

Design of a Web-Based Inventory Information System at Mitra Com Electronics Business

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ABSTRACT

An inventory information system is important for helping Micro, Small, and Medium Enterprises (MSME) manage stock data accurately and efficiently. MSME Mitra Com still uses manual stock recording, which often causes data errors, delays in reporting, and difficulties in monitoring inventory conditions. This study aims to develop a web-based inventory information system to support stock management activities at MSME Mitra Com. The research method used is software engineering with a qualitative descriptive approach. The research stages include system requirement analysis, system design using Unified Modeling Language (UML), system implementation using PHP and MySQL, and system testing using the Black Box Testing method. The results show that the developed system can manage item data, record incoming and outgoing goods, and generate inventory reports automatically. The system helps improve work efficiency, reduce recording errors, and support decision-making at MSME Mitra Com.

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I. Introduction

The rapid advancement of information technology has brought significant changes to various business processes, including inventory management activities [1], [2]. Information systems are increasingly adopted to enhance operational efficiency, improve data accuracy, and accelerate decision-making processes, particularly within Micro, Small, and Medium Enterprises (MSME [3], [4]. MSMEs play a crucial role in supporting Indonesia's economic growth by generating employment opportunities and strengthening local economies [5], [6]. Nevertheless, a considerable number of MSMEs still depend on manual systems for their daily operations, resulting in inefficiencies and a higher likelihood of errors, especially in inventory recording and reporting processes [3], [7]. Consequently, the utilization of information technology becomes an essential factor in improving business performance and maintaining competitiveness in the digital era [1], [6].

Mitra Com is an MSME operating in the field of electronic product sales and repair services [3], [1]. Currently, inventory management at Mitra Com is conducted through manual recording practices. This condition leads to several operational issues, including inconsistencies between physical stock and recorded data, delays in report generation, and difficulties in monitoring inventory availability [8], [7]. Such problems can adversely affect service quality and reduce the accuracy of managerial decision-making. Therefore, the implementation of a web-based inventory information system is required to facilitate more systematic, accurate, and efficient inventory data management [9], [7]. This study aims to design and implement a web-based inventory information system that supports Mitra Com in managing inventory data more effectively while enhancing daily operational performance [4], [10].

Several previous studies have demonstrated that the adoption of web-based inventory information systems within MSMEs is capable of reducing data recording errors, minimizing redundancy, and



increasing overall operational efficiency [9], [7], [10]. In addition, web-based systems provide real-time access to inventory information, enable automated report generation, and support integrated data management—capabilities that are difficult to achieve through manual recording methods [8], [6]. These advantages allow business owners to monitor stock conditions more accurately and make timely, data-driven decisions [4], [10].

Moreover, recent research emphasizes that integrated inventory information systems play a vital role in supporting digital transformation initiatives and strengthening the competitiveness of MSMEs [10], [12]. The implementation of web-based systems enables MSMEs to respond more effectively to technological developments and rapidly changing business environments [1], [6]. Hence, the development of a web-based inventory information system for MSME Mitra Com is expected not only to address existing inventory management challenges but also to contribute to sustainable business growth and long-term operational improvement.

II. Research Method

This study employed a software engineering approach with a qualitative descriptive method [13], [4]. This approach was used to analyze user needs, understand existing business processes, and describe the development of the inventory information system based on actual conditions in the field [3], [7]. The qualitative descriptive method allowed the researcher to obtain a comprehensive understanding of system requirements through observation, documentation, and analysis of user activities related to inventory management processes [13], [2]. The research was conducted through the following stages:

A. System Requirements Analysis

This stage focused on identifying both functional and non-functional requirements of the inventory information system, including data processing needs, system performance, usability, and data security requirements to support daily operational activities in MSMEs [2], [9], [7]. Requirement analysis was carried out to ensure that the developed system aligns with user needs and organizational workflows [4].

B. System Design

The system design was developed using Unified Modeling Language (UML) to model system functionality and workflows. UML diagrams used in this study included use case diagrams to describe interactions between users and the system, as well as activity diagrams to illustrate the sequence of business processes and data flow within the inventory management system [9], [10], [11].

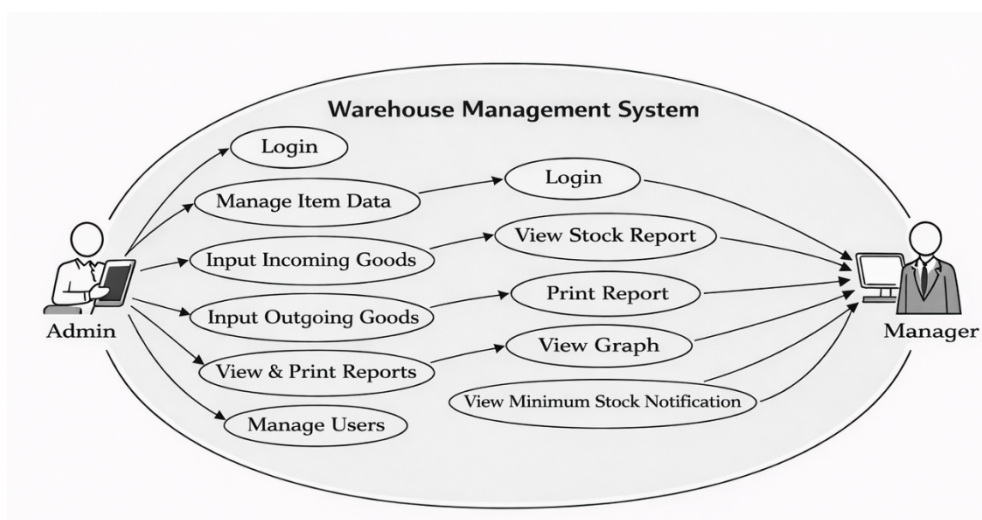


Fig 1. Use Case Diagram

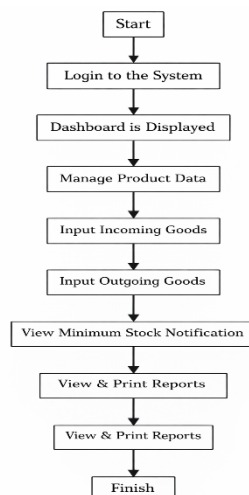


Fig 2. Activity Diagram

C. System Implementation

system was implemented as a web-based application using PHP as the programming language and MySQL as the database management system. This implementation aimed to produce a system that is flexible, easy to maintain, and capable of supporting daily inventory management activities in MSMEs [9], [7].

D. System Testing

System testing was conducted using the Black Box Testing method to evaluate system functionality based on input and output conformity without considering the internal program structure. This testing ensured that all system features operated according to user requirements and minimized potential errors during system operation [8], [9].

III. Results and Discussion

The result of this study is a web-based inventory information system that is used by administrators to manage inventory data at MSME Mitra Com [9], [7]. The system provides several main features, such as:

- Item data management
- Recording of incoming goods
- Recording of outgoing goods
- Automatic inventory report generation

A. Application Implementation

Application implementation is a stage in which the system has been fully developed and equipped with functional features and user interfaces based on the results of system analysis and design. At this stage, the system is applied to support operational activities related to inventory management at the Mitra Com electronics business [9].

1. System Dashboard Page

This page displays a summary of inventory information, including total items, available stock, incoming goods, and outgoing goods in real time.

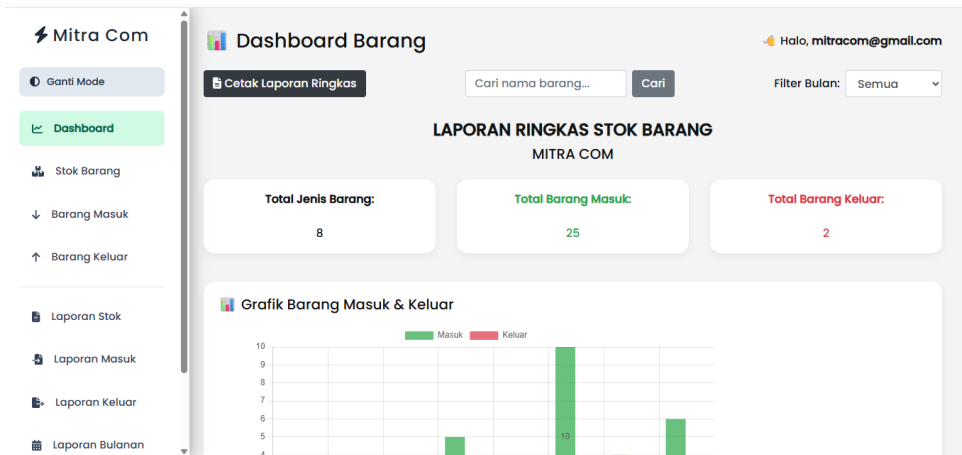


Fig 3. Main Dashboard Interface

2. Item Data Page

This page is used to manage item master data, such as item code, item name, category, unit, and stock quantity.

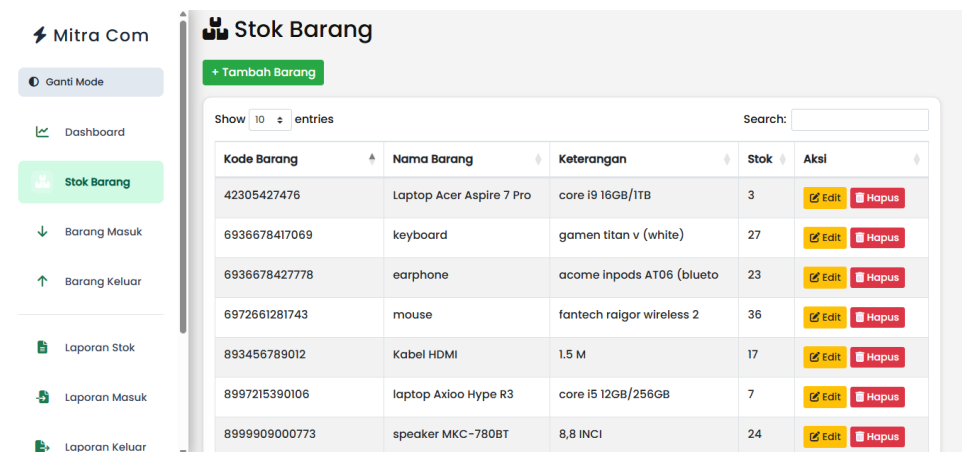


Fig 4. Item Stock Page Display

3. Incoming Goods Page

This page functions to record incoming goods transactions from suppliers, including transaction date, item details, and quantity received.

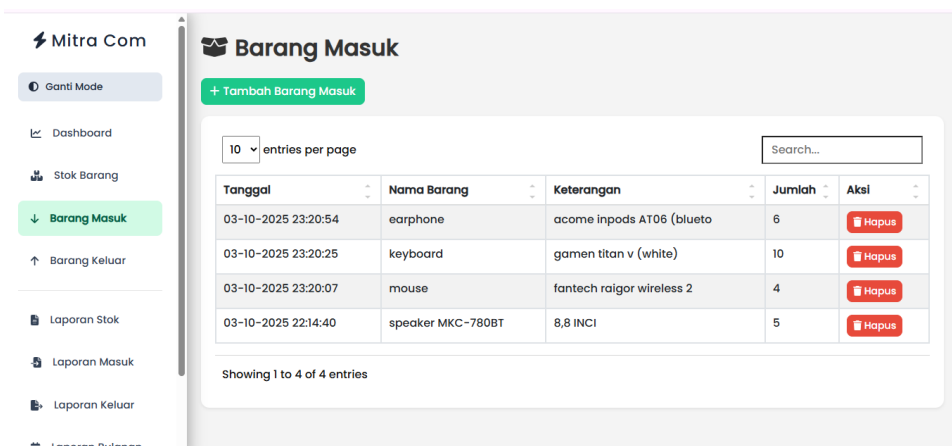


Fig 5. Incoming Goods Input Page Display

4. Outgoing Goods Page

This page is used to record outgoing goods transactions, including item details and quantities issued or sold.

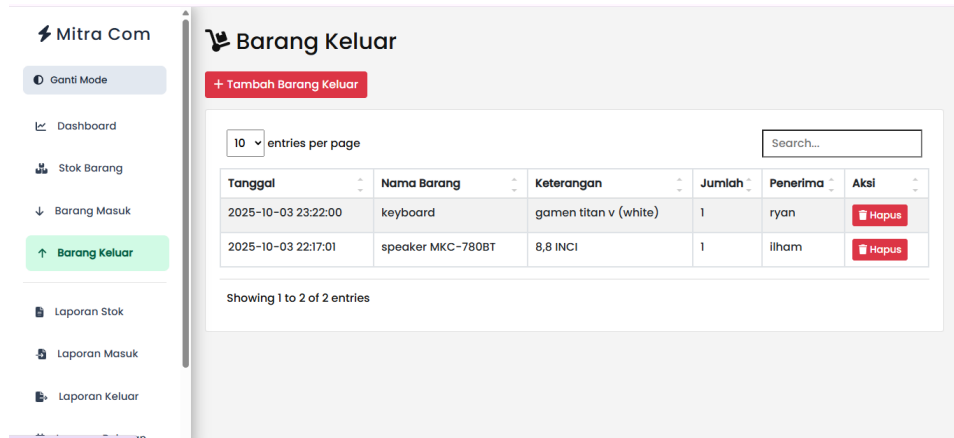


Fig 6. Outgoing Goods Input Page Display

5. Inventory Report Page

This page presents inventory reports, including item data, incoming goods, and outgoing goods within a specified period.

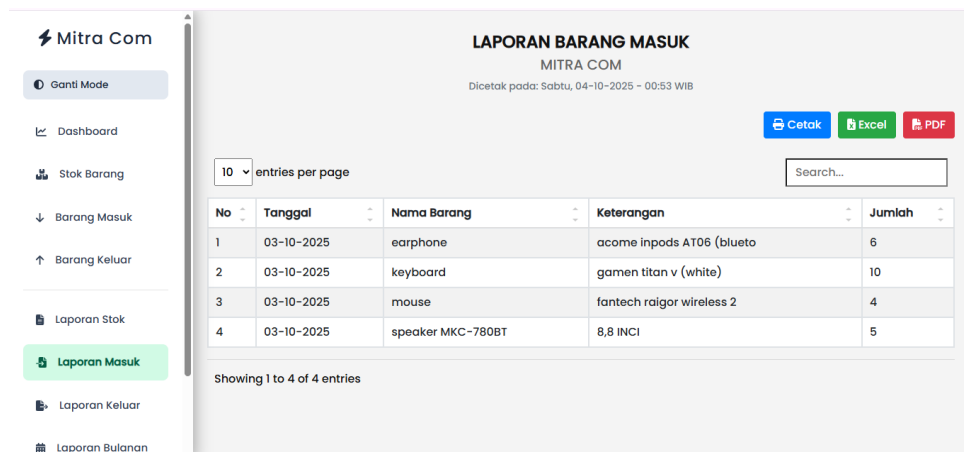


Fig 7. Incoming Goods Report Page Display

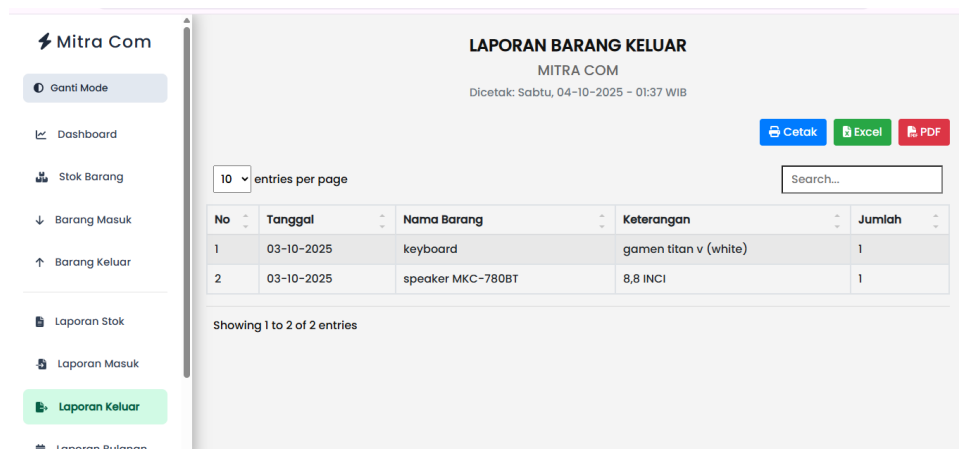


Fig 8. Outgoing Goods Report Page Display

B. Application Testing

System testing was carried out using the Black Box Testing approach, which emphasizes the evaluation of system functionality by examining the relationship between input data and the output produced, without involving an analysis of the internal program structure. This testing process was intended to verify that every feature of the Web-Based Inventory Information System implemented at the Mitra Com Electronics Business functions properly and meets the specified user requirements. The results of the Black Box Testing performed on the Web-Based Inventory Information System at the Mitra Com Electronics Business are presented in the following table.

Table 1. presents the results of Black Box Testing on the Web-Based Inventory Information System.

No	Test Description	Input	Expected Output	Test Result	Status
1	Login with correct username and password	Username: admin, Password: admin123	Redirected to dashboard	Successfully logged in	Passed
2	Login with incorrect password	Username: admin, Password: incorrect	Error message displayed	Error message displayed	Passed
3	Login without input	All fields empty	Required field validation appears	Validation message displayed	Passed
4	Input complete and valid item data	Code: BRG001, Name: TV LED, Stock: 10	Data saved and displayed in stock table	Data successfully saved	Passed
5	Input item data without item code	Item code empty, other fields filled	Message "Item code is required"	Validation message displayed	Passed
6	Input duplicate item code	BRG001 (already exists)	Error message "Item code already exists"	Validation message displayed	Passed
7	Add incoming goods with valid quantity	Code: BRG001, Quantity: 5	Stock increases to 15	Stock successfully increased	Passed
8	Incoming quantity is empty	Valid code, empty quantity	Message "Quantity is required"	Validation message displayed	Passed
9	Valid outgoing goods transaction	Code: BRG001, Quantity: 3	Stock decreases to 12	Stock successfully decreased	Passed
10	Outgoing quantity exceeds stock	Code: BRG001, Quantity: 20	Error message "Insufficient stock"	Validation message displayed	Passed
11	Print stock report	Print button clicked	PDF file generated correctly	File successfully generated	Passed
12	Export to Excel	Excel button clicked	Excel file downloaded	File successfully generated	Passed

Based on Black Box Testing results, all system functions run as expected. The system can validate input data, reduce recording errors, and produce inventory reports correctly. Compared to the previous manual system, this web-based system makes inventory management faster and more accurate. Business owners can easily monitor stock conditions and generate reports when needed.

These results support previous studies stating that inventory information systems can improve MSME operational efficiency [8], [1].

IV. Conclusion

This study demonstrates that the web-based inventory information system developed in this research is capable of resolving inventory management issues encountered by MSME Mitra Com. The implementation of the system streamlines the recording of incoming and outgoing goods, enhances the accuracy of inventory data, and shortens the time required to generate inventory reports.

In addition, the use of this system contributes to more efficient daily operational activities and supports managerial decision-making by providing inventory information that is both accurate and up to date. Consequently, the web-based inventory information system can be utilized as an effective solution for MSMEs, particularly those operating in the electronics business sector, to improve inventory control and overall business performance.

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