

Inventory And Logistics Information System Architecture Based On Web Using Agile Development Method

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ABSTRACT – PT. Mekanikatama Jaya Makmur still manages its inventory manually using a general ledger, which may lead to inventory data discrepancies, recording errors, and delays in report preparation. This study aims to develop a web-based Inventory Information System to support the structured management of fixed assets and consumable supplies. The method used in this study is Agile Development, with data collection techniques including observation, interviews, and literature review. The developed system provides features for managing fixed assets, item data, incoming goods, outgoing goods, inventory reports, and user access rights. The results of the study include the implementation of a web-based inventory information system that provides integrated inventory recording, management, and reporting functions. System testing showed that the developed features could be used in accordance with the identified inventory management requirements. The developed system can be used as a supporting tool for managing fixed assets and consumable supplies at PT. Mekanikatama Jaya Makmur.

Keywords - Information System, Inventory, Assets, Stock, Agile Development

Arsitektur Sistem Informasi Inventaris Dan Logistik Berbasis Web Menggunakan Metode Agile Development

ABSTRAK PT. Mekanikatama Jaya Makmur masih melakukan pengelolaan inventaris secara manual menggunakan buku besar yang berpotensi menimbulkan ketidaksesuaian data inventaris, kesalahan pencatatan, dan keterlambatan dalam penyusunan laporan. Penelitian ini bertujuan untuk membangun Sistem Informasi Inventaris berbasis web untuk mendukung pengelolaan aset tetap dan persediaan barang habis pakai secara terstruktur. Metode yang digunakan adalah Agile Development dengan teknik pengumpulan data berupa observasi, wawancara, dan studi pustaka. Sistem yang dibangun menyediakan fitur pengelolaan aset tetap, data barang, barang masuk, barang keluar, laporan inventaris, serta pengaturan hak akses pengguna. Hasil penelitian berupa implementasi sistem informasi inventaris berbasis web yang menyediakan fungsi pencatatan, pengelolaan, dan pelaporan inventaris secara terintegrasi. Pengujian sistem menunjukkan bahwa fitur-fitur yang dikembangkan dapat digunakan sesuai dengan kebutuhan pengelolaan inventaris yang telah diidentifikasi. Sistem yang dibangun dapat digunakan sebagai sarana pendukung dalam pengelolaan aset tetap dan persediaan barang habis pakai di PT. Mekanikatama Jaya Makmur.

Kata Kunci – Sistem Informasi, Inventaris, Aset, Stok, Agile Development

1. INTRODUCTION

The advancement of information technology in the modern era has had a big impact on work systems across various industrial sectors and organizations. The use of information technology is not just aimed at speeding up work processes, but also at creating a more efficient, accurate, and integrated data management system. One area that really needs tech support is company inventory management, which includes fixed assets and consumable goods. This management involves activities such as recording, monitoring, storing, and reporting assets and

inventory so they can be used effectively and kept under control.

Using Microsoft Excel for company inventory management comes with limitations, like only being accessible by one user at a time and lacking adequate security systems to protect data from unauthorized access [1].

To address these various problems, a solution in the form of a web-based inventory information system is needed, which can manage data centrally and in real-time. A web-based system allows users to access data from various devices flexibly, speeds up the reporting process, and minimizes the risk of data loss. Implementing a digital-based inventory

information system can help users manage item data more effectively and efficiently [2].

An information system is a system consisting of a collection of system components, namely software, hardware, and brainware, that process information into outputs useful for achieving specific goals within an organization [3]. In an organization, all items used to support operational activities are recorded as inventory so that their existence can be well controlled [4]. Inventory can also be defined as items or materials used by an organization or company to carry out its business operations [5]. The inventory includes fixed assets that have a useful life of more than one year [6]. Fixed assets are tangible assets that are ready for use or constructed by the organization, used in its operational activities, not intended for sale as part of the organization's normal activities, and have a useful life of more than one year [7] as well as consumable supplies that can only be used once or within a certain period depending on operational needs [8].

Considering the inventory system needs of PT. Mekanikatama Jaya Makmur, which can grow along with the company's operational processes, this study uses the Agile Development method because it can support system development in an iterative, adaptive way and involves users at every stage [9]. Agile Software Development is also a software development methodology based on an iterative work process, in which agreed-upon rules and solutions are implemented in an organized and structured manner through collaboration among team members [3].

Various previous studies have been conducted to develop web-based inventory information systems in different institutions. Research by Al Amin and Devitra [10] focused on designing an inventory system for government agencies using UML and resulted in a prototype that supports inventory data management and report presentation. Meanwhile, Siswanto et al. [11] developed a web-based asset inventory system using the FIFO method to help manage incoming and outgoing assets as well as inventory reports. Another study by Mariska and Megawaty [1] designed a web-based warehouse inventory system using a Design Thinking approach, equipped with user authentication and multi-user features to improve efficiency and security in managing inventory data.

Even so, most previous research has still focused on managing stock or fixed assets separately. Besides that, not much research has integrated the management of fixed assets, consumable inventory, incoming goods transactions, outgoing goods transactions, and the preparation of inventory reports into a single system. Therefore, this study develops a web-based inventory information system that

integrates fixed asset management, consumable goods inventory, incoming goods transactions, outgoing goods transactions, and inventory reports into a single application. The system development was carried out using the Agile Development method because it allows active user involvement in every stage of development, so the system can be developed gradually according to user [12] needs making the development process adaptable to user requirements step by step and resulting in a more flexible and integrated inventory system.

Based on that description, this study aims to build a web-based inventory information system using the Agile Development method at PT. Mekanikatama Jaya Makmur.

2. RESEARCH METHOD

Research methods are a systematic way of collecting data and also analyzing it in order to answer research questions or problems (Ibrahim et al., 2023:68)

A. Research Method

This study uses a qualitative descriptive research method. Qualitative descriptive is a method that describes and presents the events of the object being studied as they are, based on the situation and conditions when the research is conducted [13]. The qualitative descriptive method is chosen because it can portray the condition of the research object according to the facts in the field, which can match the reality on the ground.[14]

B. Data Sources

The data used in this study consist of primary and secondary data. Primary data are collected directly by researchers through methods such as surveys or experiments, making them more specific and relevant to the research questions [15]. Primary data were obtained through direct observation and interviews with the Admin Support at PT. Mekanikatama Jaya Makmur. The observation focused on the existing inventory management process, including the recording of fixed assets, incoming goods, outgoing goods, and inventory reporting. The interviews were conducted to identify problems in the existing process and determine the requirements of the proposed system. Secondary data were obtained from books, scientific journals, and documents related to inventory management and information system development. These data were used to support the theoretical foundation and development of the proposed system.

C. System Development Method

The system development method is a structured approach used in the process of designing and building information systems. Agile development is a short-term software development model that can be rapidly adapted to address changes and evolving

requirements [16] This method consists of six stages, namely Requirements, Design, Development, Testing, Deployment, and Review (Evaluation or Feedback). Each stage is carried out iteratively, allowing the system development to be continuously adjusted according to user needs. Agile development is a short-term software development model, which can then be quickly adapted to address any changes.

1. Requirements

This stage is carried out to identify the system needs through observation and interviews with PT. Mekanikatama Jaya Makmur as the basis for system development.

2. Design At this stage

At this stage, the system design was prepared based on the requirements identified in the previous stage. The design used the Unified Modeling Language (UML), including Use Case Diagrams, Activity Diagrams, and Class Diagrams. The design was reviewed against the identified user requirements before proceeding to the development stage.

3. Development

This stage is the process of building a web-based inventory information system based on the design that has been made by implementing all the required features.

4. Testing

Testing is conducted to ensure all system functions work well and meet user needs.

5. Deployment Once

the system is deemed feasible, it is deployed to users to support the inventory management process at PT. Mekanikatama Jaya Makmur.



Figure 1. Agile Methodology
Source: Hidayat et al 2025

D. Design Tools

Unified Modeling Language (UML) is a standard modeling language that has syntax and semantics for documenting, specifying, and building software systems [17]. UML is used to visualize, design, and document system requirements and structures in a systematic way. Additionally, UML supports object-oriented programming approaches,

making the software development process more structured, clear, and easier for everyone involved to understand.

3. RESULT

Implementation is a process of achieving results that align with established goals or objectives, in which the implementer carries out a series of activities so that the system can be used as intended [18]. In this study, implementation is the next phase following the completion of the system design process. At this stage, the developed system is deployed into the work environment so that users can actually use it. The implementation process involves running all the system's features and functions to ensure that the application operates in accordance with previously planned requirements. Additionally, every component of the system is tested to ensure they are interconnected and operate smoothly without encountering any issues. This stage also aims to assess the quality and performance of the developed system. Through this implementation process, the researcher can determine whether the system is capable of helping users perform their work more effectively and efficiently.

1. Login From

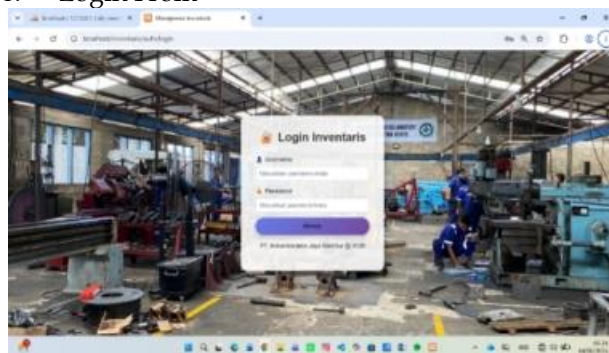


Figure 2: Login Form

The login page serves as the user authentication process before accessing the system by entering a registered username and password. This feature ensures that only authorized users can manage inventory data, thereby better safeguarding the security and confidentiality of company data.

2. Dashboard page

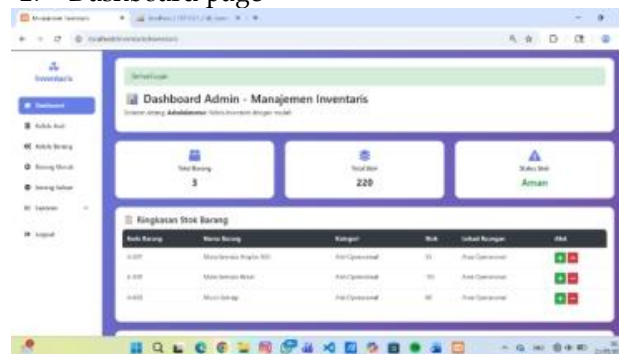


Figure 3: Dashboard View

The dashboard is the main page displayed after a successful login. This page provides a real-time summary of information regarding the number of fixed assets, consumable supplies, and inventory levels. This information helps administrators monitor inventory status more quickly, enabling them to make more effective decisions regarding inventory management.

3. Asset Data Page



Figure 4: Asset Data Page

The Asset Data page displays all information regarding the company's fixed assets in tabular form. The information presented includes the asset name, category, quantity, condition, location, and date of acquisition. The structured presentation of data makes it easier for administrators to monitor the condition of assets and helps reduce the risk of asset loss or recording errors.

4. Add Asset Page



Figure 5: Add Asset Page

The Add Asset page is used to enter new fixed asset data into the system. Once the data is saved, the system stores it in the database so that asset data can be managed centrally. This process helps reduce manual record-keeping and improves the accuracy of the company's inventory data.

5. Item Management Page

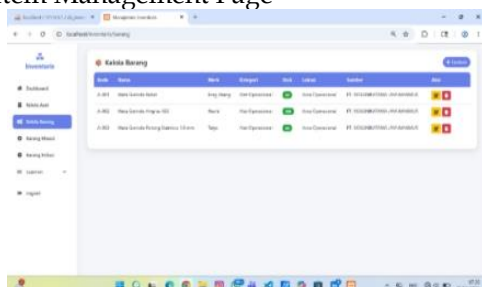


Figure 6: Item Management Page

The Item Management page is used to display all inventory data for consumable items stored in the system. Through this page, administrators can add, edit, or delete item data as needed. Centralized data management simplifies the process of searching for items and ensures inventory data accuracy.

6. Add Item Page

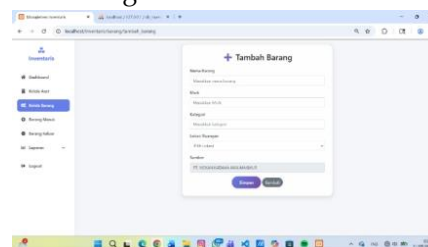


Figure 7: Add Item Page

The Add Item page is used to enter inventory data for consumable items into the system. The information entered is stored in the database so it can be used in the processes of goods received, goods issued, and the automatic generation of inventory reports.

7. Goods Received Page

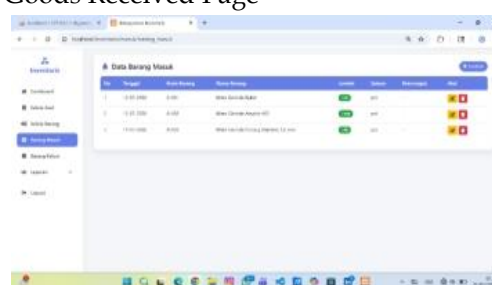


Figure 8: Incoming Goods Page

The Incoming Goods page is used to record and manage data on goods entering the company. Each entry of incoming goods that is successfully saved will automatically increase the available stock quantity in the system. Recording incoming goods transactions automatically updates the available stock quantity, ensuring that inventory information always reflects the company's actual status.

8. Add Incoming Goods Page

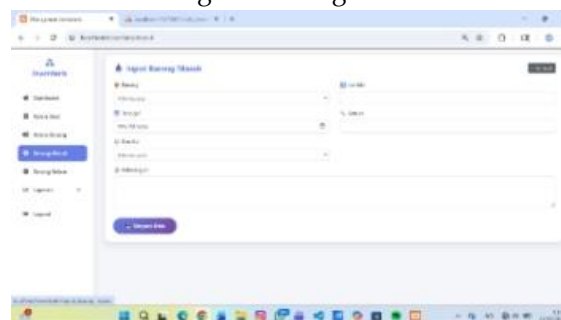


Figure 9: Add Incoming Goods Page

The Add Incoming Goods page is used to record transactions involving goods received by the

company. Once the data is saved, the system automatically updates the stock quantity so that inventory information remains consistent with the actual status.

9. Outgoing Goods Page

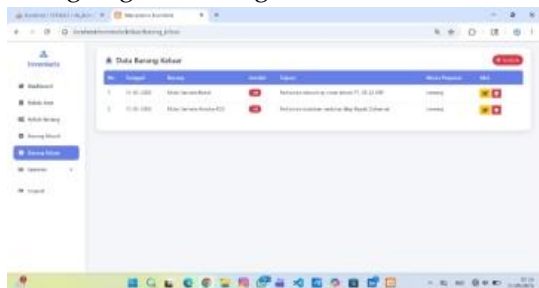


Figure 10: Goods Issued Page

On this page, the admin can record every goods issued transaction used for the company's operational activities. Each goods issued transaction automatically reduces the stock quantity, helping to prevent discrepancies between inventory data and the physical condition of the goods.

10. Add Goods Issued Page



Figure 11: Add Outgoing Goods Page

The Add Outgoing Goods page is used to record each transaction involving the issuance of goods. The system automatically reduces the stock quantity by the number of items issued, thereby helping to maintain the accuracy of inventory data. Based on the results of the implementation, the inventory information system developed is capable of supporting the management of fixed assets and consumable inventory more effectively than the manual processes previously used at PT. Mekanikatama Jaya Makmur. All inventory data is stored in a single database, which facilitates searching, stock monitoring, recording of incoming and outgoing goods, and the preparation of inventory reports. In addition, the use of the Agile Development method allows the system to be developed in phases according to user needs throughout the development process.

4. CONCLUSION

Based on the results of the research conducted at PT. Mekanikatama Jaya Makmur, the following conclusions can be drawn regarding the design and

development of the web-based inventory information system. The web-based inventory information system was successfully designed and developed to support the management of fixed assets and consumable inventory at PT. Mekanikatama Jaya Makmur. The system provides functions for recording, managing, and monitoring inventory data that were previously managed manually using ledgers. The developed system provides an integrated database for storing fixed asset and consumable inventory data. This allows inventory records, incoming goods, outgoing goods, and related information to be managed through a centralized system. The system provides inventory reporting and data retrieval features that support the preparation and monitoring of inventory information. Based on the functional testing conducted, the implemented features operated according to the identified system requirements. The system integrates fixed asset and consumable inventory management within a web-based platform and provides user authentication and access-right management features. These features allow system functions to be accessed according to the roles assigned to users. Overall, the research resulted in a web-based inventory information system that corresponds to the inventory management requirements identified during the research process and can be used as a supporting tool for inventory management at PT. Mekanikatama Jaya Makmur.

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