

Design of a Fixed Asset Inventory System at Bank BRI Branch Offices Using the *Waterfall Method*

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ABSTRACT

Bank Rakyat Indonesia (BRI) is one of the largest state-owned banks in Indonesia with branch offices distributed across various regions, including the BRI 16 Ilir Branch Office located in the central trade area of Palembang City. This branch plays a strategic role in providing banking services such as financial transactions, account opening, and People's Business Credit (KUR). Based on initial observations, the management of fixed assets at the BRI 16 Ilir Branch Office is still conducted conventionally using physical documents and separate digital spreadsheets. This condition often causes data duplication, delays in updating asset information, inconsistencies between administrative records and physical assets, and difficulties in auditing and monitoring asset conditions. The absence of an integrated system also hampers maintenance planning and asset disposal processes. Therefore, this study aims to develop a web-based inventory information system as an effective solution to improve asset management efficiency and accuracy. The system is designed to record asset data in real time based on category, location, and usage status, and to provide comprehensive monitoring and reporting features. The development process adopts the Waterfall method due to its structured, linear, and well-documented approach. The results are expected to support better asset management practices and contribute to academic references in banking information systems.

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1. Introduction

The development of information and communication technology (ICT) has experienced significant acceleration in recent decades. Technology no longer functions just as an administrative tool, but has become the backbone in the management of data, information, and decision-making in various sectors[1]. One of the great contributions of information technology is its ability to automate work processes and minimize errors that are common in manual processes. Modern organizations, including financial institutions, rely heavily on information systems to improve efficiency, effectiveness, and accountability in their operations[2] Banking as a fast, accurate, and data-based service-oriented sector demands a reliable technological infrastructure to support its various business processes, including in terms of asset and inventory management [3].

One of the most important systems in the context of resource management is the inventory information system. This system is used to record, manage, and monitor fixed assets in a systematic and structured manner. In the operation of financial institutions such as banks, fixed assets such as computers, network devices, office furniture, and ATM machines are vital components that support the continuity of

services to customers [4]. Instability in asset management can cause loss of goods, data inconsistencies, and difficulties during internal and external audits. According to Putra and Prasetyo (2022), organizations that do not have a digital inventory system tend to experience data inconsistencies of up to 35% during audits, which has an impact on the low level of accuracy of financial statements and budget planning. This reinforces the urgency of implementing a web-based inventory information system to prevent administrative and operational losses.

Bank Rakyat Indonesia (BRI) as one of the largest state-owned banks in Indonesia has a network of branch offices that are spread widely to various regions [4]. One of them is the BRI 16 Ilir Bank Branch Office, which is located on Jl. Jend. Sudirman No. 623, 16 Ilir Village, Ilir Timur I District, Palembang City, South Sumatra. This office is located in the central area of trade and economy of Palembang City and is one of the main service offices that serve financial transactions, account opening, people's business credit services (KUR), and other financial activities. Based on internal data in 2023, this office manages fixed assets spread across various operational rooms and supporting sections. However, until now, the asset management system is still carried out using manual documents and spreadsheets that are not centralized. This has the potential to cause data redundancy, recording errors, and delays in reporting and updating assets.

The results of initial observations show that the management of fixed assets at the BRI 16 Ilir Branch Office is still carried out conventionally using physical documents and digital spreadsheets stored separately in each section. This often leads to duplication of data, delays in updating information, and inconsistencies between administrative data and the physical condition of goods. In addition, the unavailability of a system-based asset monitoring system makes the process of auditing, tracking goods, and identifying maintenance needs inefficient. Assets that are damaged or transferred to other units are often not recorded accurately, thus hampering the procurement planning process and the removal of goods. This problem strengthens the urgency of building a more structured, automated, and integrated inventory information system.

The development of a web-based inventory information system is considered the right solution to answer these various problems. This system is expected to be able to record asset data in real-time based on its category, location, and usage status, as well as provide comprehensive reporting and monitoring features [5]. In addition, the system can also be equipped with notifications for asset maintenance schedules, item mutation history, as well as an easy-to-use user interface for administrative staff. According to Rahayu & Santosa (2021), the implementation of an inventory information system can increase operational efficiency by up to 40% in public institutions. With the support of an integrated system, inventory management at the branch office will become more efficient, transparent, and support fast, data-driven decision-making. The use of this technology is also expected to improve accountability and the quality of asset governance in the banking environment.

In the design process, the system requires a systematic and well-documented approach to software engineering. The Waterfall method is one of the most suitable methods to use because it offers a linear, structured, and documentation-oriented workflow. Stages such as needs analysis, system design, implementation, testing, and maintenance are carried out sequentially, making it easier to control the quality and suitability of the system with user needs. This method is suitable for applications that have a stable and predictable functional coverage from the start. With the waterfall method, the fixed asset inventory information system at the BRI 16 Ilir Branch Office can be built comprehensively and well documented at every stage.

Based on this presentation, it can be concluded that the problem of managing fixed assets at the BRI 16 Ilir Bank Branch Office needs to be immediately overcome through the design of a structured and efficient information system. This research is not only aimed at solving practical problems in the work environment, but also provides an academic contribution to the development of inventory information systems in the banking sector. The results of this study are expected to enrich scientific references regarding the application of the waterfall method in asset management systems at the branch level, as well as become an implementation model that can be replicated by other branch offices under large organizations.

2. Research Methods

3.1 Time and Place of Execution

The practical work activities were carried out at Bank BRI KCP Lemabang, which is located on Jl. R. E. Martadinata, Sei Buah, Ilir Timur II District, Palembang City, South Sumatra. The practical work was carried out for two months, starting from February 5, 2025 to April 5, 2025. During this period, students conducted observations, interviews, system needs analysis, and development and testing of HR information systems.

3.2 Data Collection Methods

The data collection methods used in this practical work activity consist of:

1. Observation
It is carried out directly to the Asset Inventory administration process that runs at Bank BRI KCP Lemabang. Observations are carried out to understand the workflow, constraints, and needs of the information system.
2. Interview
It is carried out in a structured manner to HRD employees to explore the functional and non-functional needs of the system.
3. Documentation
Collect supporting documents such as employee data formats, leave application archives, and personnel report formats to be used in system design.

3.3 System Development Methods

The system development method used in this study is the Waterfall method. This method is linear and sequential, meaning that each stage must be completed first before moving on to the next. Waterfall is suitable for projects that have clear system needs at the beginning and minimal changes during development. The stages in the Waterfall method consist of:

1. Needs Analysis
This stage is carried out to identify and formulate user needs and system functions to be developed. Activities in this stage include observation of business processes and interviews with related parties such as employees, leaders, and IT staff. The result of this stage is a system requirements document that will be the basis for the design process.
2. System Design
After the system needs are known, the system design process is carried out including the creation of a user interface (UI) design, database structure, and system process flow. Tools such as Draw.io are used to compile use case, class, and activity diagrams as logical and visual representations of the system to be built.
3. Implementation
At this stage, the approved system design is transformed into program code using the PHP programming language with the MySQL database. The interface design is built using HTML, CSS, JavaScript, and the Bootstrap framework to produce a responsive and user-friendly look.
4. Testing
This stage aims to ensure the system runs according to the needs and specifications. The testing method used is black box testing, where the main focus is testing the functionality of the system without looking at the program code. The test results are used to fix bugs or shortcomings before the system is fully implemented.
5. Maintenance
This stage includes maintenance of the system that has already been implemented, including bug fixes that may be found after implementation as well as additional adjustments as per the user's needs in the future.

3. Results and Discussion

3.1 UML Plan

In this phase, the author presents a UML design for the website for the Design of a Fixed Asset Inventory System at Bank BRI Branch Offices Using the Waterfall Method. The design includes a variety of UML diagrams, such as use case diagrams, class diagrams, activity diagrams, and sequence diagrams designed to visualize the workflow and structure of the system. The author designed this system to support the operational needs of HR management efficiently, from employee data management to performance and attendance monitoring, with a structured and easy-to-understand approach.

3.1.1 Design Usecase Diagram

The use case diagram illustrates the interaction between actors, who represent system users, and the various functions or features provided by the system. This diagram is used to describe how users communicate with the system in order to achieve specific goals. Each actor is connected to one or more use cases that represent the actions or services the system can perform, such as managing data, viewing information, or generating reports. By visualizing these interactions, the use case diagram helps developers and stakeholders clearly understand the system requirements from the user's perspective. It also serves as an effective tool for identifying system boundaries, defining user roles, and ensuring that all required functionalities are accommodated. As a result, the use case diagram plays an important role in system analysis and design by providing a simple yet comprehensive overview of system behavior.

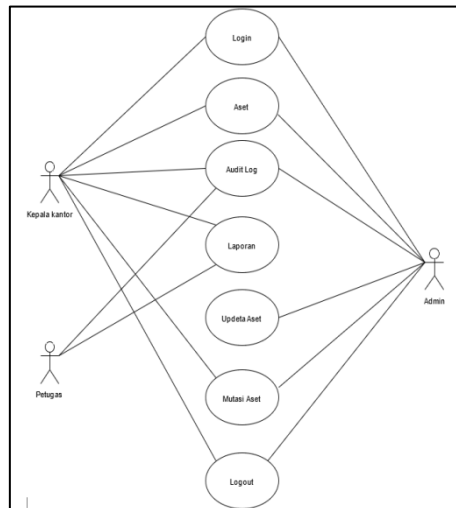


Figure 1. Usecase Diagram

3.1.2 Diagram Class Design

This Class Diagram is designed to reflect the data structure and process flow in the Design of a Fixed Asset Inventory System at Bank BRI Branch Offices Using the Waterfall Method. Each class has specific responsibilities, such as data management of admins, heads of offices, officers, and performance assessments. The relationships between classes are designed to be integrated with each other to support the overall asset inventory function. With this design, the system can be developed to handle administrative and operational processes efficiently, accurately, and in a structured manner.

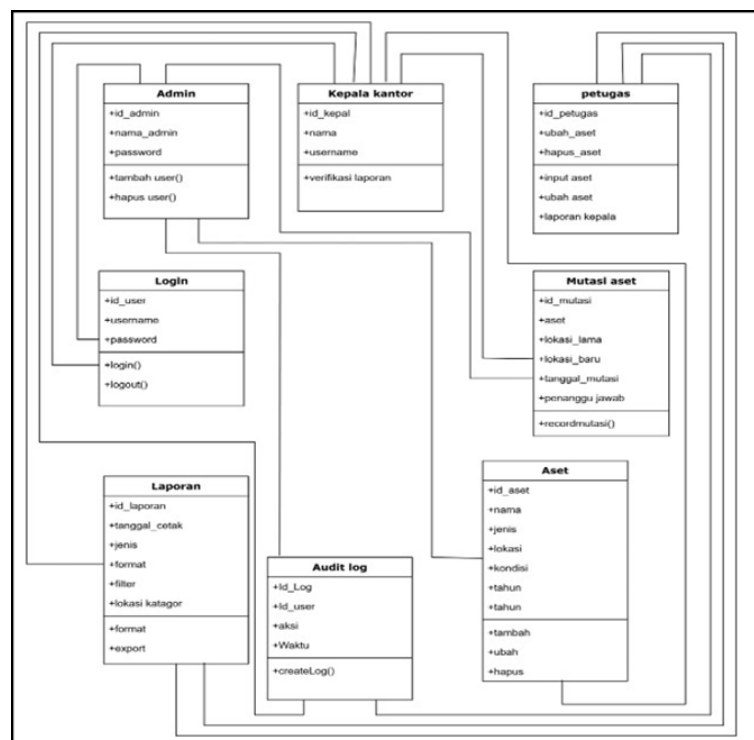


Figure 2. Diagram Class Design

3.1.3 Flowchart of the Process of Adding Fixed Asset Data

After the computerized asset mutation process, the fixed asset inventory system also supports the recording of new assets digitally. Users can add fixed asset data through the system interface that has been provided. The process begins with login, followed by navigation to the asset addition menu, then the user fills out the form with the necessary data such as asset code, name, category, location, condition, and date of acquisition. The system will automatically validate the input data before storing it into the database and audit

logs. If the data is valid, the user will get a notification that the asset was successfully added. The following flowchart illustrates the process of adding fixed asset data in this integrated system.

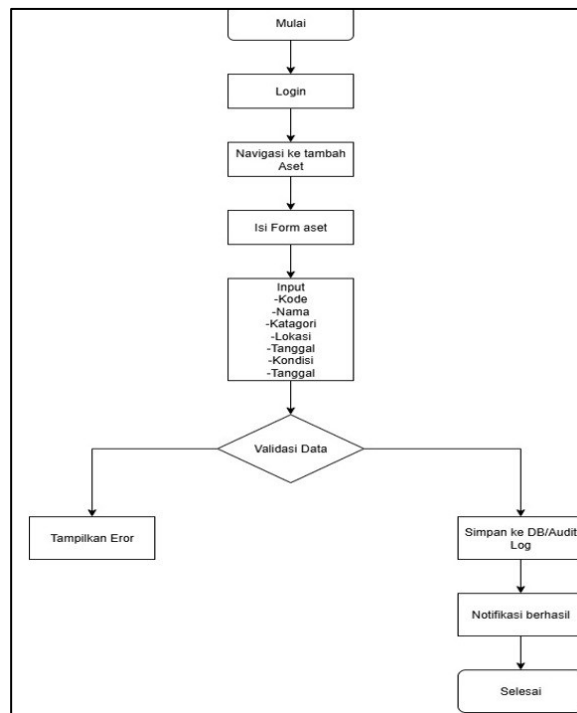


Figure 3. Flowchart of the Process of Adding Fixed Asset Data

3.1.4 Search Process Flowchart and Management

In the digital management of fixed asset inventory, the developed system allows the process of finding and managing assets to be carried out automatically and efficiently. The following flowchart illustrates the process flow when an officer logs into the system, then performs an asset data search based on code or name. If an asset is found in a database, the system displays the data and provides the option to perform advanced processes such as mutation, deletion, or update of asset information. However, if asset data is not found, the officer can directly input new asset data into the system. After that, all changes or additions to data will be automatically saved into the system database. This flow ensures that data integrity is maintained and minimizes the risk of recording errors that are common in manual processes.

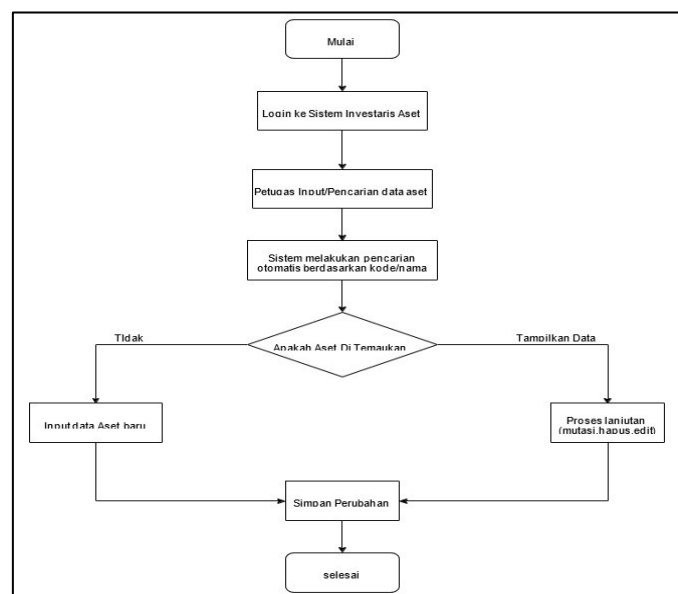
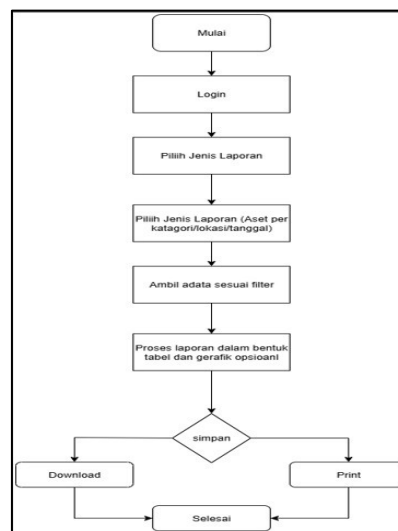


Figure 4. Search Process Flowchart and Management

3.1.5 Inventory Report Creation Process Flowchart

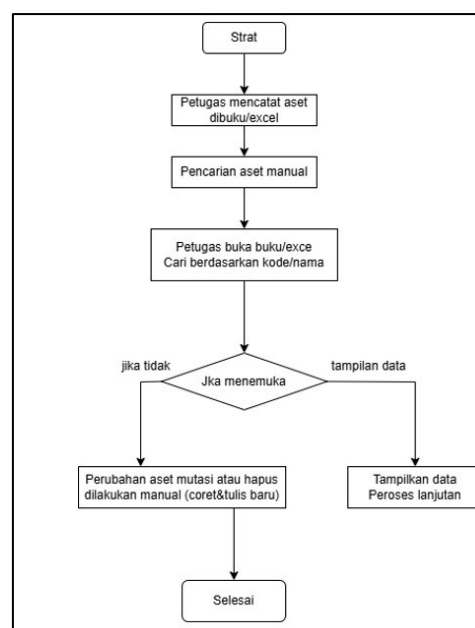
To support accurate and efficient reporting needs, the developed fixed asset inventory system provides automatic reporting features based on various criteria. This process starts with the user signing in and then selecting the type of report you want, for example based on an asset category, location, or date range. After that, the system will retrieve the data according to the specified filters and process it into table and graph formats if needed. The results of the report can be saved and customized, and then there is an option to download or print the report. The following flowchart illustrates the entire process of creating reports in a computerized inventory system.



Picture 1 Inventory Report Creation Process Flowchart

3.1.6 Flowchart Before System

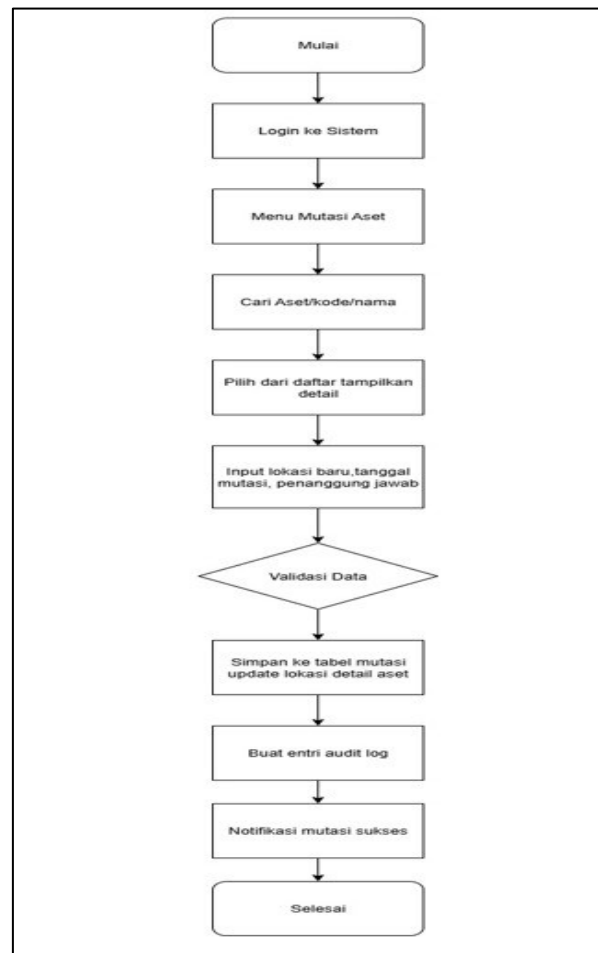
To understand the process of managing fixed asset inventory that is currently implemented at Bank BRI Branch Offices, it is necessary to analyze workflows or procedures that are still manual. The system used still relies on recording in the form of books or Excel files, so it has the potential to cause obstacles such as recording errors, delays in searching for asset data, and lack of efficiency in the process of mutation or deletion of assets. The following flowchart illustrates the flow of the system that is running, from the process of recording assets to the manual processing of mutation data or asset deletion.



Picture 2. Flowchart Before System

3.1.7 Flowchart After System

After the design and development of the fixed asset inventory system at Bank BRI Branch Offices, the workflow that was previously carried out manually is now transformed into systematic and computerized. The process of recording, searching, and mutating assets can now be carried out through a system integrated with the database, thereby speeding up data processing time and minimizing the risk of input errors. In addition, this system is also equipped with data validation and log audit recording features to ensure that every data change is recorded transparently. The following flowchart illustrates the updated system flow, from logging into the system to notifying the successful asset mutation process.



Picture 3. Flowchart After System

3.2 Interface System Design Design

In designing the fixed asset inventory system interface at the Sub-Branch Office (KCP) of Bank BRI Lembang, the design approach is focused on simplicity, consistency, and readability of information. Each page is designed to display key features in a structured manner, such as information dashboards, asset management, asset mutations, asset deletions, reports, and user management. Visual components such as action buttons, data tables, icons, and input forms are structured with an intuitive layout to make it easy to navigate for users of different access levels, such as administrators, inventory officers, and unit heads.

3.3 System Implementation

The implemented system is developed web-based, so it can be accessed through a browser and used by inventory officers without the need for additional installation on each device. The implementation process begins with the preparation of the server and database, followed by the installation of the system as well as the configuration of access and user roles. After the system is successfully installed, the initial data integration process is carried out in the form of importing asset data that was previously stored in Excel format into the new system. The data is then validated to ensure the compatibility between the old data and the database structure used in the new system.

3.3.1 Login Page

In the login form, users are asked to enter the username and password that has been provided. After entering the correct credentials, the user can press the Login button to log in to the system. If the login is successful, the user will be redirected to the dashboard page according to their respective access rights (admin, inventory officer, or general user).

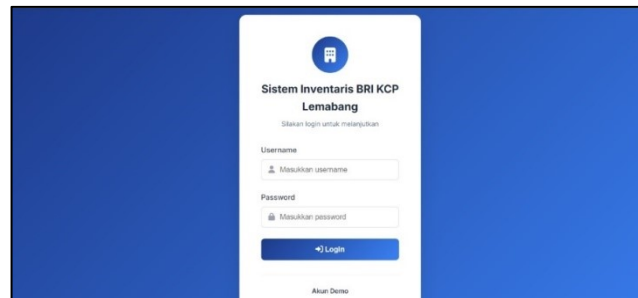


Figure 8 Login Page

3.3.2 Dashboard Page

The Dashboard page is the main display of the fixed asset inventory system that provides a concise and real-time overview of asset conditions in the BRI Lembang KCP environment. Through this page, users can directly see important information such as the total number of active assets, the value of the overall asset, the number of asset mutations, and the number of assets deleted in the current month. In addition, a list of the latest assets that have been inputted into the system is also displayed, complete with code information, name, location, condition, and date of input.

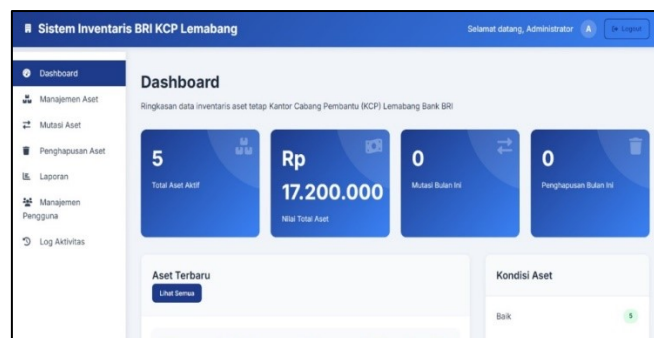


Figure 9. Dashboard Page

3.3.3 Asset Management Page

On this page, users can see the entire list of assets stored in the database, complete with information such as asset codes, asset names, categories, locations, conditions, values, and status. At the top, there are search and filter features based on name/code/location, asset category, asset condition, and active or inactive status. This makes it easier for users to find data quickly and accurately.

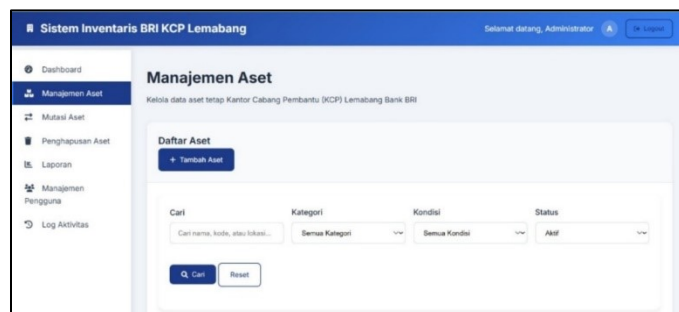


Figure 10. Asset Management Page

In addition to viewing data, users can also take direct actions through the action buttons available in the rightmost column, such as editing asset information (pencil icon) or deleting asset data (trash can icon). The "+ Add Assets" button at the top allows users to enter new assets into the system. With this page, the

process of recording and maintaining asset data becomes more structured and efficient than the manual methods previously used.

3.3.4 Asset Mutation Page

The Asset Mutation page in this system is designed to facilitate the recording of the process of moving fixed assets from one location to another within the BRI Lembang Sub-Branch Office. This feature allows users to record the date of the mutation, the type of assets moved, the old and new location, the reason for the move, as well as the name of the officer in charge. With this record-keeping, the system helps maintain the accuracy of asset location data in real-time and makes it easier to track the history of asset movements, thus supporting more orderly and transparent asset governance.

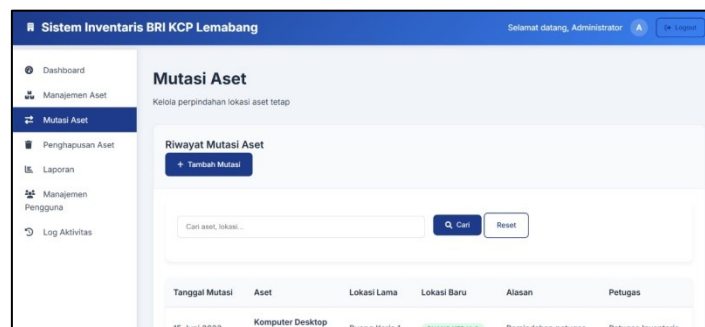


Figure 11. Asset Mutation Page

3.3.5 Asset Removal Page

The Asset Removal page is designed to record and display the history of the removal of fixed assets that are no longer used or damaged in the KCP BRI Lembang environment. Each asset that is deleted will be recorded complete with information such as the asset name, asset code, last location, reason for deletion, and the name of the officer who carried out the process.

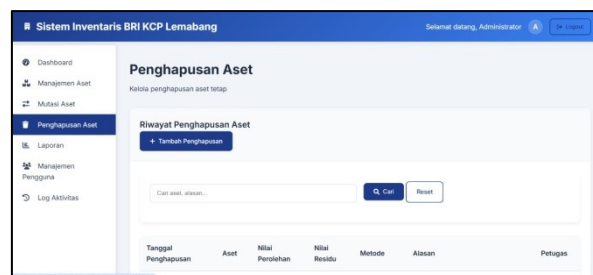


Figure 12. Asset Removal Page

3.3.6 Report Page

This page is designed to make it easier for officers to generate automatic and structured asset reports based on the various filters available. At the top of the page, there is summary information in the form of the total number of active assets, the total value of active assets, the number of asset mutations, and the number of asset write-offs in the current month. Although it looks like a mini dashboard, this information is only supporting to provide context before the report is generated.

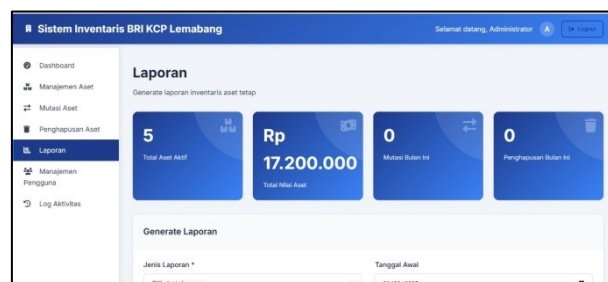


Figure 13. Report Page

The main feature of this page is the "Generate Report" form, where users can select report types based on specific categories such as assets per category, location, or date. In addition, additional filter options

such as asset condition and location are also available, as well as date ranges (start and end) to limit the data you want to appear in the report. Once the filter is defined, users can choose the desired report format—either in PDF form for print or Excel for advanced data processing. This page supports the efficiency of inventory officers in compiling monthly reports, annual reports, or custom reports as per management needs.

3.3.7 User Management Page

The User Management page serves to manage the data of users who have access to the inventory system. This feature allows administrators to add, edit, or delete user accounts according to their respective roles, such as Administrator, Inventory Officer, and Unit Head. Each entry displays important information such as name, username, level, email, account status, creation date, and action buttons to manage user data. With this feature, the management of access rights in the system becomes more structured and secure.

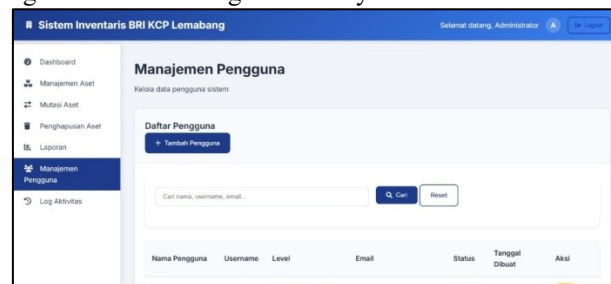


Figure 14. User Management Page

3.3.8 Activity Log Page

The Activity Log page provides a complete history of all user activity in the system. This feature is important for audit and security purposes because it records the details of the activity, the user who took the action, the time of the incident, the IP address, and the type of activity performed. There are also search and filter features by date, user, or activity type for easy tracking. Administrators can export logs into file format for further documentation needs.

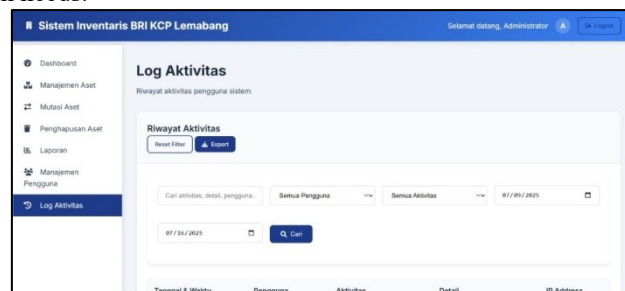


Figure 15. Activity Log Page

4. Conclusion

Based on the results of the practical work conducted at the Sub-Branch Office of Bank BRI Lembang, it can be concluded that the fixed asset inventory information system developed using the Waterfall method has proven effective in supporting asset management activities in a more structured, accurate, and efficient manner. The system is capable of facilitating key asset management processes, including the recording of new assets, asset mutation or transfer, asset disposal, and the generation of comprehensive reports in real time. Through the implementation of a systematic development approach, each stage—from requirements analysis to implementation and testing—was clearly documented, resulting in a system that aligns well with organizational needs. In addition, the availability of real-time data enables management to monitor asset conditions and locations more easily, reduce data duplication, and minimize inconsistencies between physical assets and recorded data. This contributes to better decision-making, especially in planning procurement, maintenance, and asset replacement.

Furthermore, the user interface of the system was intentionally designed to be simple, intuitive, and user-friendly, allowing employees from different backgrounds to operate it without difficulty. This simplicity plays a crucial role in reducing input errors, accelerating work processes, and increasing overall operational efficiency. With the adoption of this system, asset data management becomes more organized, transparent, and accessible, thereby strengthening internal control and accountability within the organization. However, to ensure that the fixed asset inventory system continues to operate optimally and remains relevant to future needs, several improvements are recommended. First, the system can be enhanced by adding features such as periodic maintenance reminders or automated asset audit notifications to ensure asset conditions are

continuously monitored. Second, regular training programs should be provided for officers or employees who use the system so that all available features can be utilized effectively and consistently. Third, it is advisable to integrate the inventory system with existing administrative or financial systems to create a more comprehensive and interconnected asset management framework. Such integration would not only improve data consistency but also support more holistic reporting and strategic planning across departments.

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