

WEB-BASED EMPLOYEE ASSET INVENTORY INFORMATION SYSTEM AT KEMENTERIAN PELINDUNGAN PEKERJA MIGRAN INDONESIA

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Abstract

Asset inventory management in government agencies requires a system that is able to ensure data accuracy, ease of monitoring, and presentation of information quickly and accurately. In the Kementerian Pelindungan Pekerja Migran Indonesia (KP2MI), the inventory process of assets used by employees is still carried out manually, potentially causing data duplication, recording errors, difficulty in tracking the whereabouts of assets, and delays in preparing reports. This study aims to develop a web-based employee asset inventory information system to improve the effectiveness, efficiency, and transparency of Barang Milik Negara (BMN) in the KP2MI environment. System development using the Waterfall method which includes the stages of needs analysis, design, implementation, testing, and maintenance. The system is developed using PHP programming language with MySQL database, while data collection is done through observation, interview, and literature study. Evaluation of the system is carried out using Black Box Testing to test the functionality of the system and the system Usability Scale (SUS) to measure the level of ease of use based on user perceptions. The test results showed that all 11 functional test scenarios were successfully executed, so that all system functions met the specified needs. In addition, the usability test obtained a SUS score of 82, which belongs to the category of Excellent with Grade A, indicating that the system has a very good level of ease of Use and can be accepted by users. The system developed is able to integrate asset data management, employee data, lending, returns, asset mutations, and presentation of reports in a centralized and real-time manner, thereby increasing data accuracy, accelerating report preparation, and supporting decision-making in asset management in the KP2MI environment.

Keywords: Information System; Asset Inventory; Web Based System; Waterfall

Abstrak

Pengelolaan inventarisasi aset pada instansi pemerintah memerlukan sistem yang mampu menjamin ketepatan data, kemudahan pemantauan, serta penyajian informasi secara cepat dan akurat. Di Kementerian Pelindungan Pekerja Migran Indonesia (KP2MI), proses inventarisasi aset yang digunakan oleh pegawai masih dilakukan secara manual sehingga berpotensi menimbulkan duplikasi data, kesalahan pencatatan, kesulitan dalam melacak keberadaan aset, serta keterlambatan dalam penyusunan laporan. Penelitian ini bertujuan mengembangkan sistem informasi inventarisasi aset pegawai berbasis web untuk meningkatkan efektivitas, efisiensi, dan transparansi pengelolaan Barang Milik Negara (BMN) di lingkungan KP2MI. Pengembangan sistem menggunakan metode Waterfall yang meliputi tahapan analisis kebutuhan, perancangan, implementasi, pengujian, dan pemeliharaan. Sistem dikembangkan menggunakan bahasa pemrograman PHP dengan basis data MySQL, sedangkan pengumpulan data dilakukan melalui observasi, wawancara, dan studi pustaka. Evaluasi sistem dilakukan menggunakan Black Box Testing untuk menguji fungsionalitas sistem serta System Usability Scale (SUS) untuk mengukur tingkat kemudahan penggunaan berdasarkan persepsi pengguna. Hasil pengujian menunjukkan bahwa seluruh 11 skenario pengujian fungsional berhasil dijalankan, sehingga seluruh fungsi sistem telah memenuhi kebutuhan yang ditetapkan. Selain itu, pengujian usability memperoleh skor SUS sebesar 82, yang termasuk kategori Excellent dengan Grade A, menunjukkan bahwa sistem memiliki tingkat kemudahan penggunaan yang sangat baik dan dapat diterima oleh pengguna. Sistem yang dikembangkan mampu mengintegrasikan pengelolaan data aset, data pegawai, peminjaman, pengembalian, mutasi aset, serta penyajian laporan secara terpusat dan real-time, sehingga meningkatkan

akurasi data, mempercepat penyusunan laporan, dan mendukung pengambilan keputusan dalam pengelolaan aset di lingkungan KP2MI.

Kata kunci: Inventarisasi Aset; Sistem Informasi; Website; Waterfall

INTRODUCTION

Digital transformation has brought significant changes to government agencies, especially in supporting data management and improving the effectiveness of implementing various organizational activities (Devia & Anjaswara, 2025). These advances encourage various institutions and agencies to adjust the work system used with the aim of improving the quality of service to the community using Information Technology (Ramadhani, Yolanda, Rezeki, & Ernawati, 2025). The implementation of information technology is expected to provide convenience, efficiency and effectiveness in the process of organizing public services (Suprianto, 2023). Information Systems Act as a means that supports the provision of information in an accurate, relevant and timely manner (Firmansyah & Ernawati, 2023), so that it can be used as a basis in the decision-making process, including in asset management activities within the organization. Assets are an important component in supporting the organization's operations so that management must be carried out systematically, structured and integrated. In asset inventory activities, the application of Information Systems can produce more accurate and easy-to-understand data so that it supports optimal asset management (Syapudin, 2024). Therefore, the application of asset inventory information systems, especially assets used by employees, is an important requirement in improving transparency and accountability of asset management in government agencies.

Asset management, including the management of Barang Milik Negara (BMN), plays an important role in supporting government operations and must be conducted in an orderly, transparent, and accountable manner. However, several government institutions still rely on conventional asset management processes, including spreadsheet-based recording. Such practices may result in poorly organized data, difficulties in monitoring assets, and ineffective supervision of asset (No, Rapel, Saputra, Kusuma, & No, 2026). In addition, the use of manual systems also poses obstacles such as low data accuracy, difficulty in monitoring asset conditions and evaluation and reporting processes that take longer

(Oktaviana Ina Palang, Ferdinandus Lidang Witi, & Benediktus Yoseph Bhae, 2025). These conditions make it a challenge for the Kementerian Pelindungan Pekerja Migran Indonesia in managing assets used by an increasing number of employees and spread across various work units.

Several previous studies have developed web-based information systems to address asset management problems. This condition is supported by the results of previous studies which explain that asset management that is still carried out without support has the potential to cause delays in the preparation of reporting, inaccuracies in the recording process and low quality of the information produced (Faizal & Irfan, 2025). The impact of these problems not only reduces work efficiency but also has the potential to cause losses to the organization, both financially and operationally and hamper the decision-making process.

In an effort to overcome these problems, a solution is needed in the form of developing a web-based employee asset inventory information system that can integrate all asset data used by employees in a centralized system. The web-based system was chosen because it has easy access, flexibility and ease of data integration between work units. The implementation of this system is expected to support the improvement of efficiency, accuracy, transparency and ease in monitoring and reporting of actual assets. Previous research has shown that the use of web-based asset management information systems can optimize asset management processes while increasing the effectiveness of supervision and control activities in the organizational environment (Syaputra & Susanti, 2025).

However, most of the research that has been done before is still focused on the basic functions of asset recording and reporting, so the support for integrated asset management processes is still limited. The systems that have been developed generally have not integrated Role-Based Access Control (RBAC), asset identification using QR codes, asset lending and return workflows, asset mutation approval mechanisms, and real-time monitoring dashboards in one integrated platform. Table 1 presents a feature-based comparison between previous studies and

the proposed system to clarify the identified research gap and the contribution of this study.

Table 1. Comparison of Previous Research

Author	Method	Result	GAP
(Erianto Tampubolon & Hidayat, 2023)	Waterfall	The web-based system is able to support the process of input and search of asset data and generate reports in PDF format. The implementation of the system helps to improve the efficiency of asset management and reduce the potential for errors in the recording process.	Previous research has focused on recording, searching, and reporting assets. This research has a more integrated scope by adding borrowing and returning assets, asset mutations, RBAC, QR codes, and real-time monitoring.
(M. Mustani, Cristian, & Suhartini, 2024)	Waterfall	The inventory system provides management of item data, categories, locations, and reports so that the inventory recording process is faster and reports can be generated more accurately.	Previous research has focused on the recording of inventory items in the school environment. This study focuses on the asset management of employees/BMN in government agencies with a process that includes borrowing, repayment, mutation, RBAC, QR Code, and real-time monitoring.
(Tarigan et al., 2024)	Waterfall	The system supports real-time procurement, maintenance, and asset monitoring processes. The use of Waterfall method provides systematic development stages so that the system can be built according to the needs of the organization.	Previous research has provided real-time monitoring of assets as well as management of procurement and maintenance. This study is different from integrating employee asset management with lending and repayment, asset mutation, RBAC, and QR Code in one platform.
(Hariyanto, Edo, Nasution, & Muhammad Irfan Sarif, 2025)	Waterfall	The system simplifies the process of monitoring assets, asset movements, and preparation of real-time reports on government agencies.	Previous research has similarities in the objects of government agencies and has supported the mutation and monitoring of assets. This research expands the management process by integrating asset lending and repayment, RBAC, QR Code, and asset mutation approval mechanism by the authorities.
(Fransiska Br Simanungkalit, Halim, & Satria Alasi, 2025)	Waterfall	The system speeds up the data input and search process, makes it easier to monitor incoming and outgoing goods, and generates inventory reports more quickly and accurately.	Previous research has focused on the inventory of assets in the school environment and the monitoring of incoming and outgoing goods. This study focuses on the management of BMN used by employees with the integration of borrowing, repayment, asset mutation, RBAC, QR Code, and real-time monitoring.
Our research developed	Waterfall	The system integrates asset and employee data management, asset lending and returns, asset movements, RBAC, QR codes, real-time monitoring, and report preparation in one web-based platform.	The novelty of the study lies in the integration of various asset management functions of these employees in a single platform to support access security, asset traceability, transaction Accountability, monitoring, and decision-making of BMN management in KP2MI.

Based on Table 1, previous research has shown that web-based inventory information systems have been developed to support various processes, such as recording and searching asset data, procurement, maintenance, mutation, monitoring, and report preparation. Several studies have also implemented real-time monitoring and asset mutation. However, based on the features reported in previous studies, there has not been a simultaneous integration between asset and employee data management, lending and returning assets, asset mutations with approval mechanisms, Role-Based Access Control (RBAC), asset tracking using QR codes, and real-time monitoring in one platform. Therefore, the novelty of this study lies in the integration of these functions in a web-based employee asset inventory information system adapted to the process of managing state property (BMN) in the Ministry of protection of Indonesian Migrant Workers (KP2MI).

This study employs the Waterfall software development methodology, which consists of five sequential phases: requirements analysis, system design, implementation, testing, and maintenance. The Waterfall method was selected because it provides a structured and systematic development process that is suitable for information systems with well-defined requirements. The waterfall method was chosen because it has a coherent, clear and structured workflow. With these systematic stages, the process can be carried out in a directed manner to facilitate data collection, monitoring, reporting and providing information to support decision-making (Hariyanto, Edo, Nasution, Muhammad Irfan Sarif, & Muhammad Amin, 2025).

This study aims to build a web-based employee asset inventory information system that is able to improve efficiency, accurate data and transparency in asset management, especially assets used by employees, so that it can facilitate monitoring, reporting and support the decision-making process in asset management more effectively and integrated, and support the overall organizational performance.

RESEARCH METHODS

This research was carried out at Kementerian Pelindungan Pekerja Migran Indonesia (KP2MI) in the period March 2026 to August 2026. Data collection was carried out in March 2026 through observation, interviews, and literature studies to identify needs and problems in

managing employee asset inventory. The development of the system was carried out from April 2026 to July 2026 by following the stages of the Waterfall method. Furthermore, system testing was carried out in August 2026 using Black Box Testing to evaluate system functionality and the System Usability Scale (SUS) to evaluate the level of ease of use of the system.

The research is carried out through a series of stages that are systematically arranged so that the objectives can be achieved in accordance with the plan. Information System project development is carried out with reference to user needs so that the resulting solution is able to answer existing problems. The entire research process includes the stages of initiation, planning, implementation, monitoring and control until the closure of the project (Daisy Debora Grace Pangemanan, Yuni Ulfiyati, & Suyadi Suyadi, 2024). Each stage of the study is presented in Figure 1.

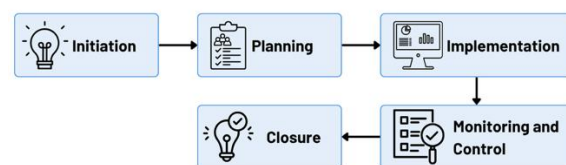


Figure 1. Stages Of Research

The following is a detailed description of each stage carried out in the study:

1. Initiation

This stage is carried out to identify problems, determine the purpose of system development and observe the ongoing asset inventory process at the Kementerian Pelindungan Pekerja Migran Indonesia.

2. Planning

The planning stage is carried out to draw up the steps of research and development of the system. This stage is carried out the preparation of research schedules, determination of hardware and software needs and planning of data needs and resources used in research. At this stage, the system design includes the creation of use case diagrams, activity diagrams, database design and interface design. Planning is done so that the system development process can run according to the target time and user needs.

3. Implementation

At this stage, the process of developing a web-based employee asset inventory information system is carried out. The method of system development used in this study is the waterfall method. The waterfall method is a software

development method that is carried out in stages and sequentially starting from needs analysis to system maintenance (Jahang, Atik Nurmasani, Fauzy, & Laksono, 2025). The selection of waterfall method is based on the characteristics of system development that requires a structured workflow, well documented and in accordance with the needs of the system that has been determined since the beginning of the study (Hariyanto, Edo, Nasution, Muhammad Irfan Sarif, et al., 2025) (Tampubolon & Hidayat, 2023) (A. C. Mustani & Suhartini, 2024). The stages of system development using the waterfall method in this study are:

- a) System needs analysis: collecting data through observation, interviews and documents to obtain information about the needs of the system to be developed. The results of the needs analysis phase are in the form of system requirements specifications which include asset data management, employee data, asset lending and returns, asset mutations, asset inventory reports, data security, ease of system users and web-based system access.
- b) System Design : perform the preparation of a system design that includes database design (database), interface design (user interface) and system modeling using the Unified Modeling Language (UML). System modeling used includes use case diagrams and activity diagrams to describe the process flow and the relationship between users and the system. The result of this stage is a system design document that is used as a reference in the implementation process.
- c) System implementation: the process of implementing the results of the system design into the form of web-based applications. At this stage, the coding process is carried out using the PHP programming language and MySQL database. The implementation process is carried out by building system features according to user needs, such as asset data management, employee data, borrowing and returning assets, asset mutations, inventory reports and managing system user access rights. All of these modules are developed based on the design that has been made in the previous stage.
- d) System testing: the testing phase is carried out to ensure that the system that has been developed can run according to user needs and expected functions. System testing in this study used the method of black box testing and System Usability Scale (SUS). Black box testing is carried out by testing each system feature based on the input (input) and output (output) produced

without looking at the program code structure (Christin, Wahyuningsih, & Mahendrasusila, 2024). System usability scale testing is carried out by providing a questionnaire containing 10 standard statements to users after they try a system (Alam & Puji Rahayu Kurniasih, 2024). This stage aims to determine whether there is an error or mismatch of system functions so that improvements can be made before the system is applied.

- e) System Maintenance: the maintenance stage is the final stage in the waterfall method which is carried out after the system has been developed and used by the user. At this stage, improvements are made to system errors found during use, adjustments to New needs so that the system can run optimally and sustainably.

4. Monitoring and Control

This stage is carried out to ensure that the system development process runs in accordance with predetermined planning, and supervision of the system development process. The results of this stage are used as evaluation and improvement materials so that the system can run properly and according to the research objectives.

5. Closure

The closing stage is the final stage of research and development of the system which consists of the completion of the entire research process, preparation of reports on research results, as well as documentation of the system that has been developed. In addition, the results of the web-based employee asset inventory information system were also submitted to relevant parties within the Kementerian Pelindungan Pekerja Migran Indonesia Protection. The closing stage is carried out as a final form that the system has been developed and is ready to be used to support more effective and integrated asset management. The closing stage marks that the project has been completed and approved by the relevant parties (Erdiansyah & Samidi, 2025).

RESULTS AND DISCUSSION

System Requirements Analysis

The results of the analysis of system needs are grouped into two categories, namely functional needs and nonfunctional needs.

1. Functional needs: describe the functions that must be able to be run by the system, including the following:

- a) The system should be able to centrally manage asset master data and employee data.
 - b) The system must be able to process asset loan applications by employees along with the flow of verification and approval by asset officers.
 - c) The system must be able to record the return of assets complete with conditions and photo documentation as proof of handover.
 - d) The system must be able to process the application for mutation (transfer) of assets between locations/work units along with the flow of approval by the leadership.
 - e) The system should be able to generate asset inventory reports automatically in printable PDF format as well as print QR code assets.
 - f) The system must provide role-Based user access rights management (Role-Based Access Control) that can be configured menu and access for each role (Admin, leader, asset Officer, Employee).
 - g) The system shall provide a dashboard monitoring the condition and status of assets in real time.
2. Non-functional needs: defines the system quality criteria that must be met, including the following:
- a) Reliability the system must be able to operate stably without interruption during operating hours.
 - b) Security the system must be equipped with a secure user authentication and authorization mechanism using password encryption.
 - c) Ease of use the system interface should be intuitive and easy to understand by users from different backgrounds.
 - d) System performance must be able to respond to each user request in a short time (under three seconds).
 - e) The scalability of the system must be able to accommodate the continuous addition of asset and user data.

System Planning

At the design stage of the system is done the preparation of models and system design which includes UML diagram making, database design and user interface design (user interface). System modeling using Unified Modeling Language (UML) consisting of use case diagrams and activity diagrams to visually describe the process flow and relationships between system components (Harlina, Susilowati, Suharni, Herawati, & Atsiilah, 2025).

Use case diagrams are used to visually illustrate the relationship between actors and the functions provided by the system. There are four main actors in the kp2mi employee asset inventory information system, namely admins, leaders, asset officers and employees according to The Role-Based Access Control (RBAC) scheme applied to the system. Each actor has different access rights and roles in the system. Figure 2 is an admin use case diagram.



Figure 2. Use Case Diagram Admin

Admin has access to all system features, including: login, asset data management, user data management, employee data management, role management and access rights, Loan Management, return management, asset mutation management, asset monitoring, report printing and logout. Admin is responsible for the overall configuration and management of the system.

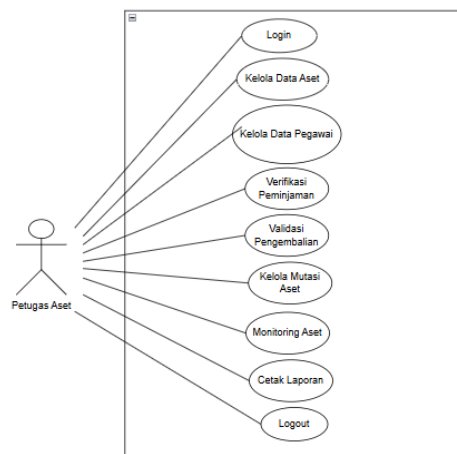


Figure 3. Use Case Asset Officer Diagram

Use case explanation asset officer diagram based on Figure 3, asset officers have access to key

operational features, namely: login, asset data management, employee data management, asset loan verification, asset return validation, asset mutation management, asset monitoring, print reports and logout. The asset officer is responsible for the daily operations of asset management.

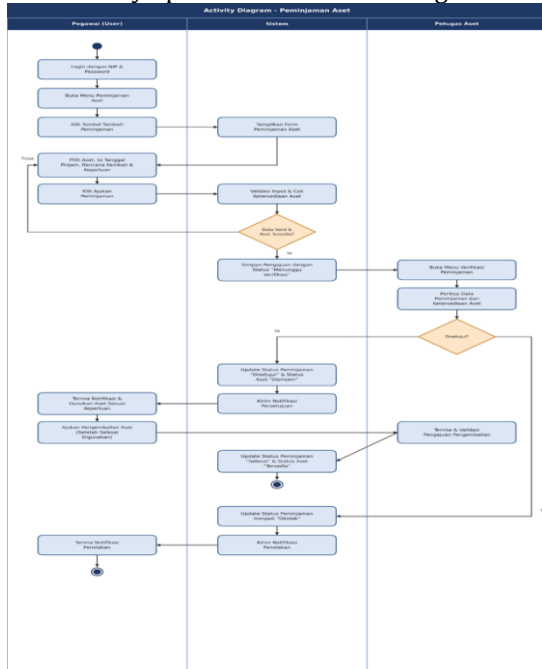


Figure 4. Asset Lending Activity Diagram

The asset lending activity diagram presented in Figure 4, represents the flow of the application process until the approval of asset lending by employees. The process begins when the employee logs in using NIP and password, then opens the asset lending menu and clicks the add lending button. The user selects the asset to be borrowed and fills in the borrowing date, return date plan and borrowing needs. The system validates the input and checks the availability of assets, then saves the submission with the status of waiting for verification. Next, the asset officer opens the loan verification menu, checks the loan and asset data, then approves or rejects the application. When approved, the system automatically updates the status of the loan to be approved and the status of the asset to be borrowed, and sends notifications to employees. After the asset is used and returned according to the planned date, the employee makes a return submission which is then accepted and validated by the asset officer, so that the borrowing status changes to complete and the asset status again becomes available.

The database design is done to define the data storage structure (Ega Seladevi, Desi

Ramadani Putri, & Agung Wibowo, 2025) that will be used by the asset inventory system. With a good design, databases can maintain consistency, improve security and support the availability of information needed by organizations (Rafianto & Voutama, 2025). KP2MI employee asset inventory Information System database is designed using MySQL/MariaDB database management system with attention to data Normalization Principles to avoid redundancy and ensure data integrity. The database is presented in Figure 5.

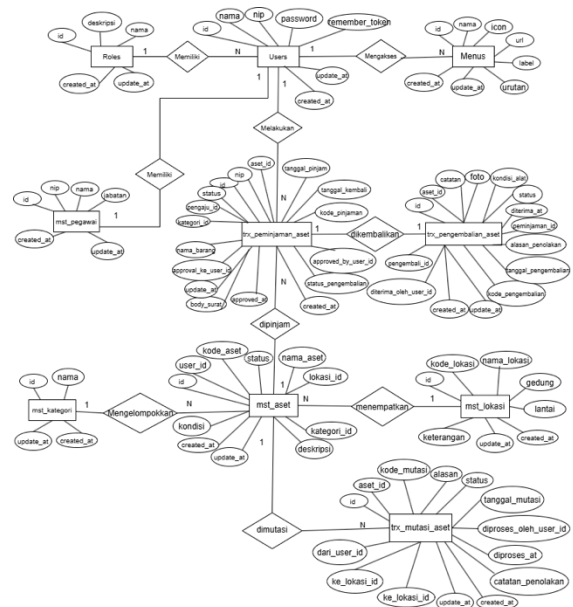


Figure 5. Entity Relationship Diagram (ERD)

User Interface Design

The design of the system interface prioritizes the principle of ease of use, so that all users can operate the system easily without requiring lengthy training. The system is designed with a responsive web-based display so that it can be accessed through various devices, both desktop computers and mobile devices.

Figure 6 shows the login page. On this page displays the nip and password input fields along with the login button and the agency logo to be able to enter the website.

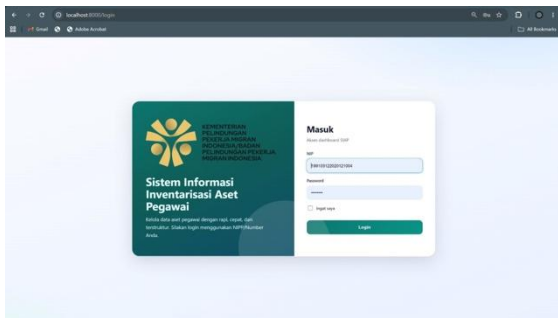


Figure 6. Login Page

The dashboard page displays a summary of the main information in the form of total assets, total assets borrowed, assets in good condition and the number of mutations in the process in the form of statistical cards and graphs presented in Figure 7.

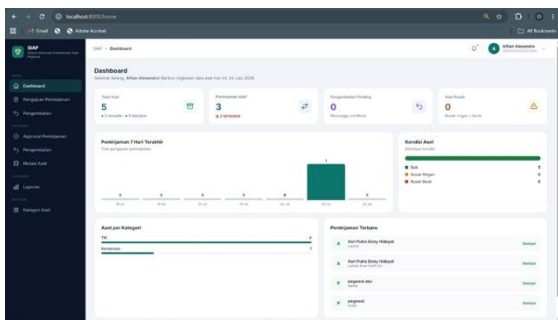


Figure 7. Dashboard Page

Figure 8 is an asset loan page that displays a list of asset loan applications and their verification status, complete with a loan application form and a verification menu for asset officers.

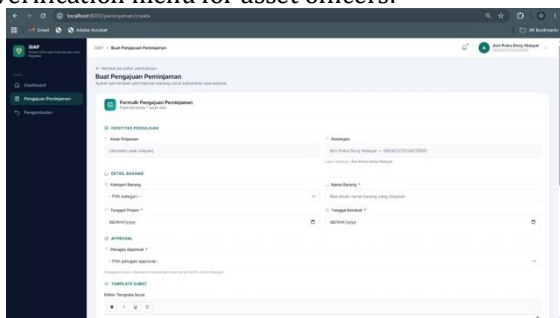


Figure 8. Asset Landing Page

System Testing with Black Box Testing

Testing focuses on verifying the functionality of the system based on the given inputs and the resulting outputs without regard to the internal structure or code of the program. This

method is chosen because it is able to verify the suitability of the system behavior with the specifications of the functional requirements that have been set. Testing is carried out on all modules and key features of the system that has been developed.

Table 2. Blackbox Testing Results

Test Code	Fitur e	Test Scenario	Expected results	Status
F-01	Login	Masukkan nama pengguna & kata sandi yang valid	Sistem masuk ke halaman dashboard	Successful
F-02	Login	Enter the wrong username or password	Credential error message appears	Successful
F-03	Asset Master Data	Add new asset data with complete data	Asset Data stored to the database	Successful
F-04	Asset Master Data	Add asset data with field must be empty	Validation error, data not saved	Successful
F-05	Employee Data	Complete new employee data Input	Employee Data stored in the database	Successful
F-06	Asset Lending	Filing of new asset loans by employees	Loan Data is stored with the status "Menunggu Verifikasi"	Successful
F-07	Asset Mutation	Submission of asset mutation between work units	Mutation Data recorded, asset location updated	Successful
F-08	Report	Print a specific period inventory report	Report displayed and successfully downloaded (pdf)	Successful
F-09	User Management	Add new user	New user saved and can login	Successful
F-10	Logout	Click the logout from System button	Session ended, return to the login page	Successful
F-11	Return On Assets	The officer receives and validates the return of assets	The return Status becomes "Diterima " and the return	Successful

Test Code	Future	Test Scenario	Expected results	Status
			asset status "Tersedia"	

Based on the results of the black box testing presented in Table 2, it can be concluded that all test scenarios conducted on the main features of the system managed to give results in accordance with the expectations that have been set. No functional errors were found in any of the features tested. Thus, the system is declared to have met all the established functional needs and is worthy of submission to the user.

Testing systems with the System Usability Scale (SUS)

In addition to testing using black box testing, usability testing is also carried out to measure the level of ease of use of the system from the point of view of the end user. Usability testing is

done by testing the application directly to prospective users who will be involved in the operation of the system, namely admins, asset management officers and employees.

The test was conducted by five testers representing each user role of the system, consisting of 1 admin, 2 Asset Management officers, and 2 employees in the KP2MI Secretariat General Work unit. The test was conducted by asking each respondent to try to run the main usage scenarios of the system (login, asset loan application, asset return, asset mutation and report generation), then filling out a questionnaire consisting of 10 statements with a rating scale of 1-5.

Table 3 is a recapitulation of questionnaire answers given by respondents, and Table 4 is a conversion of contribution scores and calculation of SUS scores based on respondents.

Table 3. Recapitulation of SUS questionnaire answers per respondent

Respondent	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
R1	5	1	5	2	5	2	5	2	5	4
R2	5	1	4	2	5	2	4	2	4	3
R3	5	1	5	2	4	2	5	3	5	3
R4	5	2	4	2	4	2	4	2	4	2
R5	5	1	5	1	4	2	5	1	4	4

Table 4. Conversion of contribution score and calculation of SUS score

Respondent	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Total	Skor SUS
R1	4	4	4	3	4	3	4	3	4	1	34	85.0
R2	4	4	3	3	4	3	3	3	3	2	32	80.0
R3	4	4	4	3	3	3	4	2	4	2	33	82.5
R4	4	3	3	3	3	3	3	3	3	3	31	77.5
R5	4	4	4	4	3	3	4	4	3	1	34	85.0

$$\begin{aligned} \text{Average SUS} &= \frac{85,0 + 80,0 + 82,5 + 77,5 + 85,0}{5} \\ &= \frac{410}{5} = 82,0 \end{aligned}$$

The results of the calculation of SUS with an average score of 82.0 are in the range of 80.3-100 which includes the category of Excellent rating, with grade A, and the level of acceptance/acceptability in Acceptable, so that the system developed is declared to have a very good level of usability from the user's point of view.

Project Closure

The closing stage of the project is the final stage of the project management cycle development of web-based employee asset inventory

information system on KP2MI. At this stage, a series of formal activities are carried out that mark the end of the implementation of the project. The submission of the results of the web-based employee asset inventory information system to KP2MI was officially carried out accompanied by a demonstration of the system (demo system) in the presence of asset managers and representatives from related units.

In the process of handing over the system, a short training is conducted to prospective users of the system including admins, asset management officers and employees so that they can operate the system properly and correctly. The training includes an explanation of the system workflow, how to use each key feature as well as basic

troubleshooting procedures that may be encountered during system use.

CONCLUSIONS AND SUGGESTIONS

Conclusion

Based on the results of design, implementation, and evaluation, this study successfully developed a web-based employee asset inventory information system at the Kementerian Pelindungan Pekerja Migran Indonesia (KP2MI). The system developed is able to integrate asset data management, employee data, lending, returns, asset movements, and report presentation in one centralized platform. The implementation of this system provides ease in asset inventory management through improving the efficiency of administrative processes, data accuracy, transparency, and accountability of State Property Management (BMN).

The results of the evaluation showed that the system has met the established functional requirements. Testing using Black Box Testing obtained a 100% success rate, that is, all 11 test scenarios were successfully executed in accordance with System Specifications. In addition, the system Usability Scale (SUS) test resulted in a score of 82, which is included in the Excellent category with Grade A, thus indicating that the system has a very good level of ease of Use and can be accepted by users.

The main contribution of this research lies in the integration of Role-Based Access Control (RBAC), asset tracking, lending and asset return workflow, asset mutation approval mechanism, and real-time monitoring dashboard in one web-based information system. This integration can improve data security, asset traceability, operational efficiency, and support decision making in managing employee asset inventory in KP2MI.

Suggestion

Some suggestions for the development of an employee asset inventory information system are then expected to establish clear policies and standard operating procedures related to the use of the system. Including loan approval mechanisms and asset mutations as well as regular training to all users (admins, managers, asset officers and users/employees) so that the system can be used optimally and sustainably. Adding automatic notification features (reminders of asset return due dates and pending approvals), automatic data backup mechanisms, strengthening security such as two-factor authentication (2FA) and integration

with the Sistem Pengelolaan Barang Milik Negara dari Kementerian Keuangan (SAKTI/SIMAN) in the government environment to support integrated asset reporting. As well as adding a predictive asset needs analysis module, integration with the agency's financial system for monitoring the realization of the budget plan directly and the implementation of a car-based version of the application so that the system can be accessed more flexibly by employees in the field.

REFERENCES

- Alam, R. G., & Puji Rahayu Kurniasih. (2024). Penggunaan Metode System Usability Scale (Sus) Pada Aplikasi Simamurat. *JSAI (Journal Scientific and Applied Informatics)*, 7(2), 189–197.
<https://doi.org/10.36085/jsai.v7i2.6209>
- Christin, E. Y., Wahyuningsih, Y., & Mahendrasusila, F. (2024). Penerapan Model Waterfall pada Perancangan Corporate Web. 10(1), 40–50.
- Daisy Debora Grace Pangemanan, Yuni Ulfiyati, & Suyadi Suyadi. (2024). *Pengantar Manajemen Proyek*. Sumatera Barat: Yayasan Tri Edukasi Ilmiah. Retrieved from https://books.google.co.id/books?id=ozcYEQAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false
- Devia, E., & Anjaswara, D. (2025). *Pengembangan Sistem Informasi Administrasi Nonakademik Pada Program Studi Berbasis Web*. 5, 1–11.
- Ega Seladevi, Desi Ramadani Putri, & Agung Wibowo. (2025). Model Penelitian Basis Data untuk Sistem Informasi Skala Besar. *Jurnal Informatika Dan Kesehatan*, 2(2), 99–107.
<https://doi.org/10.35473/ikn.v2i2.3804>
- Erdiansyah, D., & Samidi. (2025). Penerapan Project Management Pada Proyek Sistem Penjualan Motor Berbasis Geografik. 18(3), 208–217.
- Erianto Tampubolon, A., & Hidayat, F. (2023). Perancangan Sistem Informasi Inventarisasi Aset Berbasis Web Menggunakan Metode Waterfall. *Zona Komputer*, 3, 1.
- Faizal, L., & Irfan. (2025). Perancangan Sistem Informasi Manajemen Aset Kampus Berbasis Web Menggunakan Metode Waterfall. *Jurnal Ilmiah Sistem Informasi Dan Teknik Informatika (JISTI)*, 8(2), 208–216.
- Firmansyah, D., & Ernawati, S. (2023). Rancang Bangun Sistem Informasi Manajemen Arsip Kerja Sama Pada PT. Kelola Teknologi Informasi. *BIOS : Jurnal Teknologi Informasi Dan Rekayasa Komputer*, 4(2), 54–64.
<https://doi.org/10.37148/bios.v5i2.79>



- Fransiska Br Simanungkalit, E., Halim, M., & Satria Alasi, T. (2025). Sistem Informasi Pencatatan Inventaris Berbasis Web Pada Sekolah SMA Swasta Yapim Taruna Stabat Menggunakan Metode Waterfall. *Jurnal TIMES (Technology Informatics & Computer System)*, XIV(2), 9–13. Retrieved from <http://ejournal.stmik-time.ac.id>
- Hariyanto, E., Edo, E., Nasution, D., & Muhammad Irfan Sarif. (2025). Rancang Bangun Sistem Informasi Aset Berbasis Web Menggunakan Metode Waterfall Pada Ditjen Hubla Sumatera Utara. *Jurnal Komputer Teknologi Informasi Sistem Informasi (JUKTISI)*, 4(2), 1477–1484. <https://doi.org/10.62712/juktisi.v4i2.705>
- Hariyanto, E., Edo, E., Nasution, D., Muhammad Irfan Sarif, & Muhammad Amin. (2025). Rancang Bangun Sistem Informasi Aset Berbasis Web Menggunakan Metode Waterfall Pada Ditjen Hubla Sumatera Utara. *Jurnal Komputer Teknologi Informasi Sistem Informasi (JUKTISI)*, 4(2), 1477–1484. <https://doi.org/10.62712/juktisi.v4i2.705>
- Harlina, M. S., Susilowati, E., Suharni, S., Herawati, M. S., & Atsillah, M. F. (2025). Pemodelan Sistem Rancangan Website Toko Umami Cookies Menggunakan Uml (Unified Modelling Language). *Jurnal Teknologi Dan Sistem Informasi Bisnis*, 7(3), 364–371. <https://doi.org/10.47233/jteksis.v7i3.1943>
- Jahang, Y. S., Atik Nurmasani, Fauzy, M. N., & Laksono, A. C. (2025). Penerapan Metode Waterfall Pada Pengembangan Sistem Informasi Pemesanan Paket Dekorasi. *Information System Journal*, 8(02), 129–136. <https://doi.org/10.24076/infosjournal.2025.v8i02.2430>
- Mustani, A. C., & Suhartini. (2024). *Rancang Bangun Sistem Informasi Pencatatan Barang Inventaris Berbasis Web Pada MTS AL-ROZI*. 13(September).
- Mustani, M., Cristian, A., & Suhartini, S. (2024). Rancang Bangun Sistem Informasi Pencatatan Barang Inventaris Berbasis Web Pada MTS AL-ROZI. *Jurnal Minfo Polgan*, 13(2), 1524–1529. <https://doi.org/10.33395/jmp.v13i2.14105>
- No, V., Rapel, D. A., Saputra, Z. R., Kusuma, L. I., & No, V. (2026). Implementasi Sistem Informasi Manajemen Aset Inventaris Alat Kerja Karyawan Pustekinfo DPR RI Berbasis Web. *Jurnal Informatika Dan Teknologi*, 9(1).
- Oktaviana Ina Palang, Ferdinandus Lidang Witi, & Benediktus Yoseph Bhae. (2025). Sistem Informasi Manajemen Aset Berbasis Web Di Badan Kesbangpol Ende Kabupaten Ende. *SATESI: Jurnal Sains Teknologi Dan Sistem Informasi*, 5(2), 206–211. <https://doi.org/10.54259/satesi.v5i2.5948>
- Rafianto, G., & Voutama, A. (2025). Implementasi Basis Data Terstruktur Dengan Pencegahan Sql Injection Pada Sistem Manajemen Penjualan. *Jurnal Informatika Dan Teknik Elektro Terapan*, 13(2). <https://doi.org/10.23960/jitet.v13i2.6354>
- Ramadhani, J., Yolanda, D., Rezeky, S., & Ernawati, S. (2025). Penerapan Teknologi Geofencing dalam Sistem Informasi Presensi Berbasis Website Pada Dinas Pendidikan Angkatan Laut. *Jurnal Teknik Informatika Unika ST. Thomas (JTIUST)*, 10(1), 118–128.
- Suprianto, B. (2023). Literature Review: Penerapan Teknologi Informasi dalam Meningkatkan Kualitas Pelayanan Publik. *Jurnal Pemerintahan Dan Politik Volume 8 No. 2 Mei 2023*, 8(2), 123–128.
- Syaipudin, P. B. (2024). Sistem Informasi Inventarisasi Barang Pada SMA Negeri 12 Kota Jambi. *Manajemen Sistem Informasi*, 9(1), 140–152.
- Syaputra, R., & Susanti, S. (2025). Sistem Informasi Manajemen Aset Berbasis Web Untuk Optimalisasi Pencatatan Aset Smk Negeri 8 Bandung. *JATI (Jurnal Mahasiswa Teknik Informatika)*, 9(6), 9254–9261. <https://doi.org/10.36040/jati.v9i6.15571>
- Tampubolon, A. E., & Hidayat, F. (2023). *PERANCANGAN SISTEM INFORMASI INVENTARISASI ASET*. 3(Desember).
- Tarigan, S., Batubara, S., Komputer, S., Sains, F., Teknologi, D., Pembangunan, U., & Budi, P. (2024). Rancang Bangun Sistem Informasi Manajemen Asset Berbasis Web Dengan Metode Waterfall. *Jurnal Nasional Teknologi Komputer*, 4(2), 92–99.