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Implementation of a Web-Based Sales Information System and Stock Management at TB Solusi Mitra Bangunan

Silfia[1]*, Anjelina[2], Ardi Yansyah[3], Yeni Mustika[4]

[1,2,3]*Universitas Bina Sarana Informatika*
19221057@bsi.ac.id [1*], 19221040@bsi.ac.id [2], ardiansyah.arq@bsi.ac.id [3], yeni.yem@bsi.ac.id [4]

Abstract

Purpose: This study aims to design and implement a web-based information system for sales management and inventory control at Solusi Mitra Bangunan store, to overcome problems caused by manual recording processes. Approach: The research employed the Waterfall software development method, which consists of requirement analysis, system design, implementation, testing, and maintenance stages. System modeling was conducted using Unified Modeling Language including use case diagrams, activity diagrams, sequence diagrams, and entity relationship diagrams. The system was developed using CodeIgniter 4 framework and MySQL database. Results: The result is an information system that supports data management of goods, suppliers, stock entry, sales transactions, and report generation automatically. The system was tested using black-box testing and showed valid functionality and accurate data processing. Conclusions: The implementation of this system effectively accelerates transaction processes, minimizes recording errors, ensures inventory data accuracy, and facilitates management in obtaining real-time information for decision making.

Keywords: *Codeigniter 4, Inventory control, Sales management, System information, Web based*

1. Introduction

Rapid development in information technology has brought significant changes and positive impacts in various sectors, especially in trade and business sectors. The utilization of information technology is no longer considered as an additional tool, but has become a primary necessity to support smooth business operations. According to Laudon & Laudon (2020), information technology can improve work efficiency significantly, simplify data management processes, secure data storage, and provide fast and accurate information presentation [1]. Solusi Mitra Bangunan is a trading company engaged in selling various types of building materials. Along with business growth and increasing demand from customers, the number of transactions and types of goods managed has also increased. However, in daily operations, the recording process of sales transactions and inventory management at the store is still carried out in a simple and manual way, using books and paper notes.

This manual method causes various problems, including difficulties in recalculating inventory data accurately because recorded data is unstructured, frequent errors in writing or recording numbers, delays in preparing sales reports, and high risks of losing or damaging physical evidence. In addition, the absence of integration between sales data and inventory data often leads to discrepancies between data written in records and the actual stock available in the warehouse.

Considering these problems, the most appropriate and effective solution is to develop a web-based information system. O'Brien & Marakas (2020) state that a web-based system has many advantages, such as easy access, high flexibility, ability to present information in real-time, and uses a database as the main storage to improve security and data accuracy significantly [2]. This research aims to design and implement a computerized sales and inventory information system so that business processes can run more effectively, efficiently, and produce accurate, real-time data.

2. Literature Review

2.1. Information System

An information system is a combination of people, hardware, software, communication networks, and data resources that collect, transform, and disseminate information within an organization. According to Alter (2021), an information system is a system that collects, processes, stores, analyzes, and disseminates information for a specific purpose [3]. In business, information systems are used to support operations, decision making, and strategic planning.

2.2 Sales Management
Sales management involves planning, directing, and controlling personal selling, including recruiting, selecting, training, equipping, assigning, routing, supervising, and evaluating salespeople. According to Kotler & Armstrong (2021), sales is one of the main activities in a business that generates revenue, and proper management ensures business continuity and growth [4]. An integrated sales system helps record every transaction accurately and provides data for financial evaluation.

2.3 Inventory Management
Inventory management is the supervision of non-capitalized assets (inventory) and stock items. It is a component of supply chain management that supervises the flow of goods from manufacturers to warehouses and from these facilities to point of sale. According to Heizer & Render (2020), effective inventory management aims to minimize total inventory costs while ensuring stock availability to meet customer demand [5]. Good inventory control prevents stockouts or overstocking conditions.

2.4 Web-Based System
A web-based system is an application that runs on a web server and is accessed through a web browser over a network such as the internet or intranet. According to Shelly & Rosenblatt (2021), this architecture allows users to access the system from various devices without installing specific applications, making it flexible and accessible [6]. Development using PHP and MySQL is widely used because it is open-source, reliable, and has strong community support.

2.5 CodeIgniter Framework
CodeIgniter is an open-source software rapid development web framework for building dynamic web sites with PHP. According to Paroni (2022), CodeIgniter is known for its small footprint, exceptional performance, and clear documentation, following the Model-View-Controller (MVC) pattern which separates logic, presentation, and data layers [7]. This structure makes code maintenance and development more organized and faster.

3. Research Methods

3.1 Data Collection Method
To obtain accurate and relevant data, this research used several methods as follows:

3.1.1 Observation
The researcher conducted direct observation at Solusi Mitra Bangunan store to observe and understand the ongoing business processes, including how sales transactions are recorded, how inventory is checked, and how reports are made. This method aims to obtain factual data about existing systems and identify problems directly.

3.1.2 Interview
Interviews were conducted with the owner and employees of the store to obtain deeper information regarding operational constraints, needs, and expectations regarding the new system. Questions focused on difficulties in manual recording, frequency of errors, and desired features.

3.1.3 Literature Study
Data and theories were collected from books, journals, and scientific articles related to information systems, sales, inventory, and web development. This serves as the theoretical basis and reference in system design and development.

3.2 Software Development Method
This research uses the Waterfall Model as the software development method. According to Pressman & Maxim (2020), the Waterfall model is a classic approach that proceeds sequentially through defined stages: requirement analysis, system design, implementation, testing, and maintenance [8]. This method is suitable because requirements have been clearly defined since the beginning.

3.2.1 Requirement Analysis
At this stage, data collected from observations and interviews is analyzed to determine functional and non-functional requirements. Functional requirements include features for data management, transactions, and reporting. Non-functional requirements include usability, security, and performance.

3.2.2 System Design
System design is divided into database design and interface design. Database design uses Entity Relationship Diagram (ERD) to describe relationships between data entities such as goods, suppliers, sales, and users. Interface design creates a user-friendly layout that is easy to understand.

1. Use Case Digram
This diagram describes the interaction between users and the system, as well as main functions that can be executed. Based on the design, there are two main actors interacting with the system:

1. **Admin:** Has full access rights to manage goods data, categories, suppliers, stock entry, sales transactions, product returns, stock adjustments, and report generation.
2. **Customer:** Can register or login, view product catalogs, manage shopping carts, make purchases, and view order history.

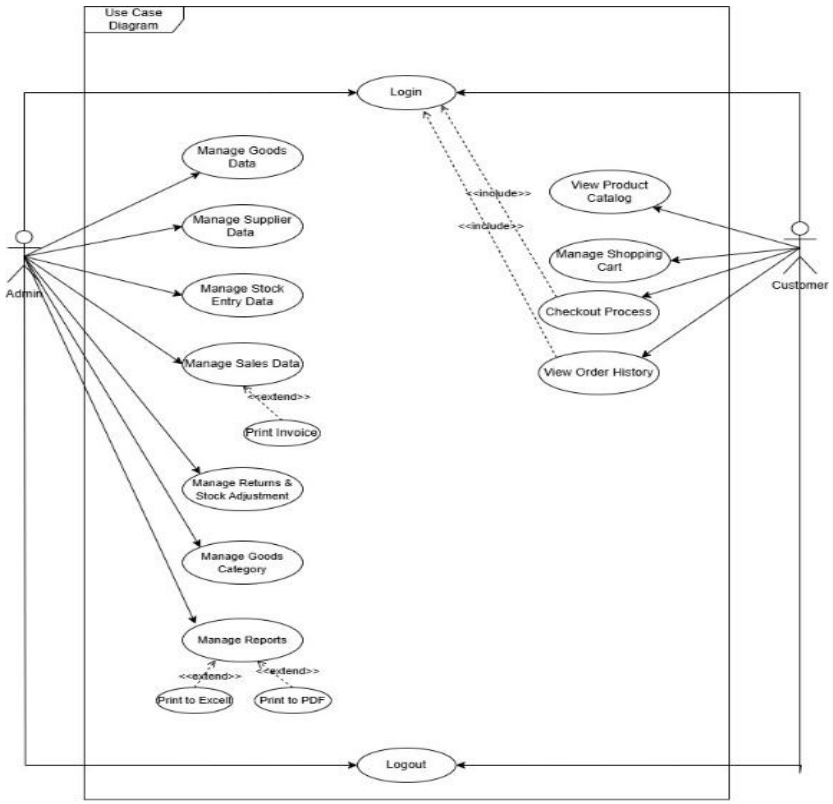

Fig. 1: Use case diagram of the system.

2. Activity Diagram

This diagram explains process flows or sequential steps of activities occurring in the system from start to finish. Diagrams were created for each main process, including login process, goods data management, stock entry transactions, sales transactions, and report printing.

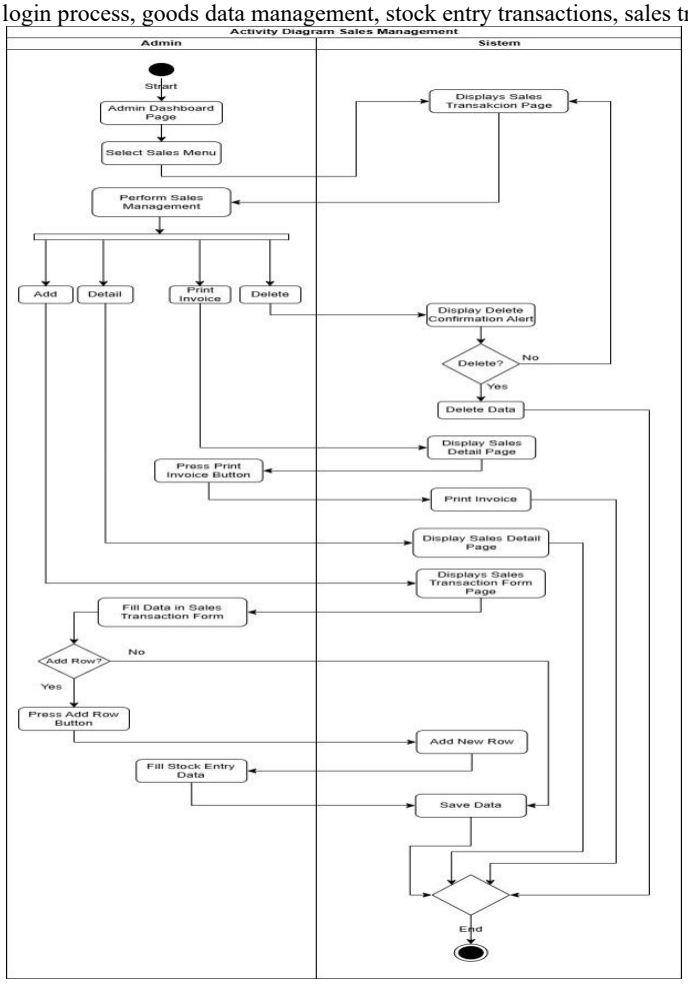

Fig. 2: Example of activity diagram for sales transaction process.

3. Sequence diagram

This diagram illustrates the interaction sequence between objects and messages sent between system components in a process, focusing on the chronological order of events. This diagram was created to explain how communication occurs between users, interfaces, and the database.

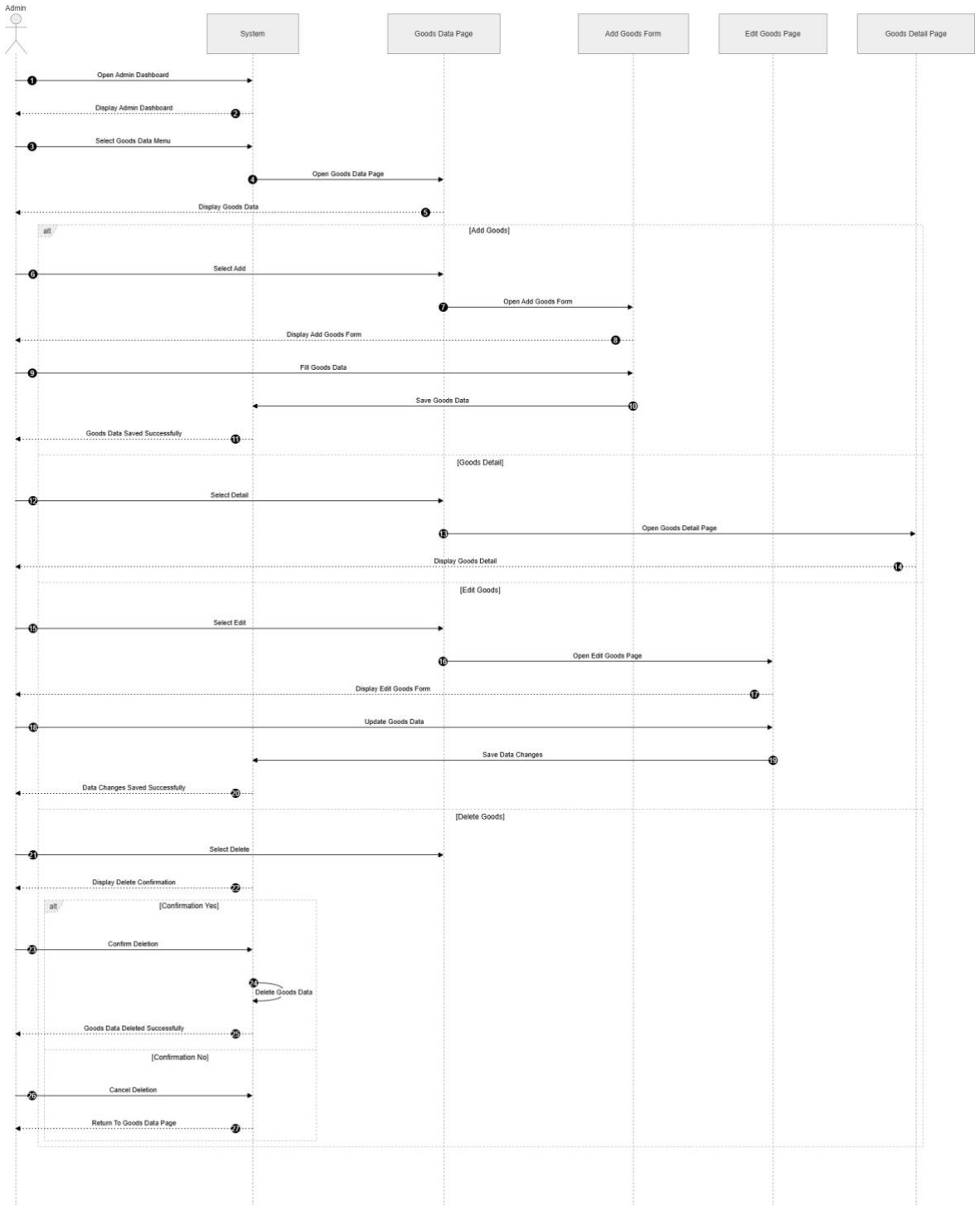

Fig. 3: Example of sequence diagram for goods data management.

4. Entity relationship diagram (ERD)

ERD is used to design database structure and describe relationships between entities or tables in the system. Main entities designed include goods, categories, suppliers, stock entry, sales, and users. Relationships between tables are designed to ensure data integrity and avoid information duplication.

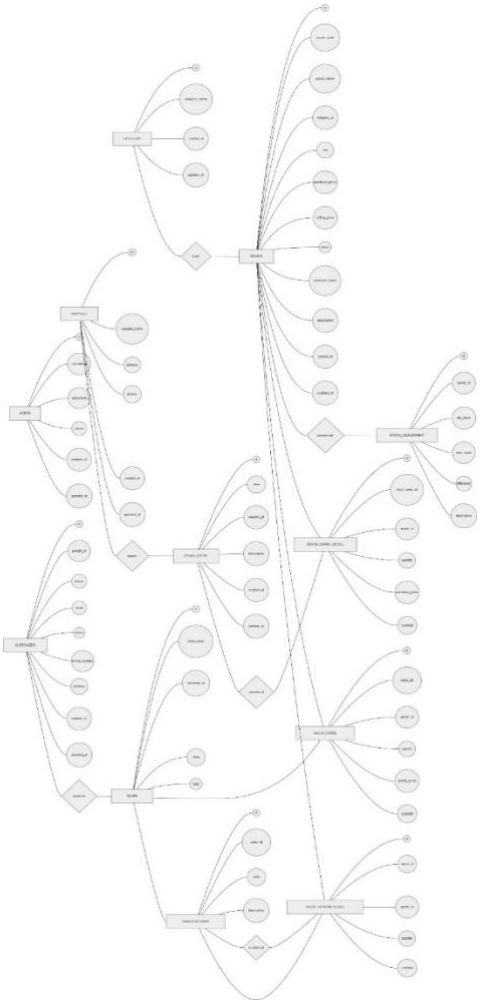

Fig. 4: Entity relationship diagram (ERD)

3.2.3 Implementation

This stage translates design into program code using the PHP programming language, CodeIgniter 4 framework, and MySQL database. Implementation follows the MVC concept to ensure structured and reusable code.

3.2.4 Testing

Testing is performed using Black Box Testing. This method focuses on functional results without examining internal code structure. Testing is done by inputting data and checking whether the output matches expectations, ensuring the system runs according to requirements.

3.2.5 Maintenance

After implementation, maintenance is carried out to ensure the system remains stable, fix errors found during use, and make adjustments if business processes change.

4. Results and Discussion

4.1 System Requirements Analysis

Based on data analysis, the system requirements are defined as follows:

Functional Requirements:

1. System provides login authentication for Admin and Customer.
2. System manages goods data including add, update, delete, and view functions.
3. System manages supplier data and category classifications.
4. System records stock entry transactions and automatically updates inventory quantities.
5. System processes sales transactions, calculates prices, and reduces stock automatically.
6. System supports payment methods including COD and QRIS.
7. System generates reports in PDF and Excel formats.
8. System provides customer interface for online ordering.

Non-Functional Requirements:

1. System is web-based and accessible via browsers.
2. Interface design is simple and user-friendly.
3. System responds quickly and operates stably.
4. Data security is ensured through login and access control.

4.2 Database Design

The database was designed using MySQL, consisting of interconnected tables to ensure data integrity. Main tables include:

1. **Goods Table:** Stores product code, name, category, price, and stock quantity.
2. **Supplier Table:** Stores partner identity and contact information.
3. **Sales Table:** Stores transaction header data including date, buyer, and total.
4. **Sales Detail Table:** Stores items purchased in each transaction.
5. **Stock Entry Table:** Records incoming goods from suppliers.

This structure eliminates data redundancy and ensures accurate data relations.

4.3 System Implementation

The system was successfully built and consists of two main interfaces: Customer and Administrator.

4.3.1 Customer Interface

1. Dashboard page

Main page displayed after successful login. This page presents important summary information, statistics regarding total goods, transaction counts, low stock notifications, and sales charts. Navigation menus to all system modules are also available here.

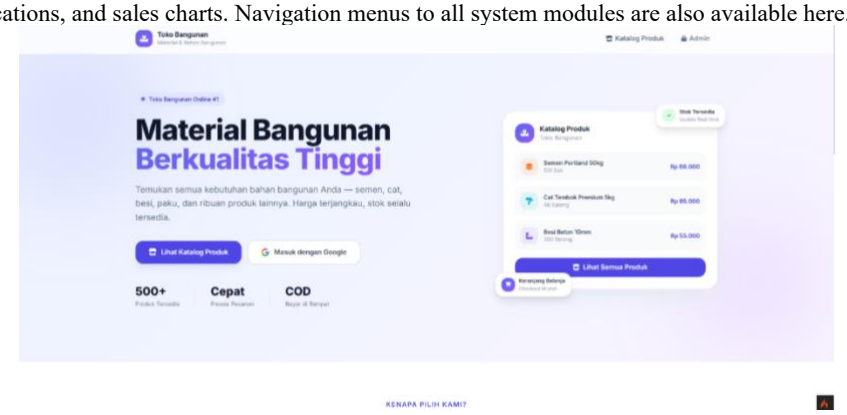

Fig. 5: Display of dashboard page

2. Goods data module

Inventory data management page. Here, admins can add new goods data, update price or product information, delete inactive data, and search for items quickly. All changes made are saved directly into the database.

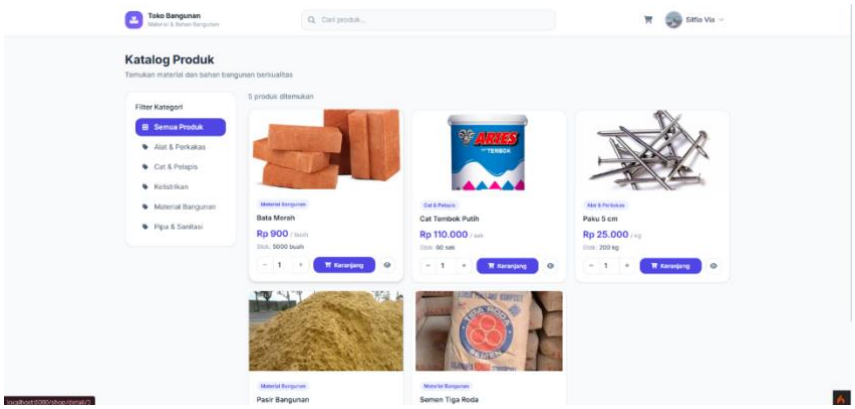

Fig. 6: Display of goods data module

3. **Payment Method and Order Confirmation Page**
   This page serves as the final stage in the transaction process for customers, where users select the payment method and review order details before finalizing a purchase. This interface is designed to support various payment options to provide flexibility, convenience, and security for customers, aligning with current digital transaction standards.

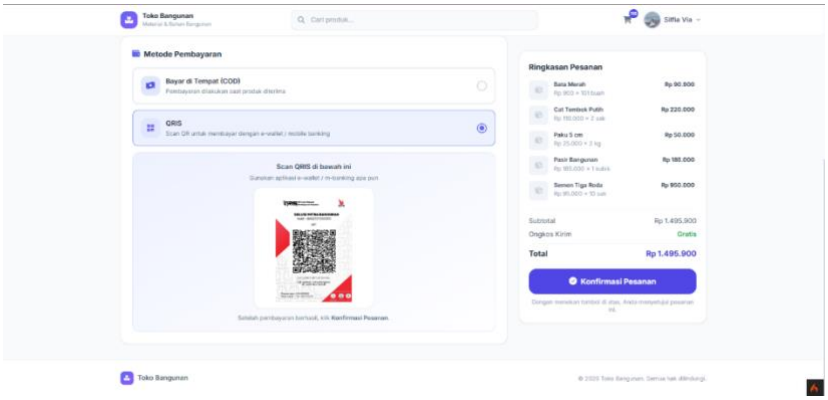

Fig. 7: Display of payment method and order confirmation page

4. Order Success and Transaction Detail Page

This page appears automatically after a customer successfully completes the payment and confirms the order. It serves as an official electronic receipt and confirmation that the transaction has been successfully recorded into the system and is being processed by the store. This interface is designed to provide clear, complete, and transparent information regarding the transaction, serving as proof of purchase and reference for both customers and administrators.

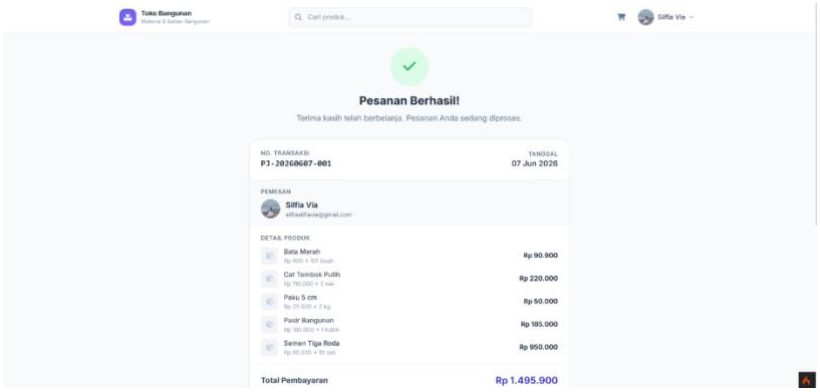

Fig. 8: Display of order success and transaction detail page

4.3.2 Administrator Interface

1. Administrator Dashboard Page

This is the main landing page displayed immediately after the administrator successfully logs into the system. Designed as a central control center, this page provides a comprehensive overview of business performance, key statistics, and quick access to primary features. It is structured to present critical information clearly and visually, enabling administrators or owners to monitor operational conditions in real-time.

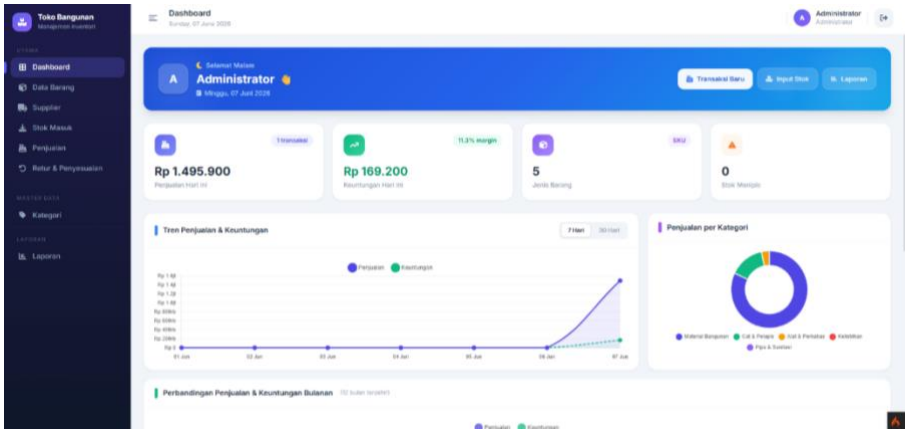

Fig. 9: Display of administrator dashboard page

2. Goods Data Management Page

This module is the core of inventory management, used to store, organize, and maintain complete data of all products available in the store. It acts as the master database for all items, ensuring consistency of information throughout every transaction process.

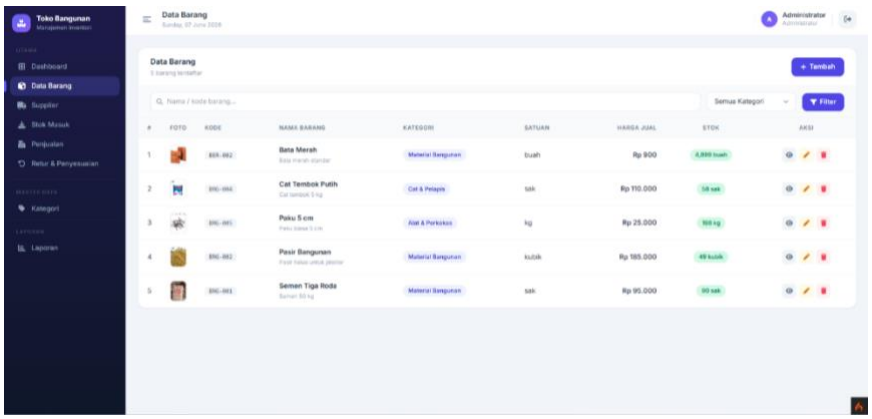

Fig. 10: Display of goods data management page

3. Sales Transaction Management Page

This page displays the history of all sales transactions processed through the system, both from customer orders and direct sales at the counter. It serves as the archive and verification center for every completed sale.

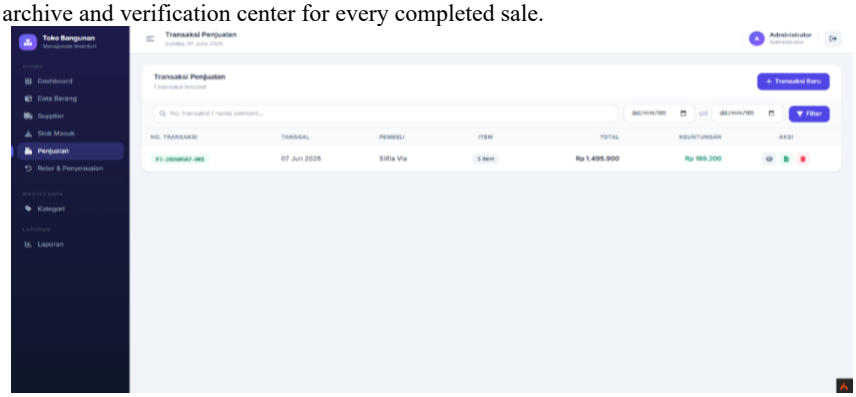

Fig. 11: Display of sales transaction management page

4. Report Generation Page

This is the most strategic module, transforming raw transaction data into structured information for decision-making. It provides official documents required for business evaluation, tax reporting, and performance analysis.

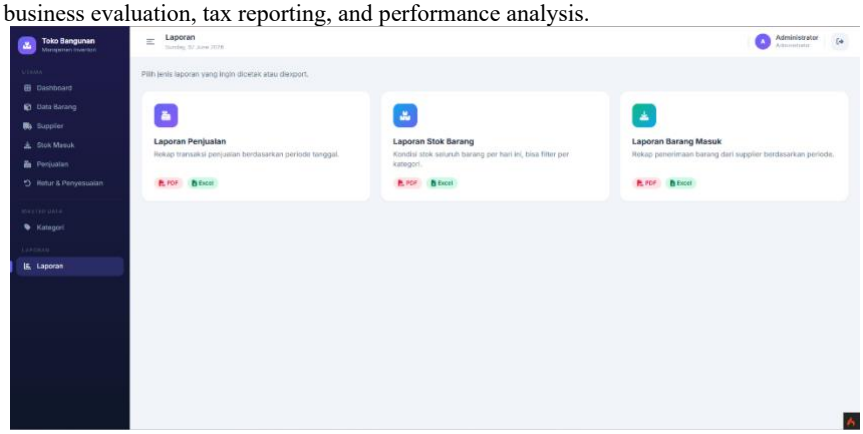

Fig. 12: Display of report generation page

4.3.3 Technology Used

The system is built using **PHP** with **CodeIgniter 4 Framework**, implementing the MVC architecture to separate data, logic, and view. **MySQL** is used as the database management system to ensure data security and speed.

4.4 Testing Results

Black Box Testing was conducted on all features. Test cases included login, data input, transaction processing, and report generation. Results showed that all functions worked as intended, input validation worked correctly, and calculations were accurate. No errors were found during testing, confirming the system is valid and ready for use.

4.5 Discussion

Before implementation, the store spent approximately 2–3 hours daily recording transactions and calculating stock manually, often resulting in calculation errors. After implementing this system, transaction recording is done instantly, stock updates automatically, and reports are generated in seconds. This system successfully integrates sales and inventory data, eliminating discrepancies that previously occurred. The QRIS payment feature also supports modern transaction needs, making payments easier and safer for customers. Overall, the system improves efficiency, accuracy, and speed in store operations.

5. Conclusion

Based on the research and implementation results, the following conclusions are drawn:

1. The web-based sales and inventory information system was successfully developed using the Waterfall method, CodeIgniter 4, and MySQL. This system transforms manual processes into computerized and integrated operations.
2. The system meets all functional requirements, including data management, transaction processing with automatic stock calculation, digital payment support (QRIS), and automatic report generation.
3. Implementation of this system significantly reduces recording errors, accelerates service time, ensures inventory data accuracy, and provides real-time reports to support management decision making.
4. Testing results confirm that the system functions properly, is valid, and is suitable for daily operational use at Solusi Mitra Bangunan store.

Suggestion: For future development, it is recommended to add a delivery tracking feature and integrate with accounting software to further expand system capabilities.

Acknowledgement

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