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MOBILE-BASED MANAGEMENT INFORMATION SYSTEM FOR ARAFURU HOUSE MANAGEMENT

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Abstract

Operational management at Wisma Arafuru currently relies heavily on conventional methods utilizing manual ledger recording. This dependence on manual processes often leads to significant administrative challenges, such as inaccuracies in guest reservation data, slow administrative handling, and difficulties for managers in monitoring room availability and facility conditions in real-time. Therefore, this study aims to design and build a mobile-based Management Information System as a digital transformation solution to enhance the operational efficiency and effectiveness of Wisma Arafuru. The methodology applied in this research is Research and Development (R&D), utilizing the systematic Waterfall software development model. The development stages include requirement analysis conducted through observation and interviews, system and interface design, application implementation using the Flutter framework supported by a Firebase backend, and comprehensive system testing. The result of this research is a mobile application that integrates key features such as room inventory management, a digital booking system, facility monitoring, and simple financial reporting. Based on implementation test results, the system has proven capable of providing convenience for managers in monitoring all operational activities, minimizing data recording errors (human error), and accelerating service processes for guests compared to the previous manual system.

Keywords: Information Systems; Guesthouse Management; Mobile; Reservations

Abstrak

Pengelolaan operasional di Wisma Arafuru saat ini masih sangat bergantung pada metode konvensional yang menggunakan pencatatan buku besar secara manual. Ketergantungan pada proses manual ini sering kali menimbulkan berbagai permasalahan administratif yang krusial, seperti ketidakakuratan data reservasi tamu, lambatnya proses administrasi, serta kesulitan bagi pengelola dalam memantau ketersediaan kamar dan kondisi fasilitas gedung secara real-time. Oleh karena itu, penelitian ini bertujuan untuk merancang dan membangun sebuah Sistem Informasi Manajemen berbasis aplikasi mobile sebagai solusi transformasi digital guna meningkatkan efisiensi dan efektivitas operasional di Wisma Arafuru. Metodologi penelitian yang diterapkan adalah Research and Development (R&D) dengan menggunakan model pengembangan perangkat lunak Waterfall yang sistematis. Tahapan pengembangan sistem ini meliputi analisis kebutuhan melalui observasi dan wawancara, perancangan desain sistem dan antarmuka, implementasi aplikasi menggunakan framework Flutter dengan dukungan backend Firebase, serta pengujian sistem secara menyeluruh. Hasil dari penelitian ini adalah sebuah aplikasi mobile yang mengintegrasikan fitur-fitur utama seperti manajemen inventaris kamar, sistem pemesanan (booking) digital, pengelolaan fasilitas, serta pelaporan keuangan sederhana. Berdasarkan hasil pengujian implementasi, sistem ini terbukti mampu memberikan kemudahan bagi manajer dalam memantau seluruh aktivitas operasional, meminimalisir kesalahan pencatatan data (human error), serta mempercepat proses pelayanan kepada tamu dibandingkan dengan sistem manual sebelumnya

Kata kunci: Sistem Informasi; Manajemen Wisma; *Mobile;* Pemesanan

INTRODUCTION

The rapid development of information technology has transformed the way organizations manage operational activities, enabling data processing to become more accurate, efficient, and well-organized (Rahmadoni et al., 2022) (Rasyidan et al., 2023). Digital systems are increasingly adopted to replace manual processes that are prone to data errors, slow response times, and limited accessibility (Purwanto & Alfarsi, 2024). In the service and hospitality industries, the use of mobile-based information systems plays an essential role in improving service quality,

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supporting real-time monitoring, and accelerating decision-making processes (Pangestu et al., 2023).

Wisma Arafuru is a guesthouse located in the Barakuda Indonesian Navy Housing Complex in Medan, North Sumatra, providing lodging and building rental services for public event activities (Asmoro et al., 2022). Despite having adequate facilities and strategic potential, Wisma Arafuru is not yet widely known by the public due to the absence of proper reservation and promotional media. Currently, reservations and payment processes are still handled manually via phone calls, WhatsApp communication, or direct visits. Booking records are maintained using a physical ledger, which often leads to problems such as data inaccuracy, slow administrative handling, and difficulty in checking room or building availability in real time (Handayani & Ulfatul Akbar Jafar, 2024).

This condition indicates a significant gap between operational needs and the current manual system. Inefficiencies in recording transactions, confirming bookings, service responsiveness, and financial reporting highlight the urgency of a digital transformation. Therefore, the development of a mobile-based management information system is needed to optimize administration, improve customer service experience, and support transparent and structured operational management for Wisma Arafuru (Sanjaya et al., 2020).

Previous studies on mobile reservation and management systems (Afriani et al., 2023) demonstrate the benefits of mobile technology in improving processing efficiency. However, the systems in previous research still lacked several essential features such as room inventory management, notifications, financial reports, and full administrative control. This study addresses those limitations by developing a more comprehensive system that integrates room and facility management, reservations, payments, and reporting for Wisma Arafuru (Sambani et al., 2023).

RESEARCH METHODS

Research & Development (R&D) Research Method

In this study, the type of research used by the researcher is the Research & Development (R&D) method (Irfan Putrawanto et al., 2024). This method allows researchers to develop, modify, or produce a product that is beneficial in terms of management and whose effectiveness has been tested for an agency, organization, group, or individual (Samsudin et al., 2022).

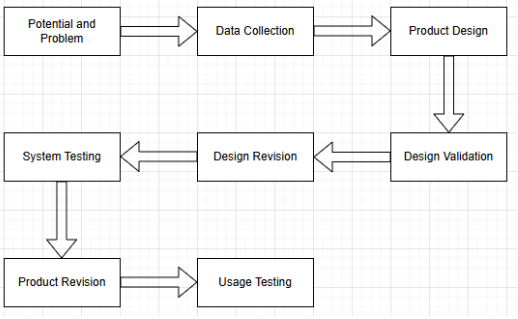

Figure 1. Research and Development (R&D) (Samsudin et al., 2022)

Figure 1 illustrates the Research and Development (R&D) process used in this study. The method begins with identifying potential and existing problems at Wisma Arafuru through preliminary studies. Data is then collected via observation, interviews, and literature review to understand system requirements. Based on these findings, the product design is created using the Waterfall model and undergoes validation to assess its feasibility (Murdiani & Sobirin, 2022). Revisions are made if needed, followed by system trials in real conditions. After improvements, a usability trial is conducted to ensure the system functions effectively and meets user needs. This structured R&D process ensures that the final product is well-tested and beneficial for practical implementation (Okpatrioka, 2023).

The stages of the R&D method are as follows (Razaq et al., 2024):

1) Potential and Problems
   At this stage, the researcher conducted a preliminary study at Wisma Arafuru to determine the potential and existing obstacles.
2) Data Collection
   The data collection process involved three stages, as follows (Lubis & Alda, 2024):
   a. Observation, commonly referred to as observation, was conducted systematically. Therefore, the author visited Wisma Arafuru directly to obtain the necessary information.
   b. Interviews were conducted to obtain the required data. In this context, the author interviewed Mr. Teguh Edi, the Manager of Wisma Arafuru. In this interview, Mr. Teguh Edi discussed how to manage Wisma Arafuru.

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c. A literature review was conducted by reviewing various research findings that had been conducted to date, documented in journals and articles.

3) Product Design
At this stage, the author chose a system development methodology called Waterfall to design the product that would be produced in the form of a system.
4) Design Validation
The design validation stage is the research stage to determine whether the system design being developed is suitable for implementation at Wisma Arafuru. Validation here is still an assessment using rational thinking and responses, meaning the product is still a preliminary design (Safira et al., 2024).
5) Design Revision
At this stage, design revisions are made after validation by relevant parties, if problems or deficiencies are deemed.
6) System Trial
This stage is carried out and implemented at Wisma Arafuru. After system validation and revisions, the product is tested again. After successfully passing several tests, the product is a new system. However, the product must still be assessed for any deficiencies or problems that arise and then revised for the next stage (Saputro et al., 2023).
7) Product Revision
The product revision stage is carried out after the system trial is conducted. If it does not perform optimally, researchers can revise the product (Andharsaputri et al., 2021).
8) Usability Trial
After revisions, the product is tested again in the usability trial stage, where the product is implemented under real-world conditions to ensure that it functions optimally according to user needs .

Data Collection Techniques

Research sources include two sources: primary and secondary research sources. Sugiyono (2016:225) explains that "primary sources are data obtained directly by researchers. This primary data is obtained by recording or taking notes through direct interviews with the parties involved in the research". The following is the primary data from this study (Sari & Nasution, 2025):

a. Direct observation at Wisma Arafuru
Observing the building management process, reservations, order recording, and manual payment processing.
b. Interviews with Wisma Arafuru management
Gathering information regarding system requirements, management constraints, and current workflows. Furthermore, Sugiyono (2016:225) states that "secondary sources are data sources obtained indirectly by researchers".
c. Literature Review
Journals, books, and scientific articles discussing management information systems, guesthouse management, mobile applications, and system development.

System Development Method

The system development method is a step-by-step process used in research. This ensures a structured research process. System development involves creating a new system to completely replace an old system or improve an existing one. This system development method uses the SLDC method, the waterfall method. It's called a waterfall method because it requires waiting until each phase is completed . Previous (Wahid, 2020)phases must proceed sequentially. The waterfall model provides a sequential approach to the software lifecycle, starting with analysis, design, coding, testing, and support (Murdiani & Sobirin, 2022).

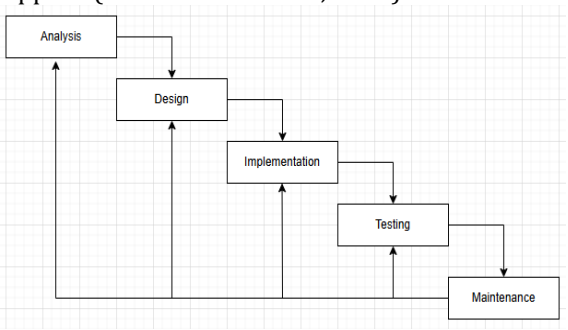

Figure 2. Waterfall System Development (Murdiani & Sobirin, 2022)

Figure 2 presents the Waterfall System Development model used in this research. This method follows a sequential and structured process, starting from system analysis to gather user requirements. It continues with system design, where the interface and database structure are planned. The implementation phase involves developing the system based on the design, followed by system testing to ensure its functionality and reliability. Finally, the maintenance stage is conducted to fix errors and enhance the system according to user needs. This step-by-step approach ensures clarity, control, and consistency throughout the development process (Chen, 2021).

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a. System Analysis
This stage involves gathering information through field research, observations, and direct interviews with the guesthouse management.
b. System Design
The design stage is conducted to provide easy access to information for all parties involved in using the system to be developed. The design stage also determines how the system will operate, including the system design, database, system flow, and output to be generated.
c. System Implementation
This stage uses an implementation of the work being done, implementing the design using Kodular and MySQL.
d. System Testing
This stage tests the system to determine whether the developed system can run properly according to the planned system.
e. System Maintenance
This stage includes the maintenance of the information system that has been developed, including the process of correcting errors, making changes, or adding additions according to the system's process requirements.

RESULTS AND DISCUSSION

Unifield Modelling Language (UML)

The Unified Modeling Language (UML) is a visual language used to describe communication models about a system, relying on diagrams and supporting text. Use cases describe interactions between one or more actors and the system being built and serve to identify which functions are authorized to use those functions (Asmoro et al., 2022).

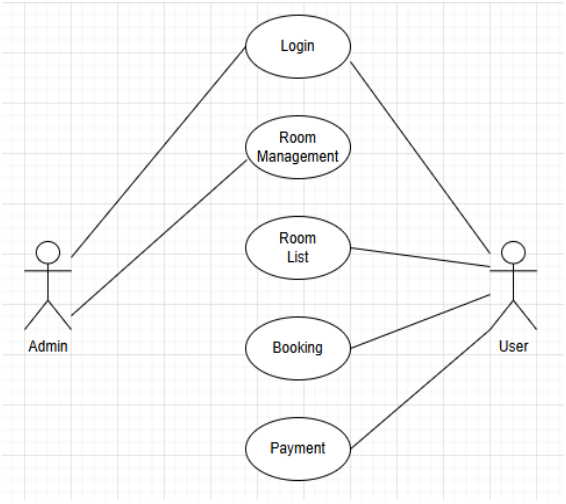

Figure 3. Use Case Diagram

Figure 3 illustrates the Use Case Diagram of the system, which shows the interaction between users (actors) and the system's main features. It identifies the roles of admin and user, along with the functions they can access, such as login, room management, booking, and viewing facility information. This diagram helps visualize system requirements and ensures that all essential user interactions are clearly defined before development .

Interface Design

a. Login Page

Figure 4. Login Page

This feature allows users to log in to the system based on their role (admin/user). User authentication is performed using Firebase Authentication to ensure secure access.

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b. Home Page

Figure 5. Home Page

Displays several menus, including buildings, events, facilities, and accommodation. The dashboard is designed with a simple and innovative UI.

c. Rooms and Facilities Page

Figure 6. Room and Facilities Page

Admins can add, edit, or delete room and building facility data. Information displayed includes: room number, room type, status (available/occupied), and rental price.

d. On the Booking Page

Users can make room reservations digitally, stored directly in the database.

Figure 7. Order Page

The system implementation results show that the developed mobile application successfully resolved the manual management issues previously encountered by the guesthouse management. This application supports faster, more accurate data management, and is accessible anytime via mobile devices. The system is also designed to be responsive and easy to use, meeting the needs of field users (admins/users) who require quick access to room and guest data.

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the research and implementation results, it can be concluded that the mobile-based management information system for Wisma Arafuru has been successfully developed and has had a positive impact on operational efficiency. This system is able to replace manual processes with digital ones, making it easier for managers to record and monitor room reservations, facilities, events, and financial reports in real-time. Key features such as building management, lodging mess, reservations, and payments have run well according to user needs. System testing shows that all functions are easily accessible and the simple interface makes it easy for users to run the application without obstacles. With this system, the management of Wisma Arafuru has become more organized, faster, and more accurate and has the potential to be further developed with additional features in the future. This research provides a scientific contribution by offering a structured and tested prototype that can serve as a reference for

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future studies and the digitalization of guesthouse management system.

Suggestion

For future system development, it is recommended that researchers integrate an automated payment gateway to allow for real-time transaction validation without lengthy manual verification, and equip the application with push notifications to ensure admins and users receive instant updates on booking status. Additionally, the inclusion of guest review and rating features would be highly beneficial for enhancing the service credibility of Wisma Arafuru, alongside regular data security maintenance and the expansion of the platform to a web-based interface to facilitate more effective management of complex financial reports in the future.

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