integrated manner [3], [10], [20]. Furthermore, the application of structured software development methods, such as the Waterfall model, can support systematic system development and improve the quality of the resulting software [12], [2].

Based on these problems, this study proposes the development of a web-based reservation information system for Hotel Ariesta. The system is designed to provide comprehensive hotel information, support the reservation process, and improve efficiency in data management. The system development is carried out using the Waterfall method, which consists of sequential stages, including requirement analysis, system design, implementation, testing, and maintenance [12].

The novelty of this study lies in the development of a web-based reservation system that is specifically tailored to the operational needs of Hotel Ariesta Kefamenanu, integrating hotel information, reservation services, and data management into a single platform. In addition, this study emphasizes the use of the Bootstrap framework to produce a responsive and user-friendly interface that can be accessed across multiple devices. Unlike previous studies that generally focus on generic system development, this research highlights system customization based on actual user needs and local conditions. Therefore, the proposed system is expected to improve service quality, enhance data accuracy, and support digital transformation in the local hospitality sector.

2. METHOD

This study employs the Waterfall software development method, which is a structured and sequential approach consisting of several systematic stages. The Waterfall model is widely used in software development due to its clear workflow and well-defined phases, allowing each stage to be completed before proceeding to the next stage [12]. This method is considered suitable for this research because the system requirements are clearly identified from the beginning.

The research process begins with problem identification at Hotel Ariesta Kefamenanu, where the existing reservation system is still conducted manually, leading to inefficiencies in information delivery and data management. To support system development, data collection is carried out using several methods, namely observation, interviews, and literature study. Observation is conducted by directly examining the ongoing reservation process to identify system weaknesses and user needs. Interviews are conducted with hotel administrators to obtain detailed information regarding system requirements, business processes, and challenges faced in managing reservations. Meanwhile, the literature study is performed by reviewing relevant journals, books, and previous research related to web-based reservation systems and the Waterfall method to strengthen the theoretical foundation.

The system development process follows the stages of the Waterfall model as illustrated in Figure 1, which include requirements analysis, system design, implementation, testing, and maintenance. The detailed explanation of each stage is as follows:

1. Requirements Analysis

At this stage, system requirements are identified based on the results of observation and data collection. The analysis focuses on user needs, system functionality, and constraints in the existing manual system.

2. System Design

The system design stage involves creating system architecture, database design, and user interface design. This stage aims to provide a clear blueprint for system development.

3. Implementation

In this stage, the system is developed based on the design that has been created. The web-based system is implemented using appropriate programming languages and supported by the Bootstrap framework to ensure a responsive interface.

4. **Testing**

The testing stage is conducted to ensure that the system functions properly according to the specified requirements. Testing includes functional testing to identify errors and ensure system reliability.

5. **Maintenance**

After implementation, the system enters the maintenance stage, which involves system updates, error corrections, and performance improvements to ensure long-term usability

The overall process of system development using the Waterfall method is illustrated in Figure 1 to provide a clearer understanding of the research workflow.

3. RESULTS AND DISCUSSION

3.1. System Analysis

The reservation system at Hotel Ariesta Kefamenanu is currently conducted manually, where customers must contact the hotel via telephone or visit directly to obtain information regarding room availability, room types, and facilities. Reservation data are recorded manually in a logbook, including guest name, check-in and check-out dates, room type, and length of stay.

This manual process has several limitations, including a high risk of data recording errors, data loss, and inefficiency in managing reservation information. In addition, room availability information is not integrated, requiring staff to check data manually before providing information to customers. This condition increases the risk of inaccurate information and double bookings.

Compared to web-based reservation systems, the manual system is significantly less efficient in terms of service speed, data accuracy, and accessibility. Previous studies have shown that web-based reservation systems can provide real-time information and improve operational efficiency in the hospitality sector [3], [10]. Therefore, the existing system at Hotel Ariesta requires improvement through digital transformation. Based on these problems, a web-based reservation information system is proposed to replace the manual process. The proposed system aims to improve efficiency, minimize errors, and provide real-time access to reservation information. The comparison between the existing system and the proposed system is presented in Figure 2 and Figure 3.

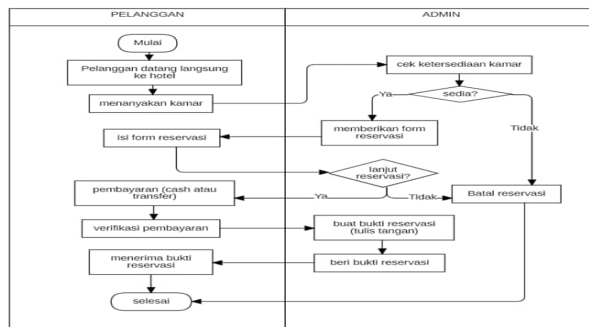


Figure 1 Flowchart of the system in action.

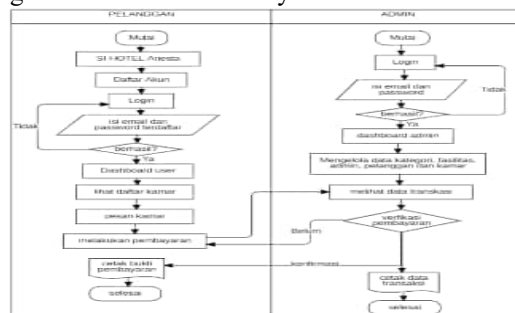


Figure 2. Proposed system flowchart

3.2. System Modeling

Use Case Diagram Flow

Use case diagrams are used to illustrate the interaction between actors and the system. In the Ariesta Hotel Information System, there are two main actors, namely Admin and User (Customer). The Admin manages system data such as rooms, facilities, and transactions, while the User performs activities such as registration, login, and room reservation.

This modeling approach is consistent with previous studies that emphasize the importance of clear system modeling to support effective system development [20]. The use case diagram of the system can be seen in Figure 4.

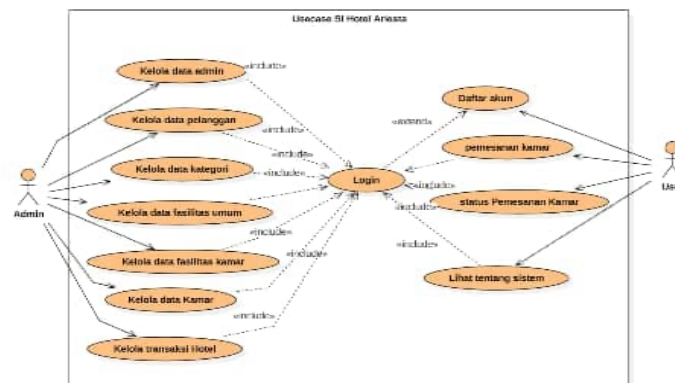


Figure 3. Use Case Diagram

3.3. Database Design

The database design is developed to support structured data storage and management. The system consists of several main tables, including user data, room data, booking data, and facility data.

A well-designed database enables efficient data processing and reduces redundancy. Compared to manual data recording, database-based systems provide better data integrity and accessibility. This is in line with previous research stating that database integration improves system performance and data accuracy [5], [19]. The database design is illustrated in Figure 5.



Figure 4. Database

3.4 System Implementation

The implementation of the web-based reservation system provides several advantages compared to the previous manual system. Users can access hotel information, check room availability, and make reservations online without time and location constraints. From the system interface, features such as registration, login, room selection, and reservation processing have been successfully implemented. Unlike the manual system, which relies on human interaction, the developed system automates the reservation process, reducing processing time and minimizing errors. In addition, the admin can manage data more

efficiently through the dashboard, including managing rooms, facilities, and transactions. This result supports previous studies which state that web-based systems improve service quality and operational efficiency in hotel management [3], [10].

The interface display results of the Ariesta Hotel reservation information system that has been successfully developed are as follows:

1. Main Page Display

The main page is the first page displayed when users access the Ariesta Hotel Information System. This page functions as the initial interface that provides an overview of the hotel and the available services. The main page typically displays several navigation menus such as the room data menu, login menu, account registration menu, and system information menu. In addition, the main page also presents brief information about the hotel, including the hotel description, available facilities, and several related images. The details of the main page can be seen in Figures 6, 7, and 8.

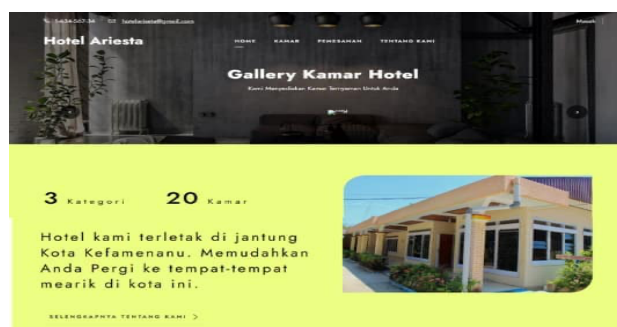


Figure 5. Main page

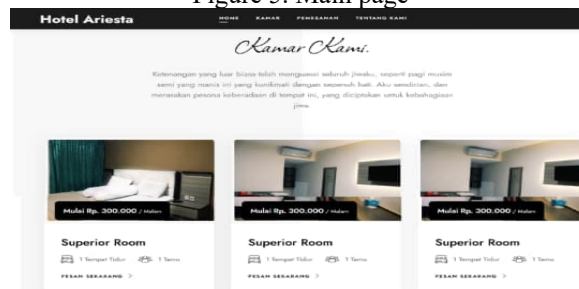


Figure 6. Main page (continued)



Figure 7. Main page (continued)

2. Account registration page display

The account registration page is used by users who do not yet have an account to register in the system. The account registration page can be seen in Figure 9.

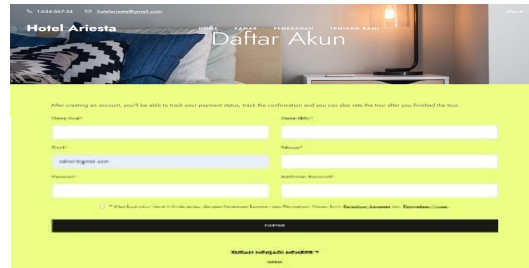


Figure 8. Account registration page

3. User login page display

The user login page is used by users to access the system using previously registered accounts. The user login page display can be seen in Figure 10.

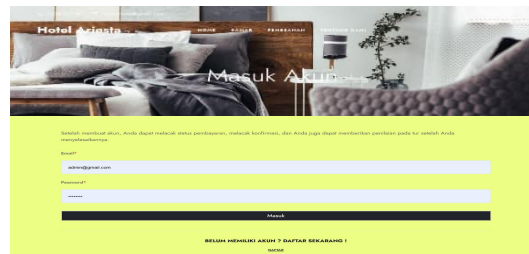


Figure 9. User login page

4. Tampilan halaman data kamar

The room data page is a page that displays a list of available rooms at Hotel Ariesta. It can be seen in Figure 11.



Figure 10. Room data page

5. Room detail page display

The room data page is a page that displays a list of available rooms at Hotel Ariesta. It can be seen in Figure 12.

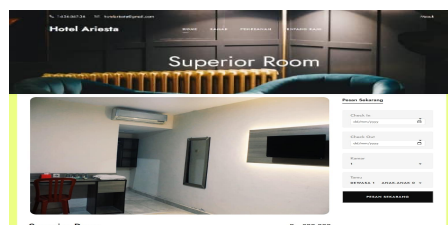


Figure 11. Room detail page

6. Reservation page display

The reservation page is used to display room booking data that has been made by users. It can be seen in Figures 13, 14, and 15.

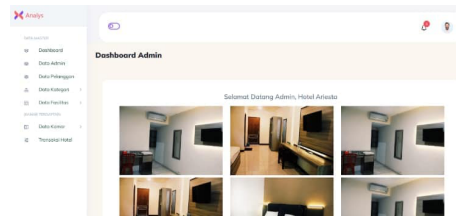


Figure 17. Admin dashboard page

10. Admin data page display

The admin data management page is used to manage admin data registered in the system. It can be seen in Figure 19.

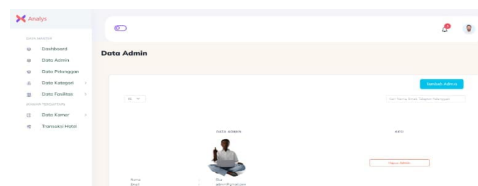


Figure 18. Admin data page

11. Customer data management page display

The customer data management page is used by the admin to view customer data who have registered in the system. It can be seen in Figure 20.

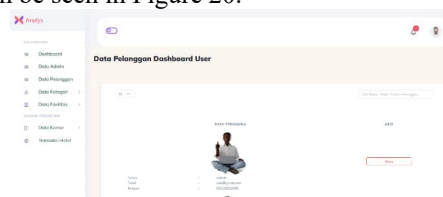


Figure 19. Customer data management page

12. Category data page display

The category data management page is used to manage the room categories available in the hotel. It can be seen in Figure 21.

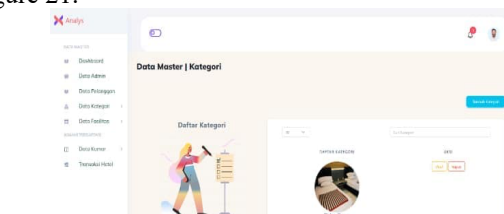


Figure 20. Category data page

13. General facilities data management page display

This page is used to manage general facility data available in the hotel such as parking area, restaurant, meeting room, and other facilities. It can be seen in Figure 22.

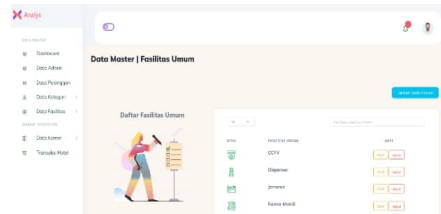


Figure 21. General facilities data management page

14. Room facilities data management page display

The room facilities management page is used to manage the facilities available in each hotel room such as air conditioning, television, bathroom, and other facilities. It can be seen in Figure 23.

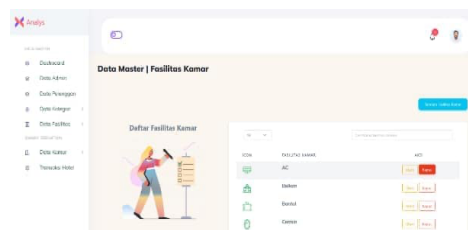


Figure 22. Room facilities data management page

15. Add room page display

The add room page is used by the admin to add new room data into the system. It can be seen in Figure 24.

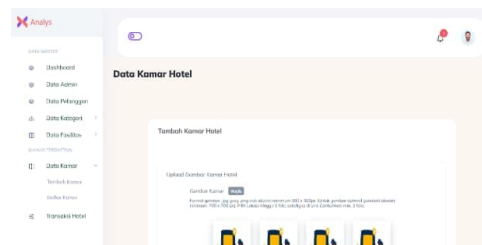


Figure 23. Add room page

16. Room data list page display

The room data list page is used to display all room data available in the system. It can be seen in Figure 25.

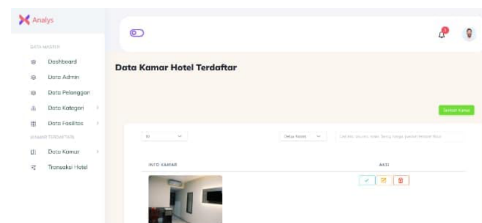


Figure 24. Room data list page

17. Transaction page display

The transaction page is used by the admin to view room booking transaction data made by customers. It can be seen in Figure 26.

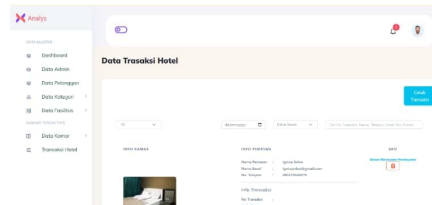


Figure 25. Transaction page

3.5 System Testing

System testing is conducted using the Black Box Testing method, which focuses on evaluating system functionality without examining the internal code structure. Testing is performed on key features such as login, data management, and reservation processes.

The results of testing show that all system functions operate as expected, with all test scenarios categorized as valid. This indicates that the system meets functional requirements and is ready for implementation.

Compared to manual systems, which are prone to human error, the implemented system demonstrates higher reliability and consistency in processing data. This finding is consistent with previous studies that highlight the effectiveness of system testing in ensuring software quality [12]. The test results are presented in tabular form as shown in Table 1 and Table 2.

4. CONCLUSION

Based on the results of the research on the design and development of the web-based reservation information system for Hotel Ariesta Kefamenanu using the Waterfall method, several conclusions can be drawn:

1. The implementation of the Waterfall method, which consists of requirements analysis, system design, implementation, testing, and maintenance, has successfully produced a structured and functional reservation system. The system development process runs systematically and results in a system that meets user needs and system requirements [12].
2. The developed system significantly improves the efficiency of the reservation process compared to the previous manual system. Customers can access hotel information, check room availability, and make reservations online without time and location limitations. This reduces the risk of data recording errors and minimizes the occurrence of double bookings.
3. Based on system testing using the Black Box Testing method, all system features function properly according to the expected outcomes. This indicates that the system is reliable and ready to be implemented in supporting hotel operational activities.
4. The results of this study are consistent with previous research, which states that web-based reservation systems can improve service quality, data accuracy, and operational efficiency in the hospitality sector [3], [10], [20].

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