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WEB-BASED ASSET MANAGEMENT INFORMATION SYSTEM AT PT ASTRA DAIHATSU NGURAH RAI TUBAN

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ABSTRACT

Effective asset management plays a crucial role in supporting organizational operations by ensuring the availability, accuracy, and accessibility of asset information. However, the asset recording process at PT Astra Daihatsu Ngurah Rai Tuban was previously conducted using a semi-manual approach, resulting in data redundancy, delays in report generation, and difficulties in obtaining real-time inventory information. This study aims to design and develop a web-based Asset Management Information System to improve the effectiveness and efficiency of asset management within the company. The system was developed using the Waterfall software development methodology, while data were collected through observation, interviews, and documentation. The application was implemented using the Laravel framework with a MySQL database and incorporates Role-Based Access Control (RBAC) to manage user permissions for Administrators, Warehouse Staff, Sales Staff, and Managers. The system provides integrated features for master data management, incoming and outgoing goods transactions, goods return processing, inventory reporting, and report export in PDF and Microsoft Excel formats. System evaluation was conducted using Black Box Testing, Role-Based Access Control (RBAC) security evaluation, and User Acceptance Testing (UAT). Black Box Testing covered 23 functional test cases, all of which achieved a 100% success rate. The RBAC evaluation verified 20 authorization scenarios, with all authorized access granted correctly and all unauthorized access attempts successfully blocked, resulting in 100% access control accuracy. Furthermore, UAT results demonstrated that all functional scenarios were successfully accepted by users, indicating that the developed system satisfied operational requirements and effectively supported daily asset management activities. Therefore, the proposed system provides a reliable and efficient solution for improving asset management and supporting managerial decision-making at PT Astra Daihatsu Ngurah Rai Tuban.

Keywords: Asset Management Information System, Laravel, Waterfall, Role-Based Access Control, Web-Based System.

INTRODUCTION

The rapid advancement of science and technology has significantly transformed various sectors, including business and industry. Globalization, supported by developments in information technology, has changed the way organizations manage data and information, enabling business processes to become faster, more accurate, and more integrated. Digitalization has become a fundamental component of this transformation by allowing data that were previously managed manually to be converted into digital information that can be accessed, processed, and managed more efficiently through computer-based systems and internet networks (Gangele & Kumar, 2025). Furthermore, enterprise information systems have become a fundamental driver of organizational digital transformation by integrating business processes, improving data quality, and enabling real-time decision-making across organizational functions (Sambhara et al., 2021).

Information technology plays a strategic role in supporting organizational management activities. Information systems are capable of collecting, processing, storing, and presenting information required to support managerial decision-making. The implementation of information systems also improves operational efficiency, minimizes recording errors, and accelerates report generation, making them an essential component of modern organizational resource management (Pasaribu & Nasution, 2025). Recent studies also emphasize that integrated enterprise information systems improve organizational agility, support operational transparency, and enhance collaboration among business units through centralized information management (Miller et al., 2024).

One of the most important organizational resources that must be managed effectively is company

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assets. Assets are economic resources used to support business operations and require systematic management throughout their life cycle, including planning, procurement, inventory management, maintenance, and disposal. Effective asset management enables organizations to optimize asset utilization while minimizing the risks of loss, damage, and recording errors (Susanti, 2021). Therefore, asset inventory management plays a crucial role in providing accurate information to support maintenance planning, procurement activities, and managerial decision-making.

PT Astra Daihatsu Ngurah Rai Tuban is an authorized Daihatsu dealer providing Sales, Service, and Spare Parts (3S) services. To support its business operations, the company manages various types of assets, including workshop equipment, office facilities, operational supplies, and spare parts inventory. Based on field observations, the company's asset recording process is still performed using separate and non-integrated records. This condition causes delays in data updating, increases the possibility of data inconsistencies among departments, and complicates information retrieval and report preparation. Furthermore, report generation requires additional verification processes, preventing management from obtaining timely and accurate information for decision-making.

Several previous studies have developed web-based asset management information systems. Susanti developed a web-based asset management information system for PT Telkom Indonesia that improved the efficiency of asset recording (Susanti, 2021). (Usnaini et al., 2021). developed a web-based asset inventory information system using the Waterfall method in an educational institution, resulting in a more effective inventory management process (Sembada et al., 2025) designed a web-based industrial inventory system supporting supplier management, inventory control, and incoming and outgoing goods transactions. (Sandy et al., 2026) implemented QR Code technology to improve asset monitoring efficiency, while (Kusumojati & Mediawati, 2024) recommended the implementation of web-based asset management information systems through a Systematic Literature Review approach.

Nevertheless, previous studies have Nevertheless, previous studies have generally focused on educational institutions or specific organizations and have not fully addressed the operational requirements of automotive dealerships, where asset management involves more complex business processes, multiple users, and real-time integrated data management. Moreover, existing systems generally implement only several individual functionalities, such as inventory recording, supplier management, or QR Code-based monitoring, without integrating comprehensive features within a single platform. Unlike previous studies, the system developed in this research integrates Role-Based Access Control (RBAC), automatic inventory stock updates following every transaction, goods return management, managerial dashboard visualization, and reporting facilities in PDF and Microsoft Excel formats within a single web-based application. The integration of RBAC is particularly important because it ensures that users only access functions relevant to their responsibilities, thereby improving information security, accountability, and operational reliability in enterprise information systems (Rao et al., 2021). This integration represents the novelty of the proposed system, enabling secure multi-user access, real-time inventory management, and more effective managerial decision-making, particularly in the operational environment of an automotive dealership.

Based on these issues, this study aims to design and develop a web-based Asset Management Information System for PT Astra Daihatsu Ngurah Rai Tuban. The system was developed using the Waterfall software development methodology and incorporates integrated asset management, incoming and outgoing goods transactions, goods return processing, automatic inventory updates, role-based authentication, reporting facilities, and an interactive dashboard. The proposed system is expected to improve the effectiveness and efficiency of asset management while supporting managerial decision-making within the company.

LITERATURE REVIEW

Asset

Assets are organizational or corporate resources that possess economic value and are utilized to support operational activities. According to (Susanti, 2021), assets are properties or resources that have economic, commercial, or exchange value and are utilized in carrying out organizational functions and responsibilities. Furthermore, assets are considered economic resources expected to provide future benefits to an organization (Kusumojati & Mediawati, 2024). Therefore, assets can be defined as valuable economic resources that should be managed effectively to support the achievement of organizational objectives.

Asset Management Information System

Asset data management is the process of systematically recording and managing asset information to produce accurate data that support

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monitoring and decision-making processes (Iswandy et al., 2025);(Abdi & Idris, 2024). An Asset Management Information System utilizes information technology to manage asset data in an integrated manner, thereby improving the effectiveness of asset control, reducing recording errors, and facilitating the generation of information and reports required by management (Usnaini et al., 2021); (Sandy et al., 2026) (Kusumojati & Mediawati, 2024)

Website and Laravel Framework

A website is an internet-based platform used to present and manage information in a centralized manner, enabling users to access information efficiently through the internet (Fahrizal & Azhar, 2025)(Safitri & Sari, 2023). In this study, the proposed system was developed using the Laravel framework, which adopts the Model–View–Controller (MVC) architecture and provides various built-in features, including Eloquent ORM, user authentication, data validation, and role-based access control. These features support the development of a structured, secure, and maintainable web-based Asset Management Information System (Widyastuti et al., 2024).

Waterfall Method

The Waterfall method is a software development methodology within the Software Development Life Cycle (SDLC) framework that follows a linear and systematic approach (Usnaini et al., 2021). The methodology consists of sequential phases, namely requirements analysis, system design, implementation, testing, deployment, and maintenance. Each phase must be completed before proceeding to the next stage, ensuring that the software development process is well-structured, properly documented, and aligned with user requirements.

RESEARCH METHOD

This study employed a descriptive research method with a software engineering approach to design and develop a web-based Asset Management Information System for PT Astra Daihatsu Ngurah Rai Tuban. Data were collected through observation, interviews, and documentation to obtain comprehensive information regarding the existing asset management process. The analysis revealed that asset recording was still performed using a semi-manual approach, resulting in data duplication, delays in report generation, and difficulties in obtaining real-time inventory information.

The system was developed using the Waterfall software development methodology because the system requirements had been clearly identified at the beginning of the study. The Waterfall model consists of sequential phases, including requirements analysis, system design, implementation, testing, deployment, and maintenance. Each phase was completed before proceeding to the next stage to ensure that the developed system met user requirements in a structured and systematic manner.

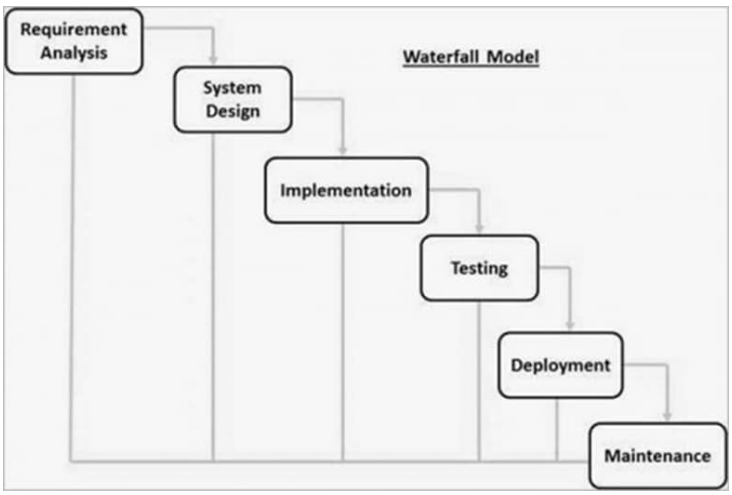


Figure 1. Waterfall Methodology

After the system requirements had been identified, an analysis of the existing business processes was conducted to design a proposed system capable of integrating the entire asset management process into a single web-based application. The proposed system enables users to manage item data, record incoming and outgoing goods transactions, process goods returns, and generate reports through an integrated platform, thereby improving the effectiveness and efficiency of asset management.

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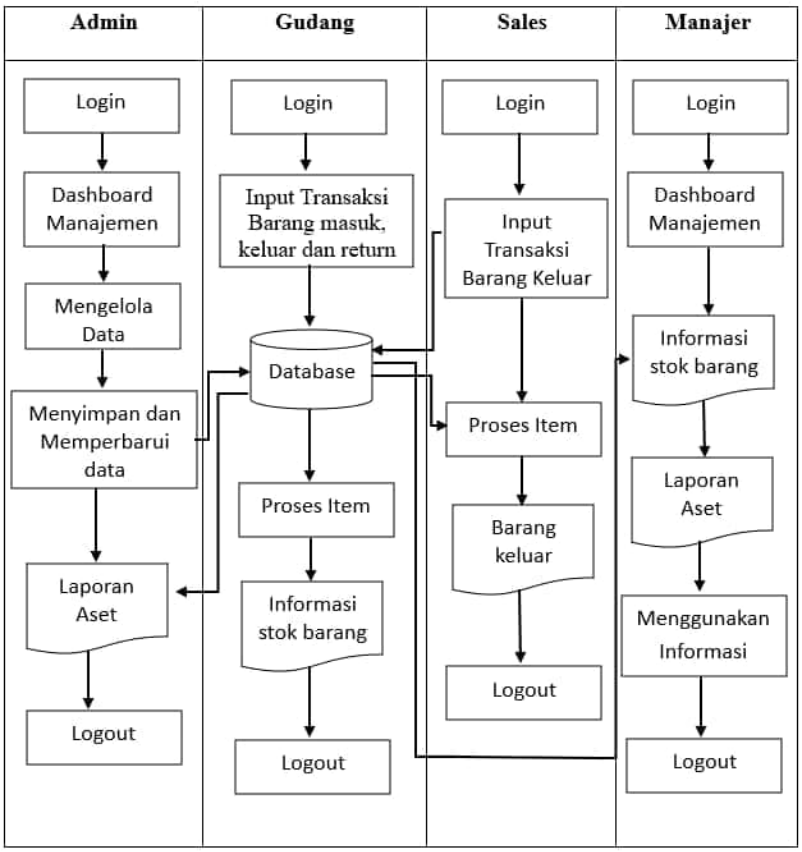


Figure 2. Proposed System Flowmap

The developed system adopts a web-based client–server architecture. All data are processed on the server and stored in a centralized database, while users access the application through a web browser according to their assigned access privileges. This architecture supports multi-user access, maintains data consistency, and facilitates system maintenance. Furthermore, the implementation of role-based access control ensures that each user can only access functions corresponding to their responsibilities, thereby enhancing system security and operational reliability.

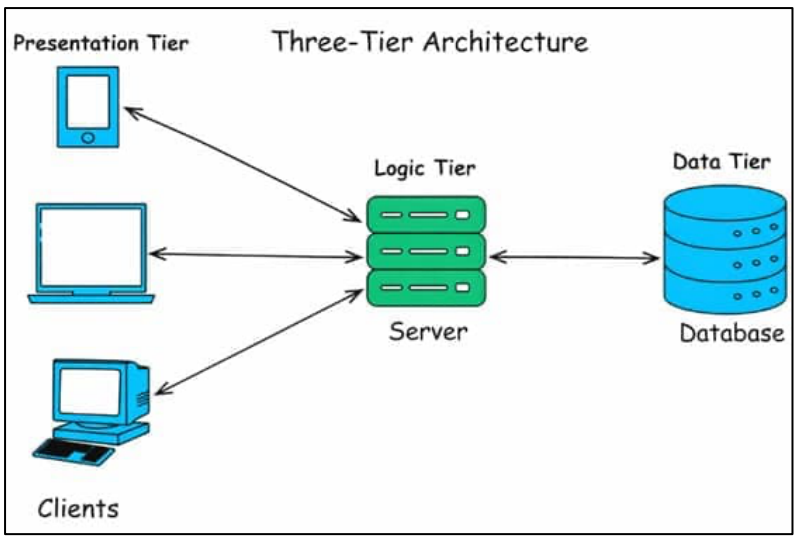


Figure 3. Client–Server Architecture

System design was carried out using the Unified Modeling Language (UML) to model the functional requirements of the proposed system. The modeling process began with the development of a Use Case

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Diagram, which illustrates the interactions between system users and the main system functionalities. The diagram identifies four actors: Administrator, Warehouse Staff, Sales Staff, and Manager, each assigned different access privileges according to their respective roles and responsibilities in the asset management process. The Use Case Diagram provides an overview of the system's functional scope and serves as a reference for subsequent stages of system design and implementation.

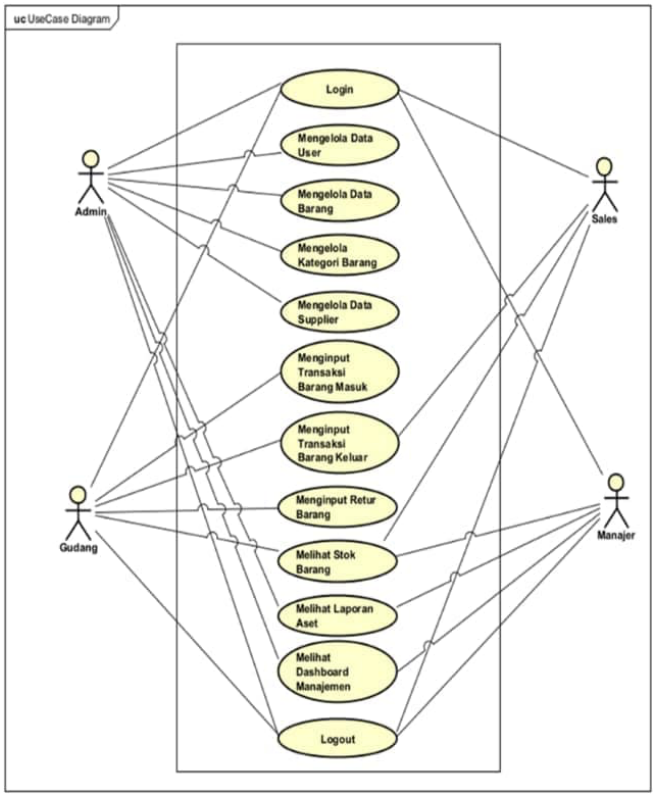


Figure 4. Use Case Diagram

After the system implementation was completed, system validation was conducted using User Acceptance Testing (UAT) to evaluate whether the developed application met user requirements and was suitable for operational use. The UAT involved four representative users, consisting of an Administrator, a Warehouse Staff member, a Sales Staff member, and a Manager, who directly interact with the asset management process. The evaluation was conducted through predefined operational scenarios representing the daily business processes of each user role, including user authentication, master data management, inventory transactions, report generation, and document export. Each participant executed the assigned tasks while the system responses were observed and compared with the expected outcomes. In addition, Black Box Testing was performed to verify that each system function operated according to its specified functional requirements.

The UAT results were analyzed descriptively by comparing the expected results with the actual system responses for each operational scenario. A scenario was considered successful when the assigned task could be completed without functional errors and the system produced outputs consistent with the predefined functional requirements. The overall validation results were summarized based on the number of successfully completed operational scenarios.

RESULTS AND DISCUSSION

System Implementation Results

The Asset Management Information System for PT Astra Daihatsu Ngurah Rai Tuban was successfully developed as a web-based application using the Laravel framework and MySQL database. The system implements a Role-Based Access Control (RBAC) mechanism to ensure that users are granted access privileges according to their assigned responsibilities, including Administrator, Warehouse Staff, Sales Staff, and Manager. The application integrates user authentication, master data management, inventory transaction management, and reporting modules with export functionality in PDF and Microsoft Excel

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formats, thereby improving the effectiveness and efficiency of asset management compared with the previous manual process.

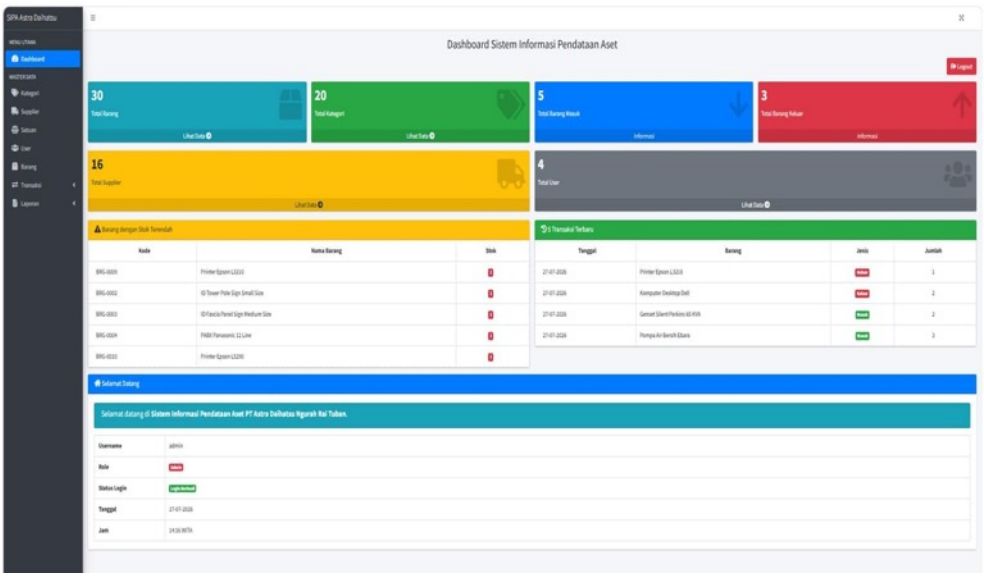


Figure 5. Administrator Dashboard

The Asset Management Information System for PT Astra Daihatsu Ngurah Rai Tuban was successfully developed as a web-based application using the Laravel framework and MySQL database. The system implements a Role-Based Access Control (RBAC) mechanism to ensure that users are granted access privileges according to their assigned responsibilities, including Administrator, Warehouse Staff, Sales Staff, and Manager. The application integrates user authentication, master data management, inventory transaction management, and reporting modules with export functionality in PDF and Microsoft Excel formats, thereby improving the effectiveness and efficiency of asset management compared with the previous manual process.

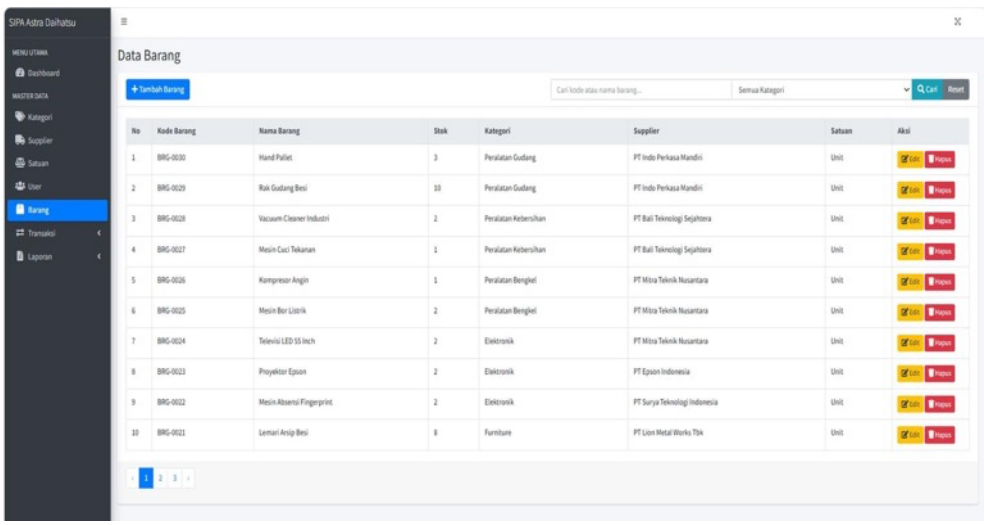


Figure 6. Item Management Interface

The Item Management module enables users to create, update, delete, and search asset records through a centralized database, ensuring data consistency and facilitating efficient asset administration. The system also supports automatic inventory updates after every incoming and outgoing goods transaction, ensuring that stock information remains accurate and synchronized in real time.

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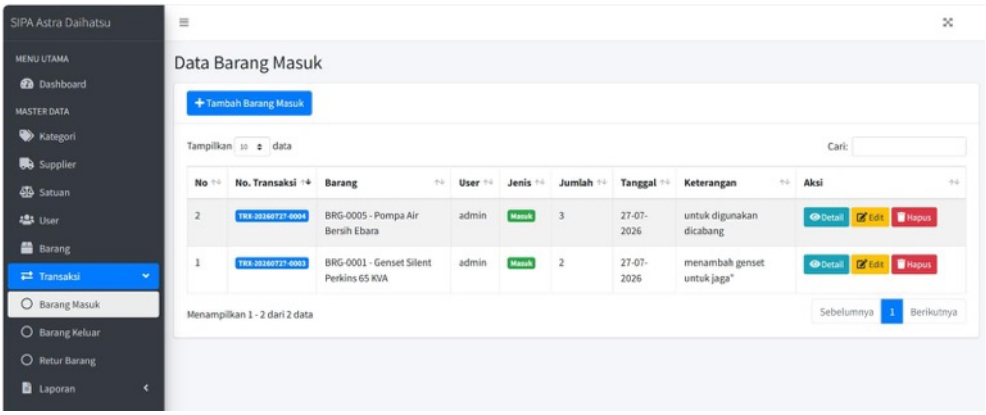


Figure 7. Incoming Goods Transaction Interface

The Incoming Goods Transaction module records inventory additions by storing transaction details, including item information, quantity, date, user, and remarks. Once a transaction is completed, the inventory stock is updated automatically, reducing manual recording errors and improving inventory accuracy.

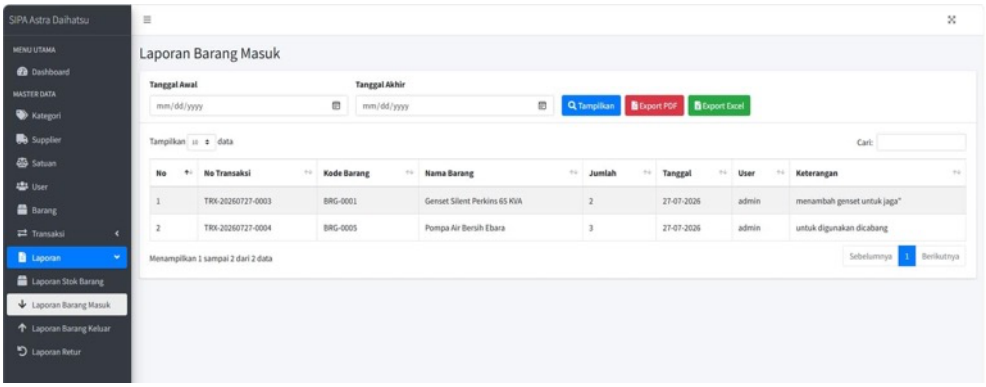


Figure 8. Asset Report Interface

The reporting module enables users to generate inventory reports based on selected periods and export them in PDF and Microsoft Excel formats. This functionality facilitates documentation, data archiving, and managerial reporting while providing timely and reliable inventory information.

System Testing Results

System testing was conducted using Black Box Testing and User Acceptance Testing (UAT). The UAT was performed through predefined operational scenarios executed by representative users according to their respective roles. Rather than measuring user satisfaction through questionnaires, the UAT focused on validating whether users were able to successfully complete operational tasks and whether the system functioned according to business requirements.

Table 1. Black Box Testing Results

No.	Tested Feature	Test Scenario	Expected Result	Actual Result	Status
1	Login	Enter a valid username and password.	The system displays the dashboard according to the user's access privileges.	The dashboard was successfully displayed based on the user's role.	✓ Passed
2	Item Management	Add a new item.	The item data are successfully saved.	The item data were successfully saved.	✓ Passed
3	Item Management	Edit an existing item.	The item information is successfully updated.	The item information was successfully updated.	✓ Passed

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No.	Tested Feature	Test Scenario	Expected Result	Actual Result	Status
4	Item Management	Delete an item.	The item data are successfully deleted.	The item data were successfully deleted.	✓ Passed
5	Category Management	Add, edit, and delete category data.	Category data are successfully processed.	All operations were completed successfully.	✓ Passed
6	Supplier Management	Add, edit, and delete supplier data.	Supplier data are successfully processed.	All operations were completed successfully.	✓ Passed
7	Unit Management	Add, edit, and delete unit data.	Unit data are successfully processed.	All operations were completed successfully.	✓ Passed
8	User Management	Add, edit, and delete user accounts.	User account data are successfully processed.	All operations were completed successfully.	✓ Passed
9	Incoming Goods	Add an incoming goods transaction.	The transaction is successfully recorded and inventory stock increases.	The transaction was successfully recorded and inventory stock increased.	✓ Passed
10	Incoming Goods	Edit an incoming goods transaction.	The transaction data are successfully updated.	The transaction data were successfully updated.	✓ Passed
11	Incoming Goods	Delete an incoming goods transaction.	The transaction data are successfully deleted.	The transaction data were successfully deleted.	✓ Passed
12	Outgoing Goods	Add an outgoing goods transaction.	The transaction is successfully recorded and inventory stock decreases.	The transaction was successfully recorded and inventory stock decreased.	✓ Passed
13	Outgoing Goods	Edit an outgoing goods transaction.	The transaction data are successfully updated.	The transaction data were successfully updated.	✓ Passed
14	Outgoing Goods	Delete an outgoing goods transaction.	The transaction data are successfully deleted.	The transaction data were successfully deleted.	✓ Passed
15	Goods Return	Add a goods return transaction.	The return transaction is successfully recorded.	The return transaction was successfully recorded.	✓ Passed
16	Goods Return	Edit a goods return transaction.	The return transaction is successfully updated.	The return transaction was successfully updated.	✓ Passed
17	Goods Return	Delete a goods return transaction.	The return transaction is successfully deleted.	The return transaction was successfully deleted.	✓ Passed
18	Incoming Goods Report	Display the report based on the selected period.	The report is successfully displayed.	The report was successfully displayed.	✓ Passed
19	Outgoing Goods Report	Display the report based on the selected period.	The report is successfully displayed.	The report was successfully displayed.	✓ Passed
20	Goods Return Report	Display the report based on the selected period.	The report is successfully displayed.	The report was successfully displayed.	✓ Passed
21	Inventory Stock Report	Display the inventory stock report.	The inventory stock report is successfully displayed.	The inventory stock report was successfully displayed.	✓ Passed
22	PDF Export	Export the report in PDF format.	A PDF report is successfully generated.	The PDF report was successfully generated.	✓ Passed

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No.	Tested Feature	Test Scenario	Expected Result	Actual Result	Status
23	Excel Export	Export the report in Microsoft Excel format.	An Excel report is successfully generated.	The Excel report was successfully generated.	✓ Passed

Based on the results of the Black Box Testing, all major system functionalities, including user authentication, master data management, inventory transactions, report generation, and PDF and Microsoft Excel export features, operated successfully according to the predefined test scenarios. All test cases achieved a Passed status, indicating that the developed system fulfills the specified functional requirements and performs as intended.

The effectiveness of the Role-Based Access Control (RBAC) mechanism was also evaluated by verifying that each user role could access only the system functions assigned to its responsibilities. Four user roles were tested, namely Administrator, Warehouse Staff, Sales Staff, and Manager. Each role was required to perform authorized operations while attempts to access unauthorized menus and functions were also evaluated. In addition to functional testing, the security aspect of the developed system was evaluated through the implementation of the Role-Based Access Control (RBAC) mechanism.

The evaluation results showed that the RBAC mechanism successfully enforced access restrictions according to predefined user roles. The Administrator was granted full access to all system modules, whereas the Warehouse Staff and Sales Staff were limited to inventory-related operations. The Manager was only authorized to access dashboards and reports without permission to modify operational data. Unauthorized access attempts were denied by the system, confirming that the implemented RBAC mechanism effectively protected sensitive system functions and maintained data security.

Table 2. RBAC Security Evaluation Results

User Role	Authorized Access Tests	Successful Authorized Access	Unauthorized Access Attempts	Blocked Attempts	Success Rate (%)
Administrator	5	5	0	0	100
Warehouse Staff	3	3	2	2	100
Sales Staff	3	3	2	2	100
Manager	2	2	3	3	100

The effectiveness of the Role-Based Access Control (RBAC) mechanism was quantitatively evaluated by measuring the success rate of authorized access and the effectiveness of blocking unauthorized access attempts for each user role. A total of 20 access scenarios were executed, consisting of 13 authorized access attempts and 7 unauthorized access attempts. The evaluation showed that all authorized operations were successfully performed, while every unauthorized access attempt was blocked by the system, resulting in an overall RBAC enforcement accuracy of 100%. These results demonstrate that the implemented RBAC mechanism effectively enforces access permissions according to predefined user roles and enhances the security of the asset management information system by preventing unauthorized access to sensitive functions. The use of quantitative measures to evaluate RBAC effectiveness is consistent with previous studies that assess access control enforcement through measurable authorization outcomes and least-privilege compliance.

Table 3. User Acceptance Testing (UAT) Results

No.	Tested Feature	Test Scenario	Expected Result	Actual Result	Status
1	Login / User Authentication	Verify that only registered users (Administrator, Warehouse Staff, Sales Staff, and Manager) can access the system according to their assigned roles.	The user successfully logs into the system with the appropriate access privileges.	Login successful.	✓

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No.	Tested Feature	Test Scenario	Expected Result	Actual Result	Status
2	Dashboard	1. The user logs into the system. 2. The system displays the dashboard according to the user's role. 3. The dashboard presents a summary of system information.	The dashboard is displayed correctly based on the user's access rights.	Dashboard displayed successfully.	✓
3	Item Management	1. Open the Item Management menu. 2. Add a new item. 3. Edit an existing item. 4. Delete an item.	Item data are successfully managed and all changes are saved in the system.	Item data processed successfully.	✓
4	Category Management	1. Open the Category Management menu. 2. Add a category. 3. Edit a category. 4. Delete a category.	Category data are successfully managed according to the user's actions.	Category data processed successfully.	✓
5	Supplier Management	1. Open the Supplier Management menu. 2. Add a supplier. 3. Edit supplier data. 4. Delete a supplier.	Supplier data are successfully managed.	Supplier data processed successfully.	✓
6	Unit Management	1. Open the Unit Management menu. 2. Add a unit. 3. Edit a unit. 4. Delete a unit.	Unit data are successfully managed.	Unit data processed successfully.	✓
7	User Management	1. The administrator opens the User Management menu. 2. Add a new user account. 3. Edit a user account. 4. Delete a user account.	User accounts are successfully managed.	User data processed successfully.	✓
8	Incoming Goods Transaction	1. Open the Incoming Goods menu. 2. Enter incoming goods transaction data. 3. Save the transaction.	The transaction is successfully recorded and the inventory stock increases automatically.	Incoming goods transaction saved successfully.	✓
9	Outgoing Goods Transaction	1. Open the Outgoing Goods menu. 2. Enter outgoing goods transaction data. 3. Save the transaction.	The transaction is successfully recorded and the inventory stock decreases automatically.	Outgoing goods transaction saved successfully.	✓
10	Goods Return Transaction	1. Open the Goods Return menu. 2. Enter return transaction data. 3. Save the return transaction.	The return transaction is successfully recorded in the system.	Goods return transaction saved successfully.	✓
11	Incoming Goods Report	1. Open the Reports menu. 2. Select the reporting period. 3. Display the report.	The incoming goods report is displayed according to the selected period.	Report displayed successfully.	✓
12	Outgoing Goods Report	1. Open the Reports menu. 2. Select the reporting period. 3. Display the report.	The outgoing goods report is displayed according to the selected period.	Report displayed successfully.	✓

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No.	Tested Feature	Test Scenario	Expected Result	Actual Result	Status
13	Goods Return Report	1. Open the Goods Return Report menu. 2. Select the reporting period. 3. Display the report.	The goods return report is displayed successfully.	Report displayed successfully.	✓
14	Inventory Stock Report	1. Open the Inventory Stock Report menu. 2. Display inventory stock data.	The inventory stock report is displayed successfully.	Report displayed successfully.	✓
15	PDF Export	1. Open the report page. 2. Click the Export PDF button.	The system successfully generates a report in PDF format.	PDF file generated successfully.	✓
16	Excel Export	1. Open the report page. 2. Click the Export Excel button.	The system successfully generates a report in Microsoft Excel format.	Excel file generated successfully.	✓
17	Logout	The user selects the Logout menu.	The system terminates the current session and redirects the user to the login page.	Logout successful.	✓

A total of 17 operational scenarios were evaluated during the User Acceptance Testing (UAT). All scenarios were completed successfully without functional errors, resulting in a task completion rate of 100%. The successful execution of all operational scenarios indicates that the developed system fulfills the operational requirements of PT Astra Daihatsu Ngurah Rai Tuban and is suitable for daily asset management activities. Furthermore, representative users, including the Administrator, Warehouse Staff, Sales Staff, and Manager, were able to complete all assigned tasks according to their respective responsibilities, confirming the functional suitability of the developed system for daily operational use.

Discussion

The implementation results demonstrate that the proposed information system successfully integrates the entire asset management process into a centralized database. The implementation of the Role-Based Access Control (RBAC) mechanism restricts user access according to assigned roles, thereby improving data security and ensuring that each user can only perform authorized activities. This finding is consistent with recent studies indicating that RBAC remains one of the most effective access control models for protecting enterprise information systems by assigning permissions according to user responsibilities and organizational roles (Anderer et al., 2023). In addition, the use of a relational database minimizes data redundancy and improves data consistency throughout the asset management process. These findings are consistent with the study by (Susanti, 2021), which reported that a web-based asset management information system can replace manual or spreadsheet-based recording, resulting in more efficient asset management and reporting. Similarly, (Usnaini et al., 2021) found that implementing a web-based inventory system significantly improves data organization, accelerates information retrieval, and simplifies report generation.

From an operational perspective, the developed system effectively manages incoming goods, outgoing goods, and return transactions within a single integrated platform. Stock quantities are updated automatically after each transaction, ensuring that inventory information remains accurate and up to date in real time. Recent studies have also emphasized that real-time inventory management enables organizations to improve inventory visibility, optimize operational decisions, and respond more effectively to dynamic business environments (Mo et al., 2024). These findings are in line with the research conducted by (Sembada et al., 2025), which concluded that integrating supplier management, inventory records, transaction processing, and reporting into a web-based system enhances operational efficiency in industrial asset management. Furthermore, the availability of reporting features in PDF and Excel formats supports faster and more accurate decision-making by providing timely and reliable asset information.

Beyond improving operational efficiency, the proposed system provides practical contributions to asset management practices in the automotive industry.

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Automotive dealerships typically involve multiple operational units, including warehouse, sales, and management, that require secure and synchronized access to inventory information. By integrating Role-Based Access Control (RBAC), automatic inventory updates, centralized data management, and reporting functionalities, the developed system enhances coordination among departments, reduces manual recording errors, and improves the availability of real-time information for decision-making. Furthermore, the integrated system architecture proposed in this study provides a practical reference for organizations with similar operational characteristics, such as automotive distributors, spare parts retailers, manufacturing companies, and other enterprises requiring secure multi-user inventory management and real-time asset monitoring. Therefore, the proposed system has the potential to support broader digital transformation initiatives in enterprise asset management beyond the case study organization. This finding is aligned with the broader concept of enterprise information systems, which emphasizes integrated business processes, centralized information management, and secure collaboration among organizational units to improve operational performance and managerial decision-making (Mo et al., 2024).

The results of the Black Box Testing and User Acceptance Testing demonstrate that all 17 operational scenarios were completed successfully without functional errors, indicating a task completion rate of 100%. These findings confirm that the developed system satisfies the specified functional requirements and effectively supports the operational workflow of PT Astra Daihatsu Ngurah Rai Tuban. These findings support the conclusions of (Kusumojati & Mediawati, 2024), who emphasized that web-based asset management information systems improve the effectiveness and efficiency of asset administration by integrating data management and reporting functions into a single platform.

Despite these achievements, several limitations remain. The current system does not yet provide minimum stock notifications, QR Code-based asset identification, or audit log functionality for tracking user activities. These limitations are also highlighted by (Sandy et al., 2026), who demonstrated that QR Code technology enhances the speed and accuracy of asset identification. Therefore, future development should focus on integrating these features to improve inventory monitoring, strengthen system security, and support more comprehensive asset management.

CONCLUSION

This study successfully developed a web-based Asset Management Information System for PT Astra Daihatsu Ngurah Rai Tuban using the Laravel framework and MySQL database. The system provides comprehensive features for managing master data, including items, categories, suppliers, units, and users, as well as supporting inventory transactions such as incoming goods, outgoing goods, product returns, and asset reporting. The implementation of a Role-Based Access Control (RBAC) mechanism ensures that each user is granted access according to their responsibilities, thereby improving data security and operational efficiency. Furthermore, the developed system addresses the limitations of the previous manual asset management process by simplifying data recording, accelerating information retrieval, and automating report generation. The results of Black Box Testing indicate that all system functions operated according to the specified functional requirements, while the User Acceptance Test (UAT) confirmed that the system was successfully accepted by users and effectively supports the company's asset management activities. In addition, the proposed system contributes to the implementation of integrated asset management practices in the automotive industry by providing secure multi-user access, real-time inventory management, and centralized reporting to support managerial decision-making.

Despite these positive outcomes, this study has several limitations. First, the system evaluation was limited to functional testing and user acceptance testing within a single automotive dealership, so its performance under high user loads and different organizational environments has not yet been evaluated. Second, the current system does not yet provide performance measurements such as response time, concurrent multi-user testing, or comprehensive security assessments beyond the implemented RBAC mechanism.

Future research should therefore focus on evaluating system performance under concurrent user access, implementing advanced security assessments, and extending the system to different organizational contexts to improve its generalizability. In addition, several functional enhancements can be considered, including the addition of minimum stock notifications, barcode or QR Code technology for asset identification, audit log functionality for tracking user activities, and analytical dashboards presenting graphical summaries of inventory transactions and stock levels. Furthermore, integrating the system with other enterprise applications would enable seamless data exchange and

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support a more comprehensive and efficient asset management process.

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