

DEVELOPMENT OF A WEBSITE-BASED TRAVEL MANAGEMENT INFORMATION SYSTEM AT PT. IKHWANIN MULYO JOYO

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ABSTRAK

PT. Ikhwanin Mulyo Joyo is a transportation services company that still uses a conventional system for booking management, customer service, and checking vehicle availability, resulting in inefficiencies and potential errors. This research aims to design and develop a web-based travel management information system to improve the efficiency and accuracy of data management. The system development used the Waterfall method, encompassing analysis, design, implementation, and testing. The system was built using the Laravel framework and supported by a structured database. The research results show that the system is able to manage customers, vehicles, drivers, bookings, and service data in an integrated manner, with real-time vehicle availability checks and transaction reports. Based on Black Box and User Acceptance Testing (UAT) results, the system performed well and met design requirements. This system is expected to improve operational efficiency, minimize errors, and support faster and more accurate decision-making.

Keyword : *Information Systems, Travel Management, Website, Laravel, Waterfall .*

1. INTRODUCTION

The rapid development of information technology has significantly influenced how companies manage data and conduct business operations. Many organizations are shifting from manual systems to digital-based systems to improve efficiency, accuracy, and accessibility of information.

PT. Ikhwanin Mulyo Joyo is a company engaged in transportation and travel services. However, the company still relies on manual processes in managing its operational data, including booking transactions, customer records, vehicle data, and service records. These processes are carried out using handwritten notes and manual checks, which often lead to inefficiency, data redundancy, and a higher risk of human error.

Previous studies have shown that web-based information systems can improve data management efficiency and reduce operational errors. The use of frameworks such as Laravel also offers some advantages in system structure, scalability, and ease of development. Therefore, implementing a web-based system is an appropriate solution to address the company's problems.

This study focuses on the development of a web-based travel management information system using the Laravel framework and a structured database. The system is developed using the Waterfall methodology, which ensures a systematic and well-documented development process.

Through this system, it is expected that PT. Ikhwanin Mulyo Joyo can improve its operational efficiency, provide more accurate information, and

support better decision-making processes. Additionally, this project provides practical experience in applying information systems development concepts to real-world cases.

2. LITERATURE REVIEW

2.1. Website

A website is a collection of interconnected web pages that can be accessed via the internet using a browser. Websites serve as a medium for conveying information in various forms, such as text, images, audio, and video. In the context of information systems, websites serve as the primary platform for presenting data in a real-time, interactive, and easily accessible manner to users.

The use of websites in businesses and institutions is increasing, particularly in supporting the digitalization of services. Websites enable more efficient data management, reduce reliance on manual systems, and increase the speed of information access.

2.2. Information Systems

An information system is a system consisting of interacting components that collect, process, store, and distribute information to support decision-making. Information systems play a crucial role in improving operational efficiency and data accuracy within an organization.

In this research, the developed information system functions to manage data for orders, customers, vehicles, drivers, and vehicle service in an integrated manner, thereby replacing previously used manual processes.

2.3. Laravel

Laravel is a PHP-based framework designed to simplify and accelerate web application development through various built-in features that support efficiency, security, and good code structure. This framework helps developers build modern, organized, and easily maintainable applications.

Laravel uses a Model-View-Controller (MVC) architecture that separates business logic, views, and application flow, resulting in more structured and maintainable code.

Furthermore, Laravel provides features such as routing, middleware, and authentication to manage system flow and application security. Laravel is also equipped with the Eloquent ORM, which simplifies database management without requiring direct SQL queries.

Other features, such as the Blade templating engine, migrations, seeders, and the Artisan CLI, contribute to development efficiency. Laravel also offers robust security systems, including protection against CSRF and XSS attacks.

With these advantages, Laravel is widely used in the development of web-based information systems, including the travel management information system used in this study.

2.4. Database MySQL

MySQL is a relational database management system (RDBMS) used to store, manage, and organize data in the form of interrelated tables. MySQL uses Structured Query Language (SQL) as the standard language for performing various data operations, such as inserting, updating, deleting, and selecting.

MySQL is known for its strong performance, being capable of handling large amounts of data and supporting simultaneous multi-user access. Furthermore, MySQL is open source, making it widely used in web-based application development. In information systems, MySQL serves as a centralized data storage medium, allowing data to be accessed quickly, accurately, and in an integrated manner by all system components.

2.5. Blackbox Testing

Black Box Testing is a software testing method that focuses on functional system testing without knowledge of or attention to the internal structure and program code used. This testing is conducted by providing a variety of inputs to the system and then evaluating the resulting output to ensure it meets predetermined requirements and specifications.

This approach emphasizes how the system responds to user input, making it highly effective for testing whether each feature performs as expected. Furthermore, Black Box Testing can also be used to

identify errors in the input validation process, logical errors in features, and discrepancies in system output.

Using this method, testing can be conducted from the user's perspective (user-oriented testing), ensuring that the developed system meets user needs and is suitable for use in an operational environment.

2.6. User Acceptance Testing (UAT)

User Acceptance Testing (UAT) is a testing phase conducted by end users to evaluate whether the developed system meets their needs, goals, and expectations. This testing is conducted after the system has passed technical testing stages, such as functional testing, so the primary focus is on user acceptance of the system.

In the UAT process, users directly experience the system based on real-world scenarios to assess whether all features function in accordance with existing business processes. Aspects tested include usability, suitability of system functions, clarity of interface display, and comfort and efficiency of use.

Furthermore, UAT also serves to identify system deficiencies that may have been missed in previous testing stages, allowing for corrections before the system is fully implemented. UAT results serve as an important indicator in determining the system's suitability for use in an operational environment and serve as a basis for decision-making regarding system implementation.

2.7. Waterfall Method

The Waterfall method is a software development model that is carried out in stages and sequentially, where each phase must be completed before proceeding to the next. This approach emphasizes a systematic and structured process, ensuring that each stage of development is well-documented.

In the Waterfall method, the development process begins with requirements analysis, followed by system design, implementation, testing, and maintenance. Each stage has a clear objective and produces outputs that serve as the basis for the next stage.

The advantage of this method lies in its ease of project management due to its clear workflow and comprehensive documentation. Furthermore, the Waterfall method is well-suited for developing systems with well-defined requirements from the outset. However, this method tends to be less flexible with changing requirements mid-development.

In this study, the Waterfall method was used because it aligns with the characteristics of the system being developed, where system requirements have been clearly analyzed, allowing for a focused and systematic development process.

2.8. Travel Management Information System

A travel management information system (SI) is a system developed to help manage and integrate all operational activities within a travel service business. This system encompasses various critical processes, such as processing data on customers, vehicles, and drivers, processing booking transactions, trip scheduling, and presenting operational and financial reports.

The implementation of this information system aims to replace previously used conventional processes, enabling various activities to be carried out automatically in a structured and integrated manner. This system can improve work efficiency, minimize recording errors, and expedite data processing.

Furthermore, the SI allows for real-time data monitoring, making it easier for management to monitor company operations. The information, presented quickly and accurately, can also be used as a basis for more effective and informed decision-making, particularly in improving service quality and travel business performance.

3. METHOD

3.1. Development Method

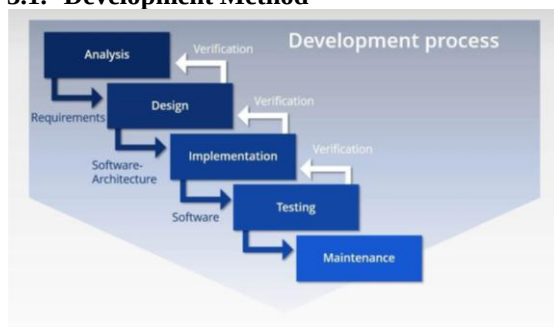


figure 1. Development Method

Analysis is the initial stage aimed at understanding the problems and identifying system requirements at PT. Ikhwani Mulyo Joyo. This process involves gathering information related to the current workflow, such as travel schedule management, ticket booking, and customer data processing, to obtain clear system requirements.

Design is the system design phase based on the analysis results. In this phase, system models are developed, such as UML diagrams, database designs, and user interface designs, to ensure the system has a clear structure and is easy to use.

Implementation is the stage of developing a web-based application system. Activities include coding according to the design, including the development of key features such as travel data management, ticket booking, and user management.

Testing is conducted to ensure the system functions properly and meets the specified requirements. Testing is conducted using Black Box Testing methods to evaluate system functionality,

and User Acceptance Testing (UAT) to ensure the system is usable and accepted by users.

Maintenance is the follow-up stage after the system is deployed. In this phase, corrections are made to errors that arise, as well as adjustments and development of the system based on new needs, so that the system remains optimal and relevant.

3.2. Admin Menu Structure

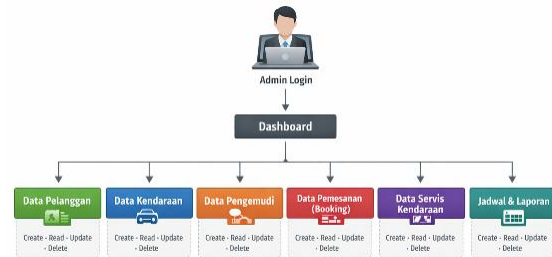


figure 2. Admin Menu Structure

The admin menu structure in the travel management information system shows the navigation flow used by admin to manage all data contained in the system. The process begins with the admin logging in, then the system directs the admin to the dashboard page, which serves as the main control center.

Through the dashboard, the admin can access various main menus, such as data on customers, vehicles, drivers, bookings, vehicle services, schedules, and reports. Within each menu, the admin can perform CRUD (Create, Read, Update, and Delete) operations to manage data as needed.

This menu structure is designed in an organized and hierarchical manner to facilitate admin's systematic data management, thereby increasing the effectiveness and efficiency of system operations.

3.3. User Menu Structure

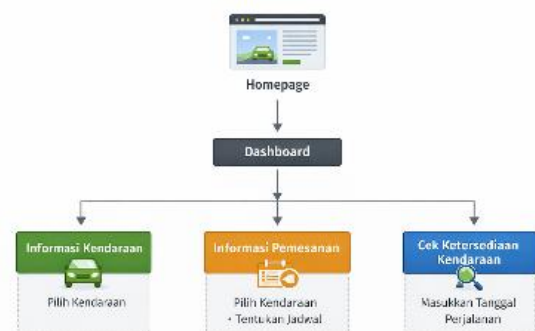


figure 3. User Menu Structure

The user menu structure illustrates the navigation flow accessible to users within the travel management information system. The process begins when users open the homepage, which

presents various information related to available travel services.

Through this system, users can access several key features, such as vehicle information, booking information, and vehicle availability checks. Users can also complete the booking process by selecting their desired vehicle, determining their travel schedule, and filling in the necessary data as needed.

Furthermore, the system is designed to facilitate user interaction, with a simple and easy-to-understand interface. This ensures users can access information and conduct transactions quickly, effectively, and efficiently without experiencing any difficulties.

With a well-organized menu structure, the system is expected to enhance user experience and support a more optimal service process in the travel industry.

3.4. Admin System Flowchart

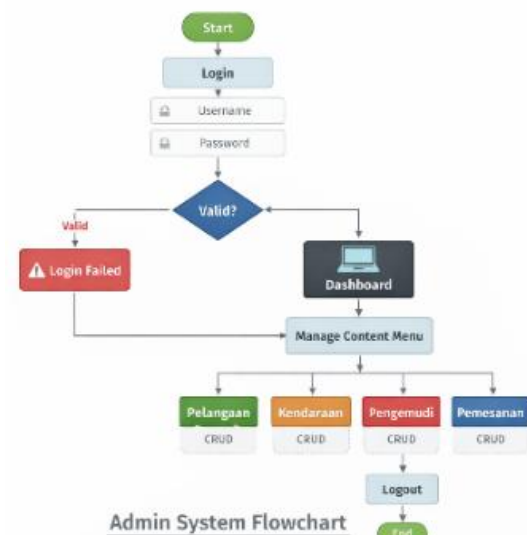


figure 4. Admin System Flowchart

The system administration flowchart illustrates the process flow carried out by the administrator in managing the travel management information system. The process begins with the login stage, where the administrator enters a username and password for authentication. The system then validates the entered data to ensure the user has the appropriate access rights.

If the login data is valid, the administrator is directed to the dashboard page, which serves as the system's control center. On this page, the administrator can access various main menus, such as data on customers, vehicles, drivers, reservations, and vehicle service. Within each menu, the administrator can perform CRUD (Create, Read, Update, and Delete) operations to add, view, modify, or delete data as needed.

Furthermore, the system ensures that all activities performed by the administrator are stored

in a database. Once all data management processes are complete, the administrator can log out to end the system session.

Conversely, if the login process is invalid, the system will display an error message and redirect the user to the login page for re-authentication. With this flowchart, the overall system workflow can be understood, especially in terms of data management based on admin access rights, thus supporting the security and operational efficiency of the system.

3.5. User System Flowchart

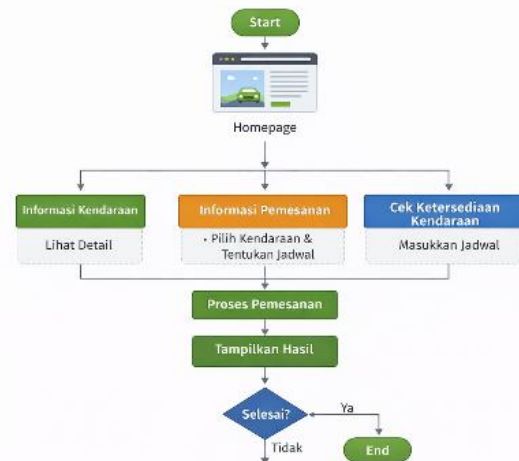


figure 5. User System Flowchart

The user system flowchart illustrates the user interaction with the travel management information system. The process begins with access to the homepage, which displays service information.

Users can then select features such as viewing vehicles, checking availability, or making a reservation by specifying a vehicle and schedule. The system then processes the input and displays the booking results.

Once the process is complete, users can view the results or exit the system. This flowchart demonstrates the ease and flow of use of the online system.

4. RESULT AND DISCUSSION

This chapter presents the implementation results of a web-based travel management information system designed and developed for PT. Ikhwanin Mulyo Joyo. This system was created to facilitate the management of travel service, customer, reservation, and reporting data, which was previously handled manually and lacked structure.

The implementation process was based on the functional and non-functional requirements analyzed in the previous chapter. Each user interface was tested thoroughly to ensure all system features functioned properly. Furthermore, system documentation is presented in the form of screenshots of each page, accompanied by

explanations of the function and role of each feature within the system.

4.1. Login Page

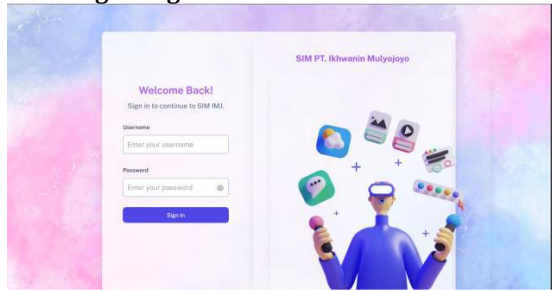


figure 1. Login Page

The Login page is the system's main gateway designed for user authentication. Registered users are required to enter their username and password in the provided input fields. If the credentials are valid, the system will redirect the user to the homepage appropriate to their role, such as admin or staff / employee. The interface for this page is simple yet functional. The documentation includes screenshots (Figure 5.1) to facilitate understanding of the design and login flow. Testing is conducted to ensure this feature is able to prevent unauthorized access and handle input errors (e.g., error messages for incorrect credentials).

4.2. Customer List Menu

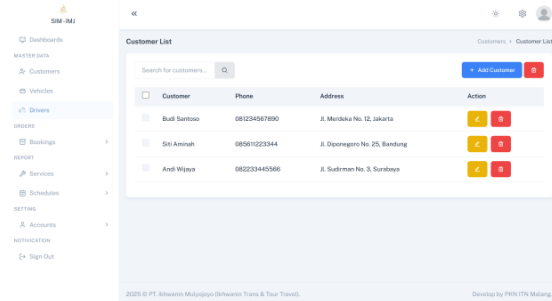


figure 2. Customer List Menu

After logging in successfully, admins will be directed to the Customer List page, which serves as the central customer data management center. This page displays a list of customers in a table containing information such as the name, phone number, and address. Furthermore, each row of data has action buttons, such as edit and delete, to make it easier for admins to modify or delete customer data.

At the top of the page, there is an add data button used to add new customers to the system. The interface is designed to be simple and structured to facilitate efficient data management for admins. Testing on this page includes validating data display, adding, modifying, and deleting data, and ensuring responsive navigation.

4.3. Vehicle List Menu

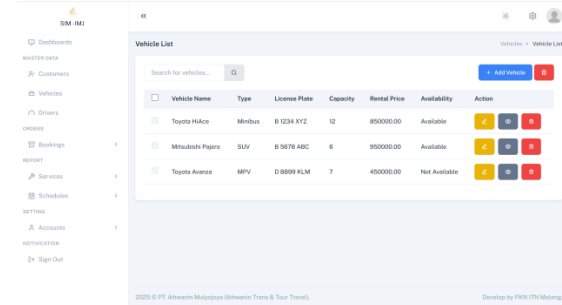


figure 3. Vehicle List Menu

Afterward, the admin can access the Vehicle List page, which is used to manage vehicle data in the system. This page displays a list of vehicles in a table containing information such as vehicle make, vehicle type, license plate number, passenger capacity, rental price, and availability status.

Each vehicle record is equipped with action buttons, including edit, update, and delete buttons, allowing the admin to make changes, update information, or delete vehicle data. The interface is structured to facilitate fast and efficient data management. Testing on this page includes validating the appearance of vehicle data, managing functions (add, change, and delete), and ensuring all features are functioning properly and responsively.

4.4. Drivers List Menu

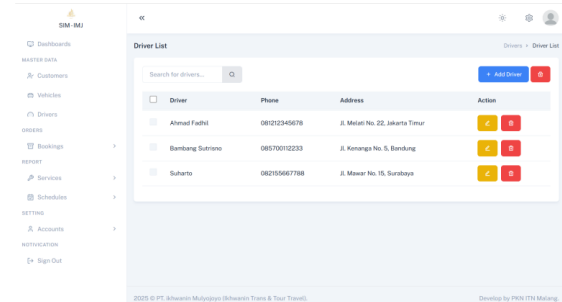


figure 4. Drivers List Menu

Next, admins can access the Drivers List page, which is used to manage driver data. This page displays a list of drivers in a table containing information such as driver name, phone number, and address. Each record has action buttons, such as edit and delete, to make it easier for admins to make changes or delete data.

Furthermore, at the top of the page is an add driver button, used to add new driver data, and a search feature to facilitate quick and easy driver searches. The interface is designed to be simple and organized to support efficient data management. Testing on this page includes validating the search, add, edit, and delete functions, as well as ensuring all features function properly and responsively.

4.5. Booking List

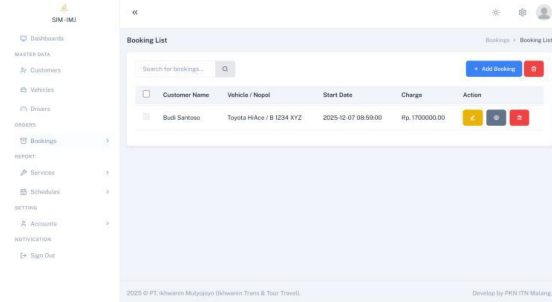


figure 5. Booking List

Admin can access the Booking List Page, which is used to manage vehicle booking data. This page displays a list of bookings in tabular form, containing information such as the customer's name, the vehicle being rented (car make and license plate number), the rental date, and the rental price.

Each booking is equipped with action buttons, including edit and delete, allowing the admin to modify or delete bookings. At the top right of the page, there is an add booking button for adding new bookings, and a search feature makes it easy for the admin to quickly search for bookings.

The interface is designed to be structured and user-friendly to support efficient data management. Testing on this page includes validating the data display, adding, modifying, and deleting data, and ensuring the search and navigation features work smoothly and responsively.

4.6. Booking Detail

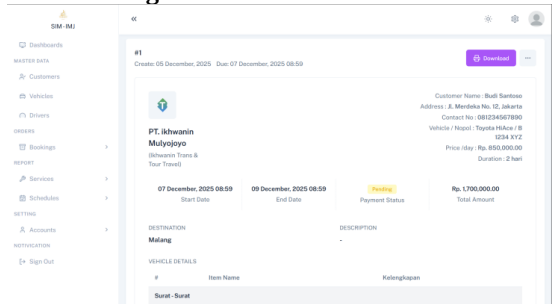


figure 11. Booking Detail.

A comprehensive view provides a complete summary of the rental transaction, including customer information, vehicle specifications, rental duration, cost details, assigned driver, and any special notes. Includes action buttons to print an invoice or extend the rental period.

4.7. Service List Menu

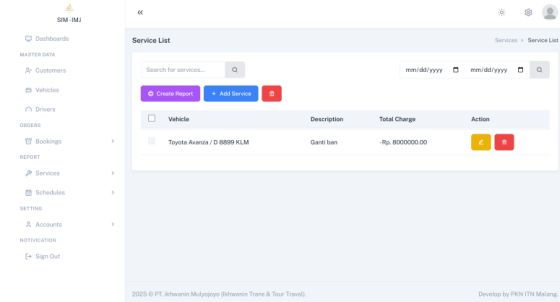


figure 12. Service List Menu

A vehicle maintenance module that records all service activities, including routine maintenance and repairs. Displays each vehicle's service history, detailing the service type, cost, date, and technician. A filter feature allows tracking by service period or type.

4.8. Schedule List Menu

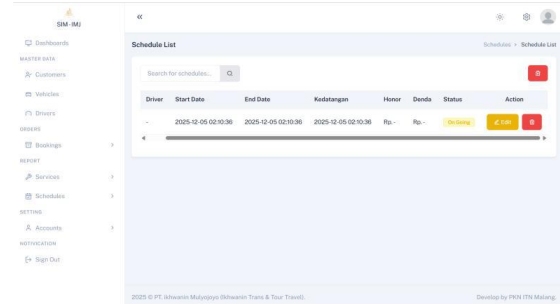


Figure 13. Schedule List Menu

A vehicle maintenance module that records all service activities, including routine maintenance and repairs. Displays each vehicle's service history, detailing the service type, cost, date, and technician. A filter feature allows tracking by service period or type.

4.9. Blackbox Testing

The testing method applied in this project is Black Box Testing, a testing method that focuses on the system's external functionality without considering the internal structure or code. Testing is conducted by providing various inputs through the system interface and then comparing the resulting output with the expected output.

The use of the Black Box Testing method is considered appropriate because it ensures that every feature in the system, such as booking and vehicle data management, operates according to user requirements. Furthermore, this method allows the system to be simulated under real-world conditions, thus representing how the system operates from the perspective of users such as administrators, employees, and customers.

Table 1. Blackbox Testing

No	Feature	Testing Scenarios	Input	Expected Results
1	Login	Authentication (Login)	Enter a valid Username and Password	The system successfully logged in and was directed to the Dashboard
2	dashboard access	Displays the dashboard page		Displays some general data such as total orders, total vehicles, etc
3	Add Data	Add customer data	Add new customer data (Name, Telephone no, Address) via the Add Customer form	Customer data is stored in the database and appears in the Customer List
4	Edit Data	Edit customer data	Change customer data (Name, Telephone, Address) via the Add Customer form	Customer data is stored in the database and appears in the Customer List
5	Delete Data	Deleting customer data	Deleting customer data	Customer data is deleted

Based on the results of testing using the Black Box Testing method, all of the system's main features performed according to the specified scenario. The login feature successfully redirected users to the dashboard after valid authentication, and the dashboard page displayed general system information.

The add, edit, and delete customer data features also functioned properly, allowing data to be saved, updated, and deleted as directed. Therefore, the system can be said to be performing as expected.

4.10. UAT Testing

User Acceptance Testing (UAT) is the final testing stage conducted to verify the business readiness of the system, ensuring that the system that has passed functional testing (Black Box) can be accepted and used effectively by end users (Admins and Employees) in the daily operational environment of PT. IKHWANIN MULYO JOYO. The main objective of UAT is to ensure that the system has met all agreed functional requirements and acceptance criteria, especially in replacing the previous conventional process.

This UAT testing method involves key users completing a series of end-to-end, critical business scenarios, such as the complete process of creating a booking transaction, checking vehicle availability (which must block other bookings and service

schedules), and printing invoices and updating payment status.

- Instrument: The UAT uses 11 standard questions with a 3-point qualitative scale (Poor, Adequate, Good).
- Respondents: The test is conducted with three potential end-users (Admin, General Manager (GM), and Owner).
- Procedure: Respondents are asked to use the system to complete core tasks (e.g., creating a new booking, adding vehicle data) before completing the UAT questionnaire.
- Objective: The success of the UAT is determined by the collective decision of key users that the system is valid, accurate, and ready for launch (Go-Live).

4.11. UAT score interpretation

Table 2. UAT score interpretation

Percentage Range	Category	Description
81% - 100%	Very good	Highly recommended for use.
61% - 80%	Good	Recommended for use.
41% - 60%	Sufficient	Requires revision before use.
0% - 40%	Poor	Needs repair

4.12. Testing Analysis and Evaluation

Tabel 3. Testing Analysis and Evaluation

No	Question	Distribution of Answers (Votes)		
		Poor	Sufficient	Good
1	How do you rate the system's responsiveness and the accuracy of the access rights menu after logging in?	0 (0%)	1 (25%)	2 (75%)
2	How easy and fast is it to enter new data (Customer/Vehicle/Driver) and make changes to old data?	0 (0%)	1 (25%)	2 (75%)
3	How is the quality of filling in and storing vehicle details (Letters, Equipment, etc.) in Vehicle Details?	0 (0%)	3 (100%)	0 (0%)
4	How smooth and easy is the overall process of making new booking transactions within the system?	0 (0%)	2 (75%)	1 (25%)
5	How accurate is the vehicle availability information when selecting a rental date range (including blocking from other bookings and services)?	0 (0%)	1 (25%)	2 (75%)
6	How reliable is the system in calculating the Total Rental Fee (charge) automatically and accurately for different rental periods?	1 (33.3%)	1 (33.3%)	1 (33.3%)

No	Question	Distribution of Answers (Votes)		
		Poor	Sufficient	Good
7	How reliable is the system in blocking a vehicle from booking when the vehicle is in unavailable status?	0 (0%)	1 (25%)	2 (75%)
8	How easy is it to record vehicle's service history and maintenance costs in Service Entry?	0 (0%)	3 (100%)	0 (0%)
9	How reliable is the system in blocking a vehicle from booking when the vehicle is noted in the Service Schedule?	0 (0%)	0 (0%)	3 (100%)
10	How accurate and complete is the data in the Invoice document (PDF/Business Output) generated by the system?	0 (0%)	2 (75%)	1 (25%)
11	What is the level of readiness of this system to completely replace the company's daily manual recording process?	0 (0%)	0 (0%)	3 (100%)
TOTAL		3,03% (1 Votes)	45,45% (15 Votes)	51,52% (17 Votes)

Based on the results of User Acceptance Testing (UAT), the Acceptance Index for this travel management information system was 82.85%. This score is in the very good category.

- Business Validity: This score is in the very good category, clearly indicating that the system is not only technically functional but also business-acceptable and highly adequate to replace PT. IKHWANIN MULYO JOYO's daily conventional recording process.
- Distribution of responses (votes): Based on the distribution of responses from three respondents, the results show that 51.52% of respondents gave a rating of "good," 45.45% gave a rating of "fair," and 3.03% gave a rating of "poor."
- Focus for Improvement: It should be noted that features related to Vehicle Details (No. 3) and Service Management (No. 8) were only rated as "fair" (2.00). This indicates that even though the feature is functional, the interface design or workflow in this section still needs to be optimized to reach a Good usability rating and improve user efficiency.

5. CONCLUSION

Based on the design and implementation results, this project successfully identified the main problems at PT. Ikhwanin Mulyo Joyo, namely inefficiency and risk of data errors due to manual processes in managing transactions and vehicle availability. To address these issues, a web-based travel management information system was built to replace the conventional pocesses. The developed system is able to help manage customer data, reservations, and travel reporting in a more structured and efficient manner with the support of features such as multi-role login, customer data management, transaction recording, and report generation.

The development of this system uses a structured Waterfall method and is supported by Laravel technology as the backend and API and JavaScript on the frontend side, resulting in a stable and responsive system. Implementation is carried

out with a user-friendly interface and responsive design to increase user comfort. The test results show that the system runs well based on Black Box Testing, while UAT produces a feasibility score of 82.83% with the "Very Good" category, supported by the majority of positive user responses who consider the system easy to use and practical, thus supporting effective system adoption.

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