

Development of a Web-Based Workshop Information System for Service Management and Customer Satisfaction Evaluation

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Abstract

Junian Jaya Motor Workshop still manages service schedules, customer data, transactions, and operational reports manually, resulting in overlapping schedules, potential data loss, and difficulties in preparing daily and monthly reports. This study aims to develop a web-based workshop information system that supports service booking, scheduling, transaction recording, payment status monitoring, and customer satisfaction evaluation through a questionnaire feature. This study employed the Research and Development method using the System Development Life Cycle waterfall model, which consists of requirements analysis, system design, implementation, testing, evaluation, and maintenance. Data were collected through observation, interviews, and a literature review. The system was developed using PHP, HTML, CSS, JavaScript, and MySQL, with XAMPP as the local server. Functional testing was conducted using black-box testing with both valid and invalid input scenarios. The results showed that all 20 testing scenarios, consisting of 14 user-feature scenarios and six administrator-feature scenarios, produced the expected outputs and passed successfully. Features including registration, login, service booking, payment status checking, questionnaire submission, message delivery, input validation, and administrator data management functioned according to the specified requirements. Therefore, the developed system is functionally feasible to support more structured and efficient workshop service management while providing customer feedback for service evaluation.

Keywords: Web-Based Information System, Workshop Service Management, Customer Satisfaction Evaluation, SDLC Waterfall, Black-Box Testing.

Introduction

The development of information technology encourages various business sectors to increase the effectiveness and efficiency of operational management, including vehicle maintenance and repair efforts. The application of information systems allows customer data, service schedules, transactions, and operational reports to be managed in an integrated manner so that information can be obtained more quickly, accurately, and in a structured manner. For workshops that are still carrying out manual administrative processes, digitization is important to reduce recording errors, data loss, and irregularity in service schedules.

The Junian Jaya Motor workshop still uses a manual system in recording customer data, ordering services, scheduling services, transactions, and preparing daily and monthly reports. The service history is only recorded on the customer note, while the process of confirming the schedule

and submitting the service progress is still carried out by phone. These conditions cause difficulties in searching for data, the risk of duplication or loss of information, poorly structured service schedules, and delays in the preparation of operational reports. This problem shows the need for a web-based information system that is able to integrate all workshop service activities. These operational conditions are in accordance with the problems described in the manuscript, namely data management and schedules that are still manual.

Previous research has shown the use of web-based technology in supporting the management of business activities. Alviano et al. (2023) designed a web-based sales application using PHP and MySQL, while Wijaya et al. (2025) developed a website-based vehicle maintenance and repair service system. Both studies show that web-based systems can be applied to support data management and business services. However, this research not only focuses on providing information and managing transactions, but also integrates service ordering features, service scheduling, transaction logging, payment status monitoring, report management, and questionnaires to evaluate customer satisfaction. The references of the two studies have been listed in the manuscript bibliography.

The system development is carried out using the System Development Life Cycle (SDLC) approach of the waterfall model. This approach provides systematic development stages, starting from needs analysis, design, implementation, testing, to system maintenance. The system is developed web-based using PHP, HTML, CSS, and JavaScript, while MySQL is used as a database to store and manage all workshop operational data.

Based on these problems, this research aims to develop a web-based workshop information system that can support customer data management, service ordering and scheduling, transaction recording, payment status monitoring, report preparation, and customer satisfaction evaluation through the questionnaire feature. The system developed is expected to help the Junian Jaya Motor Workshop carry out service activities in a more structured, effective, and efficient manner.

Method

This research uses the Research and Development (R&D) method with the System Development Life Cycle (SDLC) approach of the waterfall model to develop a web-based workshop information system at the Junian Jaya Motor Workshop. The waterfall model was chosen because the system development process can be carried out systematically and sequentially according to the needs that have been identified from the beginning. The research stages include the analysis of user and system needs through observation, interviews, and literature studies; System design using use case diagrams, activity diagrams, flowcharts, interface design, and databases; system development and implementation; testing; evaluation; and maintenance. The system is developed using PHP as a server-side programming language, HTML, CSS, and JavaScript to build interface views and interactions, MySQL as a database, and XAMPP as a local server. The system test is carried out using the black-box testing method by determining the features tested, providing correct or incomplete inputs, observing the output produced, and then comparing it with the expected output. The feature is declared successful or passes if the system can perform the functions as designed, store or display data appropriately, and provide a validation

message when the user enters incorrect or incomplete data. Testing includes registration and login, service ordering and scheduling, transaction logging, payment status checks, messaging, admin data management, and customer satisfaction questionnaire filling. The questionnaire feature is used to obtain customer assessments of the workshop system and services, then the results of the answers are stored in the database as material for evaluation and service quality development.

Results and Discussion

System Overview

The Junian Jaya Motor Workshop is a business engaged in the maintenance and repair of four-wheeled vehicles. Before the system was developed, the process of recording customer data, ordering services, scheduling services, and compiling reports was still done manually. This condition poses several obstacles, such as difficulties in searching for data, the possibility of duplication of information, loss of transaction data, and less efficient use of time in managing operational activities. To overcome this problem, a web-based workshop information system was developed using PHP and HTML as well as MySQL as a database. This system is designed to help manage customer data, order services online, arrange service schedules, record transactions, monitor payment status, measure customer satisfaction, and prepare daily and monthly reports so that workshop operational activities become more structured, effective, and efficient.

Needs Analysis

The needs analysis was carried out through direct observation of the operational activities of the Junian Jaya Motor Workshop as well as interviews with the owners and family members involved in the management of the workshop. The results of the analysis show that the recording of customer data is still done manually using books, while the service history is only recorded in the customer note and has not been stored in a structured manner. This condition causes difficulties in finding data on previous transactions and preparing monthly reports. In addition, the unstructured service schedule requires customers to confirm by phone, while service status updates are also still delivered manually. Based on these problems, a web-based information system is designed to provide features for managing customer data, services and workshop schedules, recording transactions, updating order status, storing service history, automatically generating reports, and login access for users and admins.

System Planning

The system design was carried out to describe the structure, function, workflow, and relationship between components in the information system of the Junian Jaya Motor Workshop. This stage uses Unified Modeling Language (UML) in the form of use case diagrams and activity diagrams, as well as flowcharts to describe the design process and flow of using the system. In addition, the database was designed as a place to store user data, transactions, messages, questionnaire questions and answers, holidays, and booking schedules. The design becomes the basis in the process of developing and implementing the system so that each feature can be built according to the needs of customers, mechanics, and admins.

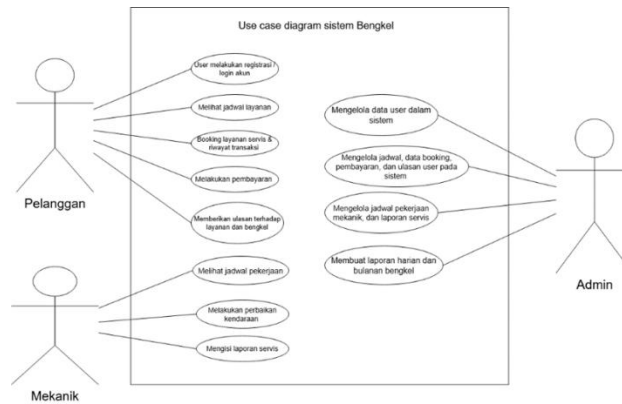


Figure 1. Use Case Diagram

The use case diagram illustrates the relationship between actors and the functions available on the system. The system involves three actors, namely customers, mechanics, and admins. Customers can register or login, view service schedules, place orders, obtain transaction information, make payments, and provide ratings on workshop services. The mechanic carries out the vehicle repair process based on the schedule that has been updated by the admin and submits service reports. Meanwhile, admins have the right to manage user data, transactions, payments, schedules, questionnaires, mechanical reports, as well as daily and monthly reports of workshops.

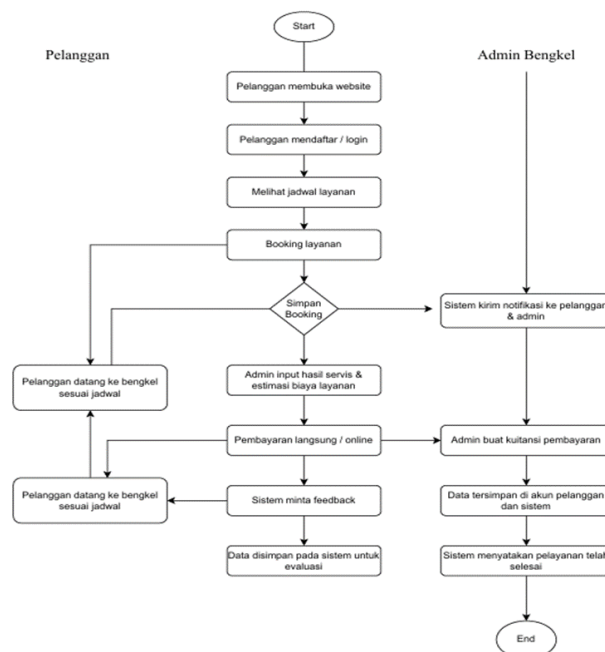


Figure 2. Activity Diagram



The activity diagram describes a series of activities that take place in the workshop information system, starting from users registering or logging in, viewing service schedules, filling out order forms, to order data stored in the system. After the customer arrives as scheduled, the mechanic performs the vehicle repair and the customer completes the payment. The admin then updates the status of the order and payment, while the customer can give an assessment of the service that has been received.

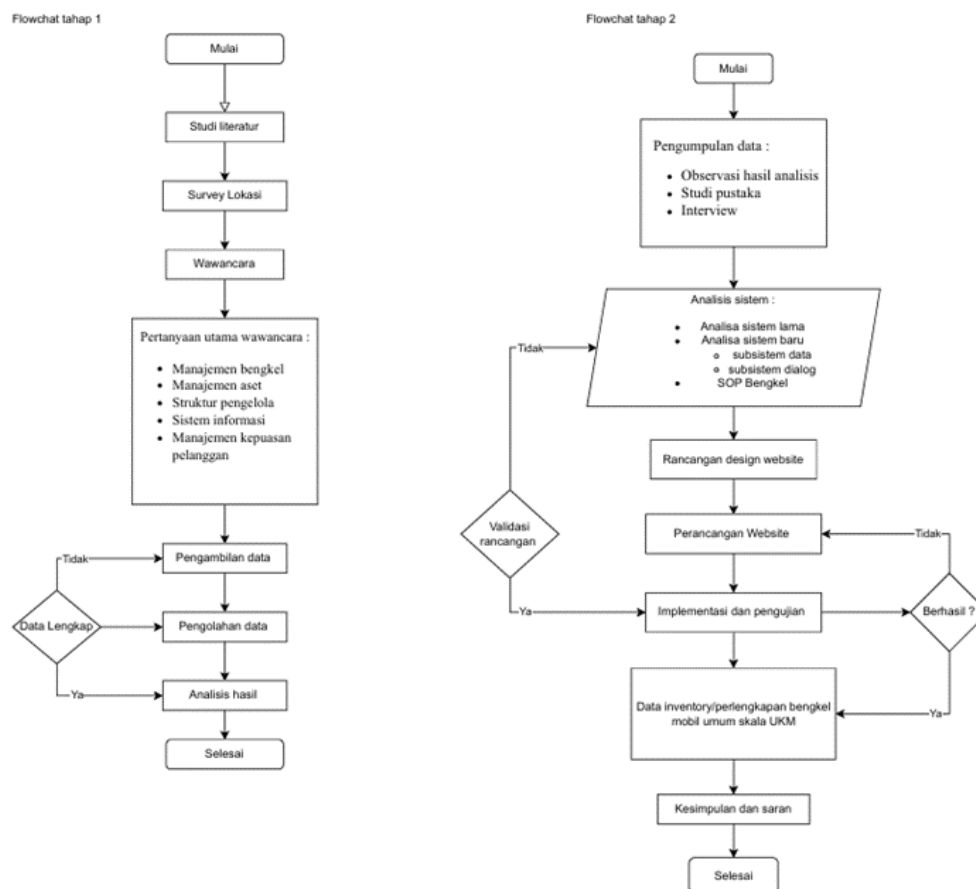


Figure 3. System Planning Flowchart

The system design flowchart shows the development stages starting from literature study, site surveys, interviews with workshop owners, data collection, and analysis of system needs. The results of the analysis are used to design the interface interface, system flow, and database. The design is then implemented through the process of developing and testing the system. If the test results are not in accordance with the needs of the user, improvements are made to the design and implementation until the system can run according to the research objectives.



Flowchart hasil web

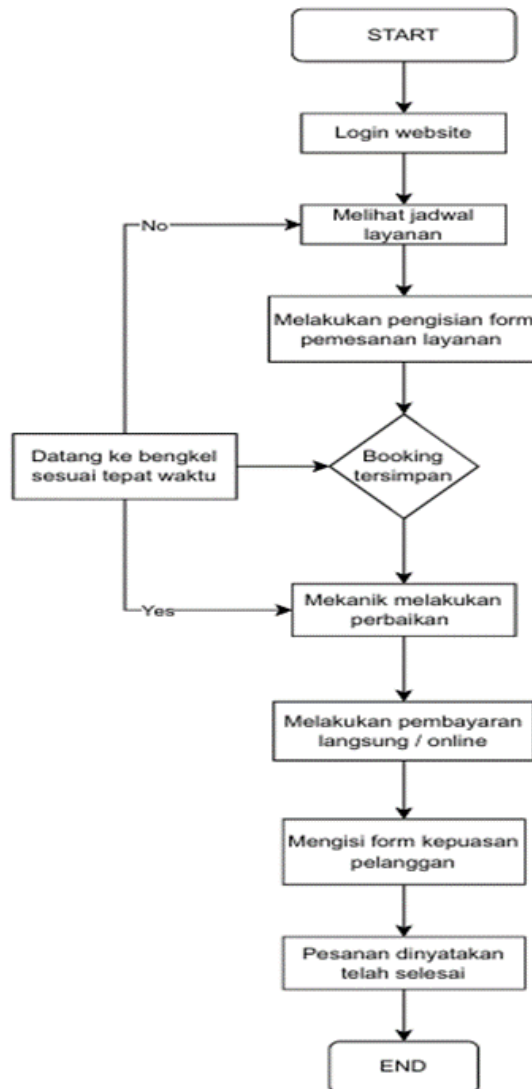


Figure 4. System Flowchart

The system flowchart depicts the flow of system usage from the customer side. The process begins when the customer registers or logs in, views the service schedule, and fills out the service order form. The saved order data is the basis for customers to come to the workshop according to the schedule. The mechanic then repairs the vehicle, then the customer makes the payment. After the transaction is completed, the admin updates the status of the order and payment, while customers can fill out a questionnaire to give an assessment of the workshop's services.

	Review: Journal of Multidisciplinary in Social Sciences Volume 06 No 06 June 2026 ISSN: 3031-6375 https://lenteranusa.id/	
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Table 1. Database Design

Data	Column Name	Data Type	Remarks
E-Mail	Id**	Int(11)	User Id
	nama_lengkap	Varchar(255)	Full name of the user
	Powered by Username**	Varchar(20)	Account name/user call
	E-mail	Varchar(30)	E-mail
	Lost your password?	Varchar(15)	User account password
	Created at	Date time	Registration date of user account
	Photo	Varchar(255)	User account profile photo
	No hp	Varchar(20)	Active user's phone number when registering
Transactions	Status	Enum('active','inactive','block')	User account status
	Id. at 1000.	Int(255)	User transaction id
	User_id	int(255)	Relationship of transaction id to user id
	Service	Varchar(255)	Service type
	Order date	Date	Service booking date
	Order status	Varchar(255)	Service booking status
	No hp	Varchar(20)	User's phone number
	Name	Varchar(255)	Username
Ask	Payment status	Varchar(30)	Service payment status
	Id*	Int(11)	Message id
	Name	Varchar(100)	Username
	E-mail	Varchar(100)	E-mail
	The content of the message	Text	User messages (questions, etc.)
Questions	Delivery date	Date time	Date the message was sent
	Id*	Int(11)	Question id
	Fill in the questions	Text	Questionnaire questions
Answer	type	Varchar(20)	Answer option type
	Id*	Int(11)	Answer id
	Question Id*	Int(11)	Relationship of the answer id to the question id
	Name	Varchar(100)	Username
	E-mail	Varchar(100)	E-mail
Holidays	Answer	Varchar(100)	User-submitted answers
	Id*	Int(11)	Holiday site id
	Date	Date	Service holiday dates
Schedule	Remarks	Varchar(255)	Reasons for holiday services
	Id*	Int(11)	Order schedule id
	Date*	Date	Order schedule date
	Hours*	Time	Order schedule hours
	Status	Enum('available','reserved')	Service schedule status
	Powered by User:S	Int(11)	Powered by User:S

The system database is designed with the name "Customer" database which consists of user tables, transactions, messages, questions, answers, holidays, and booking schedules. User tables are used to store customer identities and accounts, while transaction tables store service data, order dates, order status, and payment status. The message table is used to store customer questions, while the question and answer table is used to manage the questionnaire data. The holiday table is

used to set the dates of unavailable services, while the booking schedule table stores the date, time, availability status, and identity of the user who made the booking.

Development and Implementation

The development and implementation stage is carried out by translating the system design into a web-based application. The system is developed using HTML and CSS to build the interface, JavaScript to support interaction on the page, PHP to run processes on the server side, and MySQL to store and manage data. The process of writing and editing the program's code is done using Sublime Text or Visual Studio Code, while XAMPP is used as a local server during the development process. The structure of the program consists of an admin folder to store the system management page, a service folder to set up the database connection, an uploads folder to store the user's profile photo, and an image folder to store the images used in the system view.

The database implementation is done using MySQL via phpMyAdmin which is available on XAMPP. The database used is named "customer" and consists of seven tables, namely jadwal_pesanan, answers, holidays, questions, messages, transactions, and users. Each table supports the process of storing user data, ordering services, service schedules, transactions and payments, customer messages, and questionnaire filling results. The database structure allows all workshop operational data to be stored centrally and can be managed through the system.

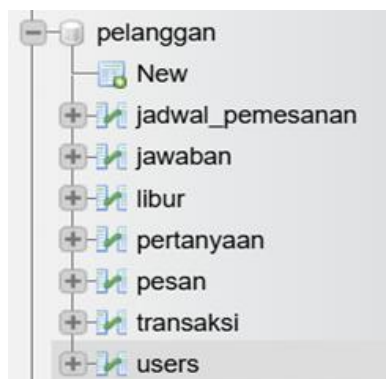
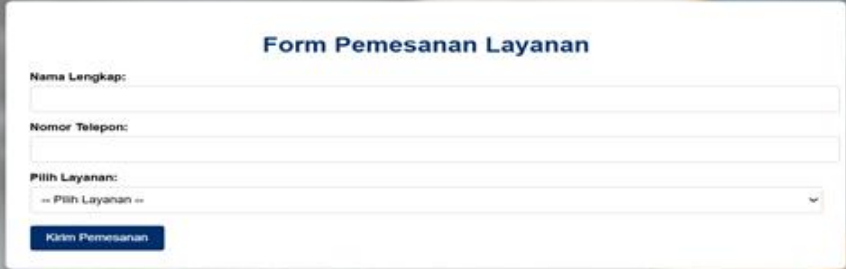


Figure 5. Database Table Structure

Figure 5 shows the implementation of the database structure used in the workshop information system. The database integrates user account data, booking schedules, transactions, messages, holidays, questions, and questionnaire answers so that the data management process can be carried out in a structured manner.

The implementation of the system from the user side includes index pages, login and registration, dashboards, service orders, service schedules, questionnaires, user accounts, contacts, and payment status. The dashboard page serves as the main page that connects the entire system menu. Through the booking page, users can choose the type of service, date, and service time, while the schedule page displays service availability as well as workshop holiday dates. Users can also access order history, update their profile picture, send messages to the workshop, check

payment status, and fill out questionnaires to provide an assessment of the workshop's system and services.



Form Pemesanan Layanan

Nama Lengkap:

Nomor Telepon:

Pilih Layanan:

Figure 6. Booking Page

Figure 6 shows the booking page that the customer uses to fill in the service data. Users can choose the available services or choose other options if the type of repair needed is not listed, then enter the vehicle complaint according to their needs.



Jadwal Servis - June 2025

Senin	Selasa	Rabu	Kamis	Jumat	Sabtu	Minggu
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

Jadwal pada Monday, 30 Jun 2025

Jam	Status	Aksi
08:00	Tersedia	Pesan
09:00	Tersedia	Pesan
10:00	Tersedia	Pesan

Figure 7. Schedule Page

Figure 7 shows a service schedule page that provides information about the dates and times of available services. The system restricts bookings to elapsed dates and marks holidays so that customers cannot make bookings at that time.

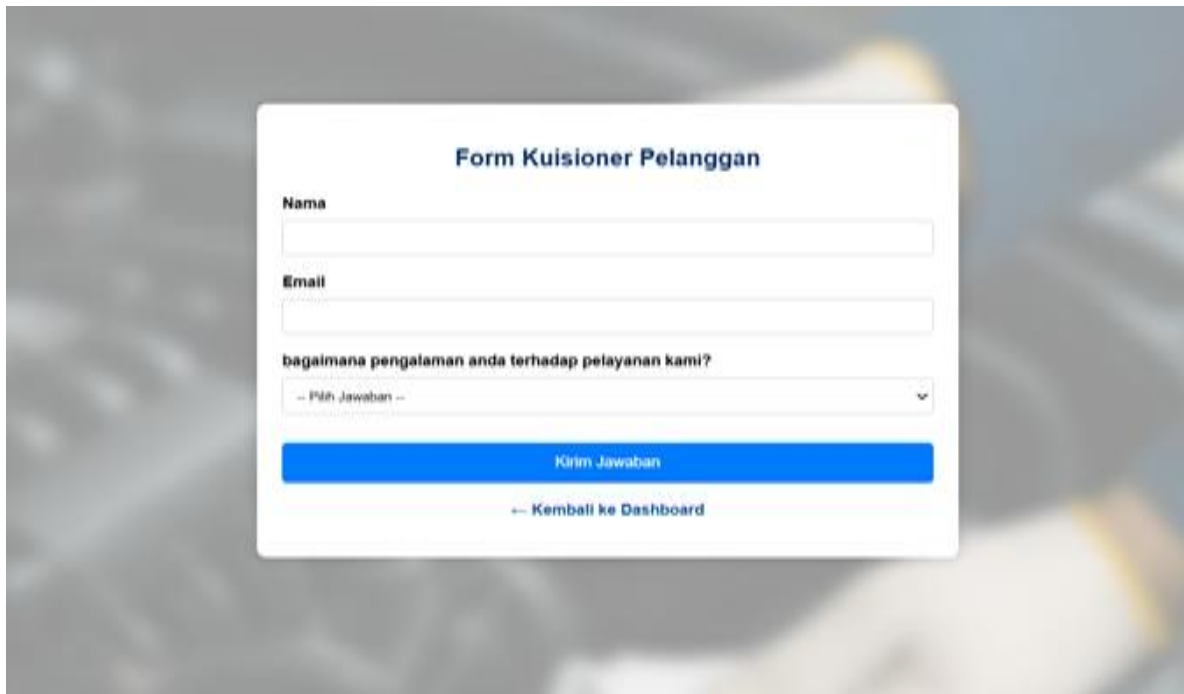


Figure 8. Questionnaire Page

Figure 8 shows the questionnaire page used to obtain user assessments of the workshop system and services. The questions on this page are managed by the admin, while the customer's answers are stored in the database for evaluation and service development.

The questionnaire feature provides a space for customers to convey their assessment of the system and services received. The test results showed that customers were able to fill out questionnaires and the system was able to store the answers into the database according to the designed function. The data can be used by managers to identify aspects of services that need to be maintained or improved. However, this study still focuses on the successful development and functional testing of questionnaire features so that customer satisfaction levels have not been analyzed in the form of scores or percentages. Therefore, stored customer answer data can be the basis for evaluating customer satisfaction at the next stage of system implementation. The questionnaire feature in the system is used to obtain customer assessments and save their answers as service evaluation materials.

Implementation from the admin side includes login pages, dashboards, transaction management, questionnaire management, holiday settings, user account management, and message management. Admins can view booking data, update service status from pending to under repair or completed, and change payment status. In addition, admins can add or remove questionnaire questions, set holiday schedules linked to user pages, block or delete accounts, and read messages sent by customers through the contact page.

Kelola Transaksi							
ID	Nama	No HP	Layanan	Tanggal	Status Pesanan	Status Pembayaran	Aksi
18	dina	0812345	servis lampu (perkabelan)	2025-06-19	menunggu		Ubah Status
14	kila	083140067893	las body	2025-06-18	menunggu		Ubah Status
15	kila	083140067893	las body	2025-06-18	selesai	belum dibayar	Ubah Status
16	kila	083140067893	las body	2025-06-18	menunggu	belum dibayar	Ubah Status
19	kila	0822143545474	servis berkala	2025-06-18	menunggu		Ubah Status
17	junian	0822143545474	servis lampu (perkabelan)	2025-06-17	menunggu	belum dibayar	Ubah Status

Figure 9. Manage Admin Transactions Page

Figure 9 shows the pages that admins use to manage customer transactions. This page displays the identity of the order, the customer's name and phone number, the type of service, the date of the order, the status of the service, and the status of the payment. Through this page, admins can update the development of services and payments so that customers get transaction information that is in accordance with the latest conditions.

The implementation of a web-based information system provides benefits for customers and managers of the Junian Jaya Motor Workshop. For customers, the registration and login feature provides more regular access to workshop services, while the ordering and service schedule features make it easier for customers to choose the type of service, date, and time of arrival without having to make repeated confirmations over the phone. Information on the availability of schedules and holidays can also reduce the risk of service schedule clashes. The order history and payment status check feature helps customers obtain transaction information more transparently, while the contact feature makes it easier to submit questions or complaints to workshop managers. From the manager's side, the customer management, transactions, schedules, payments, and reports features help the administrative process to be carried out centrally so that data searches, service status updates, and the preparation of daily and monthly reports become more structured. The system does provide features for bookings, schedules, transaction history, payment status, messages, and data management by admins.

Test Results

System testing is carried out using the black-box testing method through localhost by providing various inputs to each feature and observing the suitability of the resulting output. Testing is focused on the functioning of the system without examining the program's code structure. The test scenario includes the use of correct and complete data as well as incorrect or incomplete data to ensure the system can perform the main functions and display validation according to the given input conditions.

	Review: Journal of Multidisciplinary in Social Sciences Volume 06 No 06 June 2026 ISSN: 3031-6375 https://lenteranusa.id/	
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Table 2. E-Mail

Yes	Feature Name	Inputs provided	Expected output	Test Results	Status
1	Login to Your Blog	Username and password	User logs in to the user dashboard	Conform	Pass
2	Booking form	Completed form	Booking is successful and data is saved	Conform	Pass
3	Add profile	Select photos and save	The user's profile picture was successfully replaced	Conform	Pass
4	Account registration	Name, email, phone number, username, password	Account created successfully	Conform	Pass
5	Check payment status	Transaction id	Transaction and payment results appear	Conform	Pass
6	Filling out the questionnaire	Name, and answer	Data saved successfully	Conform	Pass
7	Asking questions (contacts)	Name, email, and questions	Enquiry/message sent	Conform	Pass
8	Login to Your Blog	Username or password does not match	A "wrong password" or "username not found" message appears	Conform	Pass
9	Booking form	Blank form	A message validation appears to fill out the form	Conform	Pass
10	Add profile	Blank photo	Not delivered	Conform	Pass
11	Account registration	Password verification does not match the original password	A message "password is not correct, please fill it in"	Conform	Pass
12	Check payment status	Id incorrect	A "wrong code" message appears	Conform	Pass
13	Filling out the questionnaire	Blank form	A message validation appears to fill out the form	Conform	Pass
14	Asking questions (contacts)	Blank form	A message validation appears to fill out the form	Conform	Pass

Table 2 shows the results of tests on the features used by the user. Testing includes login, service booking, profile photo changes, account registration, payment status checks, questionnaire fill-in, and messaging through the contact page. Testing is also carried out using the wrong username or password, an empty order form, an unselected profile photo, an incorrect password confirmation, an incorrect transaction code, and an unfilled questionnaire and contact form. All outputs produced have been in accordance with the expected results and each test scenario has gained a pass status.

Table 3. Admin

Yes	Feature Name	Inputs provided	Expected output	Test Results	Status
1	Login to your admin	Username and password	User logs in to the admin dashboard	Conform	Pass
2	Login to your admin	Username or password does not match	A "wrong password" or "username not found" message appears	Conform	Pass
3	Manage user data	Admin logs in and opens the page	View user account data	Conform	Pass
4	Manage user data	Admin not logged in	Can't access the manage page	Conform	Pass
5	Manage more data	Admin logs in and opens the page	View user account data	Conform	Pass
6	Manage more data	Admin not logged in	Can't access the manage page	Conform	Pass

Table 3 shows the test results of the features used by the admin. Testing includes logging in using true and incorrect data, access to the user's account management page, and access to other data management pages. Admins who have logged in can access and view data on the management page, while admins who have not logged in can access the page. All test results have been in accordance with the expected output and obtained passed status.

Based on the test results, all system features can run properly according to the functionality that has been designed and no errors or bugs are found during the testing process. The features used by users and admins, such as login, service booking, transaction status check, questionnaire filling, messaging, and data management, have worked as intended. Thus, the information system of the Junian Jaya Motor Workshop has met the functional needs of users and can be continued to the implementation or online hosting stage.

The results of this study support the research of Alviano et al. (2023) who developed web-based applications using PHP and MySQL to help manage business activities. The results of the study are also in line with Wijaya et al. (2025) regarding the website-based vehicle maintenance and repair service system. The research equation lies in the use of web-based technology to manage

	Review: Journal of Multidisciplinary in Social Sciences Volume 06 No 06 June 2026 ISSN: 3031-6375 https://lenteranusa.id/	
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data and services in a more structured manner. The difference in this research lies in the integration of ordering features, service scheduling, payment status, report management, customer communication, and service evaluation questionnaires in one system. Thus, the developed system not only functions as an information medium, but also supports the operational management of the workshop and the provision of service evaluation data. The two comparative studies have been listed in the manuscript reference list.

The results of black-box testing show that the features used by customers and admins have produced outputs according to the set scenario. The login and registration feature can manage user access, the ordering feature is able to store service data, the payment status feature can display transaction information, while the questionnaire and contact feature is able to receive and store customer feedback. The system can also provide a validation message when the user enters incorrect or incomplete data. The results show that the system has met the basic functional needs and is suitable to proceed to the online implementation stage. However, the tests conducted are still limited to system functionality through local servers, so long-term use testing is still necessary to assess stability, ease of use, security, and user acceptance.

Conclusion

This research has succeeded in developing a web-based information system for the Junian Jaya Motor Workshop that supports service ordering and scheduling, customer and transaction data management, payment status monitoring, report preparation, and service evaluation through the questionnaire feature. The results of black-box testing showed that all user and admin features have functioned according to the design and are able to provide validation for inappropriate inputs. Thus, the system has met the basic functional needs to help the service and administration process of the workshop become more structured and efficient. This research is still limited to functional testing through local servers and does not include online system implementation, long-term testing using actual operational data, and analysis of customer satisfaction assessment results. Further developments are suggested to include the implementation of the system in hosting services, the provision of mobile device versions, the integration of notifications via email or WhatsApp, the addition of automatic cost calculations, the improvement of system security, and the testing of ease of use and customer satisfaction in more depth.

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