

Asset Management Information System in Private Islamic College Environment

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ABSTRACT: *Asset management requires a special method for its implementation so that the management information system can run optimally. The goal is for the system to be developed in the form of web-based software in an effort to optimize asset tracking at private Islamic religious colleges. The Analytical Hierarchy Process (AHP) offers an alternative priority scale that will facilitate the decision-making process. This study will use a qualitative approach with the Research and Development (R&D) method as a strategic step. The research object was conducted in two places, namely Hasyim Asy'ari University and the Bani Fattah Islamic Institute, Jombang. The results of the study show that both universities currently still rely on a manual system using Excel which is inadequate in terms of classification and automation. Hasyim Asy'ari University has a more structured approach to asset classification, while the Bani Fattah Islamic Institute, Jombang has not implemented systematic asset categorization. The four main stages in asset management are planning, organizing, implementing, and evaluating. Both universities face challenges in organizing and implementing asset management because there is no special information system. In addition, the evaluation process is carried out manually through periodic inventory checks, thus limiting efficiency in decision-making. This study proposes the development of a structured web-based asset management system with a clear framework for system design, implementation, and testing. The integration of Waterfall and AHP methodologies is expected to improve efficiency, data organization, and decision-making in asset management. This study contributes to this field by offering a strategic approach to move from a manual asset management system to an automated asset management system, which ensures better resource utilization and administrative efficiency.*

Manajemen aset dalam pelaksanaannya diperlukan suatu metode khusus agar sistem informasi manajemen dapat berjalan secara optimal. Tujuannya adalah sistem akan dikembangkan dalam bentuk perangkat lunak berbasis web sebagai salah satu upaya untuk mengoptimalkan pelacakan aset pada Perguruan Tinggi Keagamaan Islam Swasta. *Analytical Hierarchy Process (AHP)* menawarkan suatu alternatif skala prioritas yang akan memudahkan dalam proses pengambilan keputusan. Penelitian ini akan menggunakan

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pendekatan kualitatif dengan metode *Research and Development (R&D)* sebagai langkah strategis. Objek penelitian dilakukan di dua tempat yaitu Universitas Hasyim Asy'ari dan Institut Agama Islam Bani Fattah Jombang. Hasil penelitian menunjukkan bahwa kedua perguruan tinggi tersebut saat ini masih mengandalkan sistem manual menggunakan Excel yang kurang memadai dalam hal klasifikasi dan otomatisasi. Universitas Hasyim Asy'ari memiliki pendekatan yang lebih terstruktur dalam klasifikasi aset, sedangkan Institut Agama Islam Bani Fattah Jombang belum menerapkan kategorisasi aset secara sistematis. Empat tahapan utama dalam pengelolaan aset: perencanaan, pengorganisasian, pelaksanaan, dan evaluasi. Kedua perguruan tinggi tersebut menghadapi tantangan dalam pengorganisasian dan pelaksanaan pengelolaan aset karena belum adanya sistem informasi yang khusus. Selain itu, proses evaluasi dilakukan secara manual melalui pengecekan inventaris secara berkala, sehingga membatasi efisiensi dalam pengambilan keputusan. Penelitian ini mengusulkan pengembangan sistem pengelolaan aset berbasis web yang terstruktur dengan kerangka kerja perancangan, implementasi, dan pengujian sistem yang jelas. Integrasi metodologi *Waterfall* dan AHP diharapkan dapat meningkatkan efisiensi, pengorganisasian data, dan pengambilan keputusan dalam pengelolaan aset. Penelitian ini memberikan kontribusi pada bidang ini dengan menawarkan pendekatan strategis untuk beralih dari sistem pengelolaan aset manual ke sistem pengelolaan aset otomatis, yang memastikan pemanfaatan sumber daya dan efisiensi administrasi yang lebih baik.

Keywords: *Information System, Asset Management, Analytic Hierarchy Process (AHP).*

Received: November 3, 2024; Revised: February 4, 2025; Accepted: March 29, 2025

I. INTRODUCTION

Based on Minister of Home Affairs Regulation (*Permendagri*) No. 17/2017, asset management is used within the government, schools, and universities. An asset management information system is needed to manage, maintain, use, and study rooms related to the condition of these assets. In the legislation, assets can consist of inventories of land, buildings, networks, and office equipment (Khraim, 2025). However, asset management has not been implemented optimally, so a policy is needed as a reference that can regulate the environment of private Islamic religious universities, especially in the Jombang district.

The information system needed can be in the form of data and information about assets. To improve the effectiveness and efficiency of a need in an institution to manage and identify assets that are not only in the form of goods purchased and then deposited or outgoing costs, not only can they be calculated or written in a ledger regarding data collection of assets owned. A well-managed system will minimise the occurrence of theft because data entry is carried out systematically and controlled and can be accounted for by asset managers through a clear software system (Babrdel et al., 2025; Rainer, 2013).

Higher education is a large institution that does not rule out the possibility of having a complex business system, especially private universities, most of which are financed

independently by the institution. Therefore, it must have many assets (Pambudi et al., 2017). Assets are a supporting tool for achieving the goals of the institution. Among the typology of assets are current assets, long-term investments, reserve funds, and other assets (Murdiaty et al., 2021). Assets can also be in the form of movable and immovable goods in an organisation, so they need management, identification, management, and maintenance so that they can function optimally (Surachman, 2024).

Inventory, legal audit, valuation, optimisation, supervision, and control of assets are stages in asset management that are necessary to manage assets that become property rights. In each step that has been detailed in asset management, if it can be implemented effectively, it will provide benefits for institutions, especially universities. Effectiveness and efficiency, as well as transparency, accountability, and accountability in asset management, are principles that must be built and publicised in every unit in charge of managing the institution's assets (Holovchuk et al., 2025).

Management functions include four stages, namely planning, organising, actuating, and controlling. Assets also require a management process so that they can be managed optimally. The first management stage is planning, and in asset management, the planning stage also takes precedence so that it has a function to ensure that management activities can be systematised. The second stage is organising; the organising process is carried out so that the process of grouping assets is more organised. In the third stage, namely, implementation, when assets have been classified based on their types and needs, an implementation process is needed to implement the asset management information system used in the institution. The last step is supervision, in supervising the use of funds and the use of assets both in the form of property and others, it can be ascertained that in discussions related to asset management problems, the best solution must be immediately given in decision-making. For this reason, so that all stages can run optimally, the principles of effectiveness and efficiency in management are needed to consider economic stability in the preparation of the asset management system itself (Suseno et al., 2021).

One of the strategies in the development of higher education is through asset management. Because the effectiveness and efficiency of asset management can increase the self-sufficiency of the university, the complexity of issues related to asset management can be overcome with a computerised system through a computer and web-based asset management information system so that it can be operational support in the agency concerned (Rainer, 2013). A system that interacts with each other and synergises well will form a comprehensive integration so that it can create the goals of the organisation that have been set (Belanger & Slyke, 2012). One system that can be implemented to support the needs related to asset management is a web-based asset management information system. This information system will be able to provide various needs related to quality data management, and it will be systematic and accessible to the entire academic community effectively and efficiently (Sari et al., 2024). Islamic universities in the Jombang district, namely Hasyim Asy'ari University and Bani Fattah Islamic Institute of Religion, still use Microsoft Excel to manage their asset data. This activity can increase the risk of recording errors in asset data, and the process of classifying and inventorying asset data is less effective and efficient. In addition, there is no calculation of asset preparation, causing the length of the latest asset data management. This causes the recommendation process for the procurement of future goods to be less than optimal.

Prioritizations in the procurement of goods are very important in decision-making. This is because the allocation of funds for procurement and recommendations for the purchase of goods cannot be fulfilled as a whole, requiring leaders to set a priority scale. For this reason, the procurement system can use the Generalized Data Envelopment Analytical Hierarchy Process (AHP) method. The AHP method can help the effectiveness and efficiency of decision-making because it is done in an organised and systematic manner, which can provide the best solution and ensure that the decision-making is right on target (Winanti et al., 2024). Decision-making accuracy is also very important, considering that the general problem decomposition is the solution to the problem. So, the formulation of influencing factors in the decision-making process cannot be ignored. The AHP method is an alternative problem-solving solution related to the classification of problems and priority scales for asset procurement to obtain targeted decision-making. Asset management information systems have a significant role in determining the effectiveness and efficiency of asset management performance (Gelgör & Can, 2025).

Asset Management in institutions is an important element that cannot be abandoned as in Pratiwi et al. (2021) research which states that the supporting factors for the use of financial Regional Management Information System (*Sistem Informasi Manajemen Daerah/SIMDA*) at the Regional Financial and Asset Management Agency of Donggalau Regency include employees in SIMDA special training or training held by BPKP as well as through more specific discussions regarding SIMDA operations, good response from implementors, and the existence of an administrator team as supervisors as well as employees. Suhendar et al. (2022) revealed that the design of this GIS-based asset management system uses a waterfall model approach with five stages, namely: 1) Analysis, 2) Design, 3) Implementation, 4) Integration Testing, and 5) Maintenance. This asset management application is built with web-based technology using the Leaflet framework, which supports the Web Map Service (WMS) layer, GeoJSON data, and vector and tile layers. In contrast, the database in this application uses MySQL.

In her research, Mulyati et al. (2017) stated that with the development of sophisticated information technology, currently Widuri, which is one of the websites at Raharja University, has not implemented a dashboard on the website, making it difficult for Widuri admins to recap Widuri puppet performance reports. So, it is necessary to implement a Widuri writing reporting dashboard on the Widuri Website using Mediawiki, which can accommodate and process data to be used as the information needed. The research conducted by Effendy et al. (2022) aims to design and implement a web-based IT asset management information system at PT Thamrin Telekomunikasi Network. Likewise Nurfi et al. (2024) results of her research show that the Regional Asset Management Information System Application is still not optimal in its use because there are still menus that do not exist or cannot be used, such as the minute's menu and the item deletion menu, this needs to be considered so that the financial report processing process can run smoothly, effectively and efficiently. By offering a new perspective on how the Regional Asset Management Information System Application is used, this research adds knowledge to the field of accounting information systems.

Previous research related to asset management shows that asset management is very important, especially in institutions. It is undeniable that higher education institutions must also take this role. This research is novel in terms of the concepts offered regarding

asset management. For this reason, this theme is interesting for further and in-depth studies.

Departing from the problems presented above, an asset management information system will be developed in the form of web-based software in an effort to optimise asset tracking in private Islamic religious universities in Jombang Regency. The total number of Private Islamic Religious College (*Perguruan Tinggi Keagamaan Islam Swasta/PTKIS*) in Jombang Regency is seven institutions; the author focuses the research on two universities, namely Hasyim Asy'ari University Jombang and Institute Agama Islam Bani Fattah Tambak Beras Jombang. The development of the two universities in terms of maintaining their existence is quite significant compared to other private Islamic universities in Jombang. The author uses the AHP method as a strategic step in developing an asset management information system.

According to Adawiyah & Jatmiko (2024), information systems play an important role in organisational decision-making. Private Islamic colleges can use Asset Management Information System (AMIS) to track the status of assets, which helps in planning and resource allocation. Effective asset management is key to the sustainability of an organisation. AMIS enables strategic asset management, ensuring that assets support educational and operational objectives. Previous research supports the implementation of AMIS in higher education: The study by Sari et al. (2024) shows that the use of digital-based information systems has a significant influence on the efficiency of education administration. The system enables the integration of information technology, automation of administrative tasks and integrated management of data from various sources, which in turn supports better decision-making. SIM is also equipped with strong security policies and sensitive data protection mechanisms. Research by Apriyanti et al. (2024) shows that the Asset Management Information System is designed to build a system that can help the Building Management section manage all assets owned. It can help the Building Management section in carrying out asset write-offs to be more accurate and efficient.

II. METHOD

This research uses a research method with a type of development. The development carried out is based on the waterfall method (Mirashk et al., 2025). The waterfall method is a waterfall method that provides a sequential or sequential software lifecycle approach starting from needs analysis, design, coding, testing, implementation, and maintenance (Saputra & Nugraha, 2020). The waterfall method is a waterfall method that provides a sequential or sequential software lifecycle approach starting from needs analysis, design, coding, testing, implementation, and maintenance (Goa et al., 2022). Researchers chose this model because it is quite effective to use as a system development model. After all, the steps are easy to implement and focus on good documentation. The Waterfall method is used in the development of a web-based asset management information system. The stages in the waterfall method are needs analysis, definition, system design, implementation, unit testing, system integration and testing, operation, and repair. To make it easier, the author presents it in the form of a picture below (Fathah, 2021):

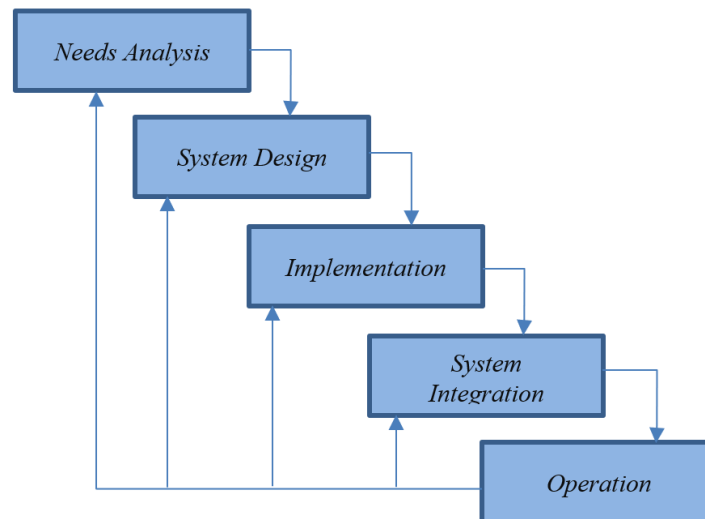


Figure 1. Stages of the waterfall method

III. RESULT AND DISCUSSION

The development of an asset management information system begins with a system needs analysis. This analysis is needed so that the development process is right on target and functions well as an asset management information system for Hasyim Asy'ari University Jombang and Bani Fattah Islamic Institute Jombang. Minimum requirements that must exist according to the results of observations and interviews are as follows: Information systems can be used to process asset data from college, the information system can be used to display data asset statistics, the information system can be used to process asset data enter, the information system can be used to process asset data out, the information system can be used to print reports report on asset data, and the information system can be used to process data asset employee data.

Asset Management Information System at Hasyim Asy'ari University Jombang

Asset is an item that must be documented because it involves the property/wealth of an institution. Because it is wealth, it needs to be documented systematically and structured. For this reason, proper management is required for the documentation process. In managing assets at Hasyim Asy'ari University, they still use the old method, namely the Excel application. The following is an example of inventory recording data in the form of item requests.

Table 1. Item request status data

No	Request Number	Request Date	Applicant	Name of Goods	Amount	Information	SPV	Manager
1.	2022-07-2001002	2022-07-20	Mahmudi	Printers	1	Broken need new	ACC	ACC
2.	2022-07-2001001	2022-07-20	Syan	Laptops	1	For new employees	ACC	Reject
3.	2022-07-1900005	2022-07-19	Dwi	Monitors	1	For new employees	ACC	ACC
4.	2022-07-1900004	2022-07-19	Surahmad	LCD	2	Broken need new	ACC	ACC
5.	2022-07-1900003	2022-07-19	Dendy	Projector	1	Broken	ACC	ACC

6.	2022-07-1900002	2022-07-19	Lista	Camera	2	New	Reject	
7.	2022-07-1900001	2022-07-19	Jaya	Keyboards	2	New	ACC	Reject
8.	2022-07-1900000	2022-07-19	Fuad	Mouse	3	Replace the broken one	ACC	ACC

The implementation of the Management Information System at Hasyim Asy'ari University to improve the quality of asset management has shown different results. From the results of research involving informants who have answered several research questions that the researchers asked from the variable asset management information system, several indicators were found based on the theory of Davis (2009), including information, humans as information processors, system concepts, decision-making concepts and information value. Gumbara & Abdillah (2024) includes information, humans as information processors, system concepts, decision-making concepts and information value. From these various indicators, the following authors describe in detail:

1. Information

Based on the results of research conducted by researchers related to the management information system, information is the result of data processing, but not all the results of data processing can be information. The results of data processing have no meaning and are not useful for informants, which is not information. In general, informants admit that the management information system at Hasyim Asy'ari University is well under the control of the Head of Administration, specifically in the field of asset management.

Due to the fact that the implementation of the asset management information system is still offline and manual, the researcher feels that this activity is less effective and efficient. As Davis (2009) argues, the information system is the result of data processing, but not all of the results of the processing become information. His own opinion reinforces this that information systems are strengthened by three resources, namely hardware components, software components, and human resources (Suwarsono, 2024).

2. Humans as information processors

The running of an information system is directly related to human resources as the information processor. Data processing is carried out by people who understand technology and understand management mechanisms well. This is evidenced by the fact that the person appointed as the manager of the college asset data is a graduate of Informatics Engineering. In other words, the existence of this day source is an added value in the management information system, but it is unfortunate if there are human resources. However, the management is still manual-based (Nor et al., 2024).

This is also in line with Davis (2009) opinion, which states that management information systems in the eyes of users are easy, so management information systems based online with computer support are administrative officers, lower-level managers, expert staff and management (Elmario, 2024).

3. System concept

Based on the research findings, it is known that the concept of an asset management information system has advantages and disadvantages because it is integrated with a system that has been compiled in grouping asset data supported by planning,

controlling, and decision-making where the analysis process uses SWOT to find out these advantages and disadvantages. The benefits of the asset management information system are that it is well-planned and can be controlled and evaluated properly to facilitate the decision-making process. However, the weakness of this information system is that the data management still uses a manual method, which researchers feel is less effective and takes a lot of time because they have to input data one by one, and the possibility of errors is also greater than using an online-based system (Heriyanti & Sulaeman, 2024).

Based on the results of interviews with several informants, information was obtained that the assets that the agency has owned require adequate maintenance to last a long time. This maintenance must be periodic and periodic. Audits and user requests will be the source of maintenance. Maintenance of a system is the best effort to maintain the efficiency of existing goods (Suwarsono, 2024).

This maintenance is also based on Davis (2009) expression that system maintenance is an effort to repair, maintain, overcome, and develop existing systems. This maintenance aims to improve the efficiency and effectiveness of system performance and goods in the form of assets so that their use can run optimally (Hartanto et al., 2024).

4. Decision-making concept

The concept of decision-making, described by Davis (2009), is a series of alternative problem-solving steps that ensure that the problem must first be understood, then consider solutions as alternatives, and finally, the solution is chosen. The details can be described as follows: (a) Preparatory effort: prepares managers to solve problems by providing system orientation; (b) Definition effort: includes identifying the problem to be solved and then understanding it; (c) Solution effort: includes identifying alternative solutions, choosing the one that seems best, implementing the solution and following up to ensure that the problem is resolved.

In other words, problem-solving is carried out in the leading sector aspect. If the problem occurs in the asset data manager, it must be reported to the head of the administrative subdivision. Thus, the manager will go down to the field to find alternative solutions to the problems being faced. Then, in making decisions involving all interested parties, including operators/programmers/administrators, related units, and the head of the administrative subdivision. Together, all elements of the University are looking for a way out of the problems that are happening.

5. Information value

A management information system is an online computer-based system that provides information data in the form of users and users with similar needs. Information output by leaders or superiors as well as employees in the organisation to decide between solving problems. Suppose a decision maker will choose one of the alternatives based on the information he receives. This means that the value of information is very useful for people when making choices. The value of information is directly related to the decision-making system. In other words, if decision-making does not exist, then information becomes useless (Katina et al., 2024).

One of the efforts made by Hasyim Asy'ari University to fulfill information and decision-making needs is to increase human resources in the hope that data accessibility can run more optimally. Guaranteeing the availability of quality and skills in the critical

use of information systems, developing an effective planning process, identifying the needs of supporting skills for an information system, determining the investment that will be directed at the information system, anticipating and understanding the economic consequences of information systems and the latest technology, improving productivity in the application of system development and maintenance are steps in information system management based on the use value of the information. So that the value of information can be useful in the eyes of users and users of information itself (Adawiyah & Jatmiko, 2024).

Asset Management Information System at Institut Agama Islam Bani Fattah Jombang

The implementation of the asset management information system that runs at Institut Agama Islam Bani Fattah Jombang uses the management function mechanism, namely planning, organising, implementing, and evaluating. All stages are carried out systematically, planned, and measured.

Based on the findings of the research conducted, it can be seen that asset management at this institution is classic, namely, using Excel applications in the data processing process. Excel applications are considered very accurate and structured. Even though there are already web-based and online application platforms, this college is still reluctant to transform from traditional to more modern information systems (Anggraeni et al., 2025).

Considerations regarding maintaining good old traditions are due to a lack of adequate human resources; this can be seen from the admin in charge of managing asset data not from graduates of the Informatics Science study programme but from Education Science. Knowing this, the researcher assumes that the competence possessed by the operator, in this case the asset data manager, is deemed inappropriate. Because the asset management system requires more modern knowledge, for example, with Informatics Engineering. In addition, it also requires skills in terms of business or accounting science because the asset data here are items of commercial value (Chang et al., 2024).

The following is an example of asset data in the form of documents owned by universities.

Table 2. List of assets and their ownership

Document	Form		Format				Ownership				
	D	M	T	I	A	V	D	K	P	F	U
Minutes	✓	✓	✓	✓					✓	✓	✓
Minutes of meetings	✓	✓	✓	✓					✓	✓	✓
Teaching materials	✓	✓	✓	✓			✓		✓		
Questions	✓		✓				✓		✓		
Student assignments	✓	✓	✓	✓			✓		✓		
Renstra	✓		✓							✓	✓
Operational plan	✓		✓						✓		
SOP	✓		✓						✓	✓	✓
Academic guide	✓		✓							✓	✓
KP/TA guide	✓		✓						✓		
Self-evaluation form	✓		✓						✓	✓	✓
Accreditation form	✓		✓						✓	✓	✓
Passport photo	✓			✓			✓	✓		✓	
Rector photo	✓	✓		✓							✓

Dean photo	✓	✓	✓				✓
Head of study program photo	✓	✓	✓			✓	
Activity photos	✓	✓	✓		✓	✓	✓
Institutional song	✓			✓			✓
National song	✓			✓			✓
Sundanese regional song	✓			✓			✓
Activity video	✓				✓	✓	✓
Profile video	✓				✓		✓

Some considerations made by Institut Agama Islam Bani Fattah Jombang as to why employees with more adequate qualifications should not be recruited are budget constraints because there are not enough enthusiasts for this college. The majority of students who are here are the students of the rice ponds themselves. In order to fulfil the academic needs and develop scientific aspects, this college was formed. The people who work in it are also alumni of the institution (Loko & Sutopo, 2024).

Based on these findings, the researchers tried to provide solutions as a alternative to facilitate the work system and performance of the Institute in terms of asset management. The solution that can be offered is an asset management information system using the web-based waterfall method. Accuracy, effectiveness and efficiency of performance can run optimally even without the need to increase human resources because it is enough just to understand the mechanism of one software tool.

Implementation of Asset Management Information System at UNHASY and IAIBAF A Jombang

1. Planning stage

In the planning stage, Hasyim Asy'ari University is more focused on compiling data on assets owned, namely by classifying the types of objects included in movable and immovable assets.

Whereas at the Institut Agama Islam Bani Fattah Jombang, it has not been systematised properly, Asset data is only inputted and entered in Excel without any sorting of moving and non-moving categories.

2. Organising stage

At the organising stage, Hasyim Asy'ari University and Institut Agama Islam Bani Fattah Jombang both organise their Asset data and have not implemented an adequate management information system because they still use a manual system that is not web-based or special applications.

3. Implementation stage

The implementation stage of the asset management information system between Hasyim Asy'ari University and Institut Agama Islam Bani Fattah Jombang is relatively the same, namely by using manual methods through Excel applications.

4. Evaluation stage

The evaluation stage is carried out to find out all forms of shortcomings and advantages in the implementation of Asset Management to obtain information for decision-making. From the two universities, the evaluation stage is carried out manually as well, namely

periodic checks on incoming and outgoing inventory data without going through an automated system.

System Design in Asset Management Information System

1. Waterfall

The waterfall method, according to Roger, is a waterfall model that implies a systematic and sequential approach to the software level, starting from the planning, modelling, construction, and delivery of software to customers, which then ends with continuous support for the complete software produced.

According to Wirosasminto, the waterfall model is a software system model that is structured and sequential, starting from the definition of needs, software system design, implementation and unit testing, system integration and testing, and operation and maintenance. In detail, these stages are explained as follows:

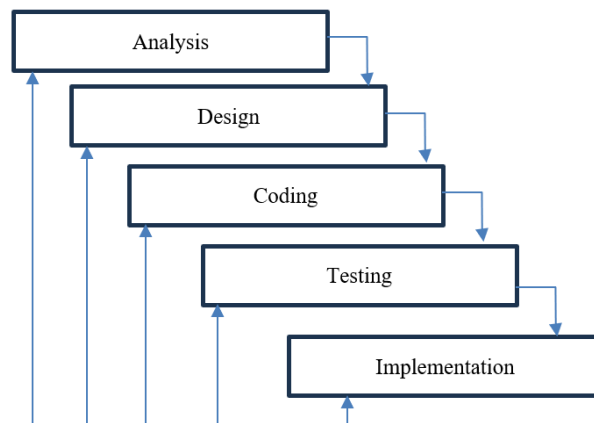


Figure 2. Stages in the waterfall method

The explanation of this stage is as follows:

a. Analysis

This stage is used to determine the features, constraints, and objectives of the system through consultation with system users. At this stage, the author carries out an analysis of the old system that runs at Hasyim Asy'ari University and Bani Fattah Jombang Islamic Institute to propose a new system that is expected to be able to carry out tasks more easily and effectively.

b. Design

At this stage, a system architecture is formed based on the requirements that have been determined by identifying and describing the basic abstractions of the system and software and their relationships. This stage is carried out to analyse the old system and then provide a new system design that will be proposed. Design the system in this stage using an uncase diagram, activity diagram, and square diagram.

c. Coding

The results of the software design that has been designed previously are realised as a program. Evaluation is carried out to reduce errors by running the code made by researchers in the coding process or making software using the PHP and MYSQL programming languages.

d. Testing

has been made is carried out so that the author can estimate the functionality of the running application. The running application can be tested to see whether it is running well or not. For the method of testing or testing this system, Block Box Testing is used.

e. Implementation

At this stage, the implementation process of a system that has been designed using the PHP programming language is carried out, resulting in an efficient application of the Asset Management information system at Hasyim Asy'ari University and Institut Agama Islam Bani Fattah Jombang.

2. *Analytical Hierarchy Process*

- a. Defining the problem
- b. Creating a comparison matrix
- c. Synthesis calculation
- d. Calculating consistency ratio
- e. Ranking alternatives

System Implementation in the Form of Development Design

1. *System Design*

System design using two methods, namely, the use of case diagrams and table relations.

a. Usecase Diagram

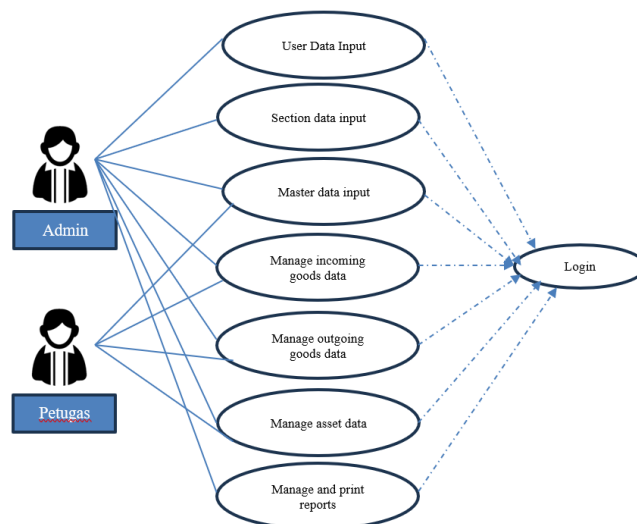


Figure 3. *Usecase diagrams*

In this asset management system, there are main actors, namely admin and officers. The admin has the main tasks of inputting user data and section data, managing item data, managing incoming and outgoing items, managing asset data, and managing and printing reports. Officers have the task of managing goods data, managing incoming and outgoing goods, and managing asset data. This, if implemented at Hasyim Asy'ari University and Bani Fattah Institute Jombang, will be very helpful in the process of recording asset data because it is well organised.

b. Table Relationships

Table relations in the asset management information system can be seen in the figure below.

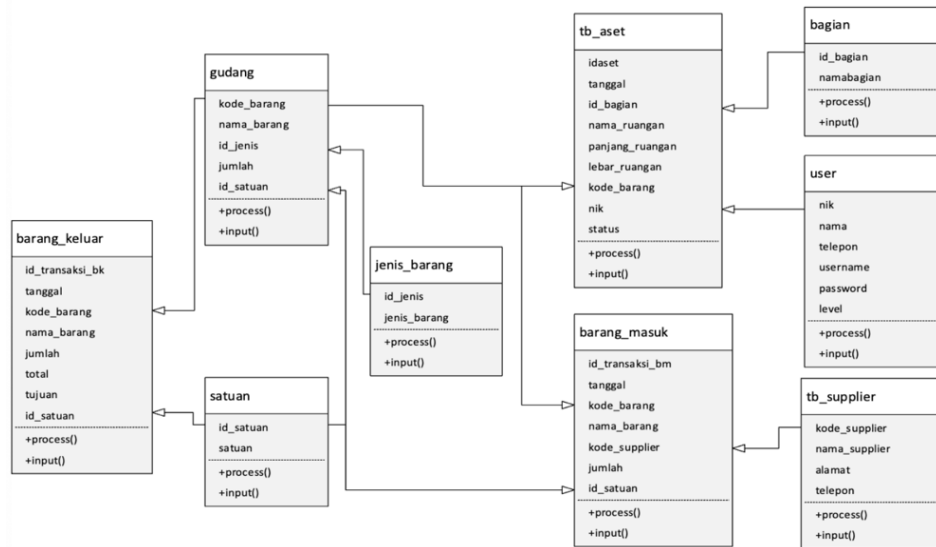


Figure 4. SIM Asset table relationship

2. Implementation

The results to be achieved in this study are the application of the Asset Management Information System at Hasyim Asy'ari University and the Institute of Islamic Religion Bani Fattah Jombang with web-based. The following is the implementation of the Asset Management Information System display.

a. Login Page Display

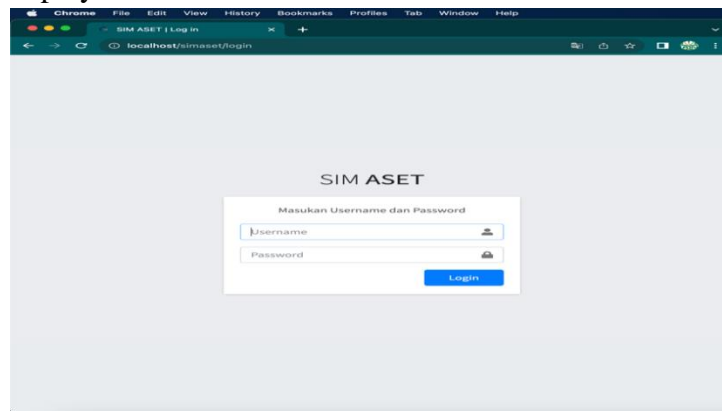


Figure 5. Login page display

On the login page, there is a login form that contains username and password input fields. In this case, there are three real levels in this application, namely admin, super admin, and officer. Each has different access rights.

b. Dashboard menu display as the main page form

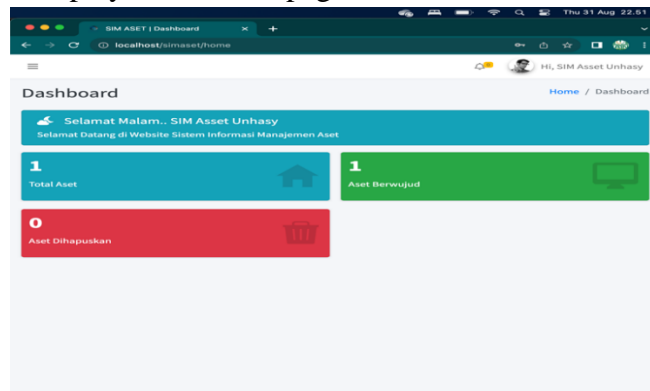


Figure 6. Dashboard menu

c. Display a menu of statistical asset data by condition, type, and category

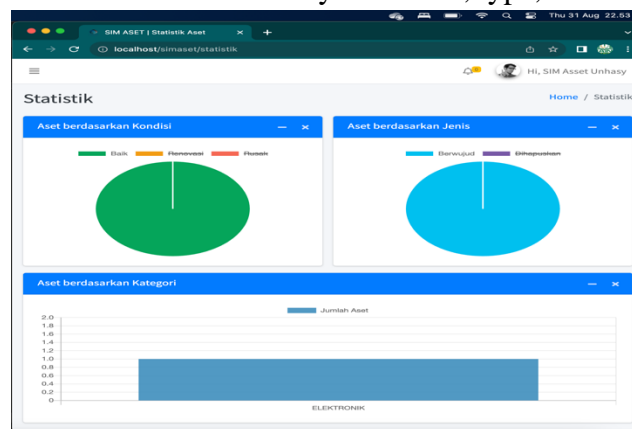


Figure 7. Statistics data menu

d. The master data menu display has four items, including Item, Item Category, Asset Location, and User, all of which have their functions and roles

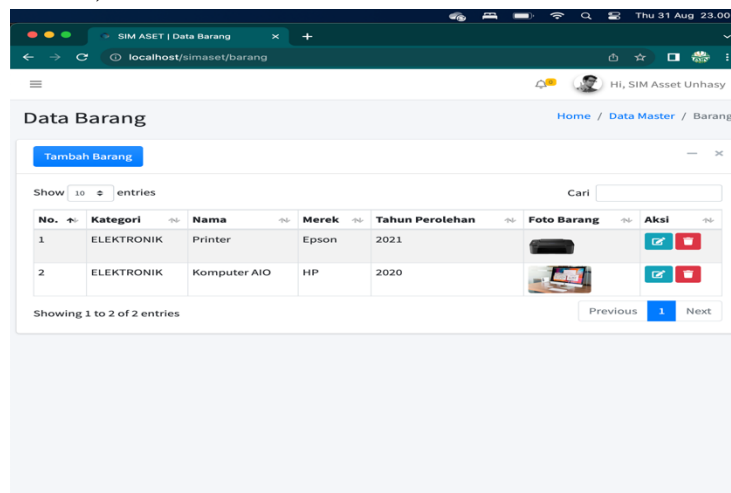


Figure 8. Master data menu

- e. Display of the asset data menu in which there are tangible assets and written-off assets

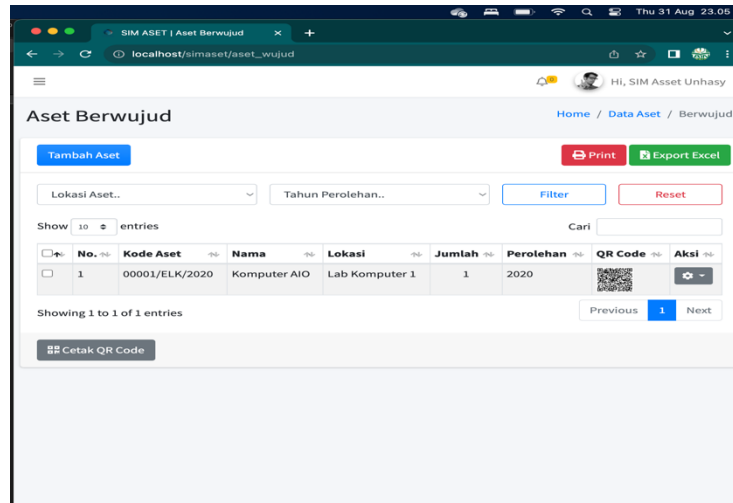


Figure 9. Asset data menu

- f. Display of the procurement decision menu, which consists of Criteria Data, Asset Data, and Value / SPK Process

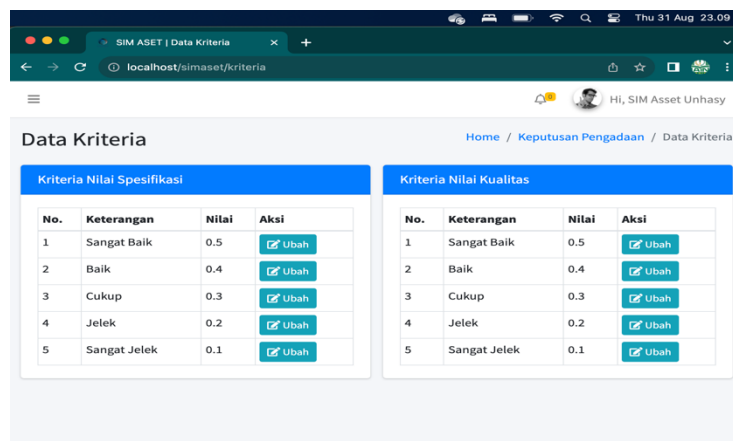


Figure 10. Criteria data procurement decision menu

- g. Display of the procurement menu consisting of submission and view data

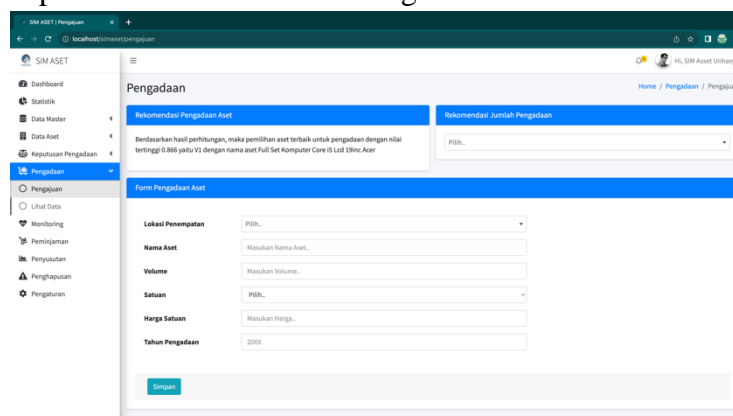


Figure 11. Procurement menu

h. Monitoring menu display

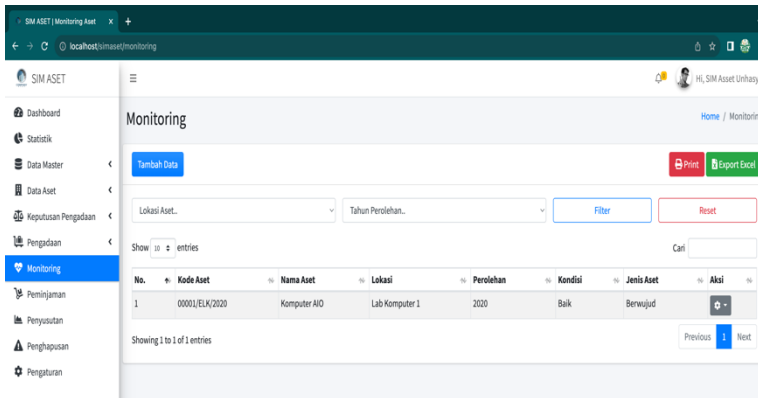


Figure 12. Monitoring menu display

i. Borrowing Menu Show

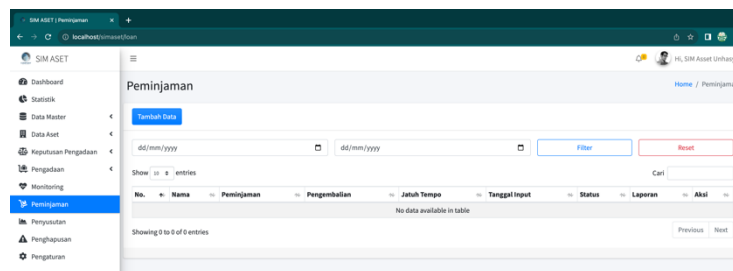


Figure 13. Borrowing menu

j. Depreciation Menu Display

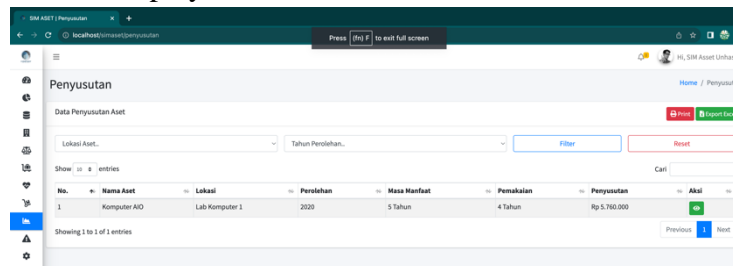


Figure 14. Depreciation menu

k. Deletion Menu Display

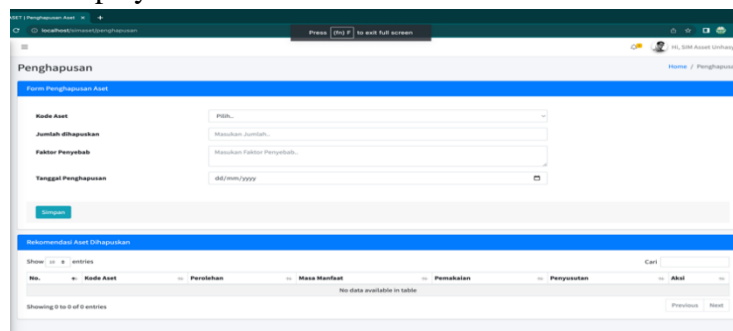


Figure 15. Deletion menu

1. Settings Menu Display

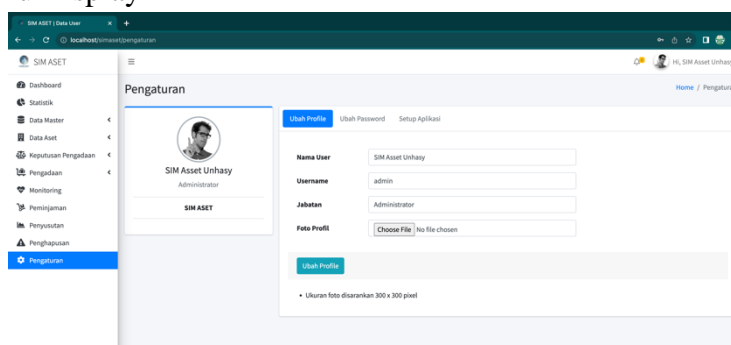


Figure 16. Settings menu

3. Testing

System testing is done using the Blackbox technique. The Blackbox technique is one of the techniques used by the author to conduct testing with the Equivalence Partitioning (EP) method. Where testing is done by entering and dividing into groups according to their function in the hope of getting a valid test case.

Table 3. System testing

Menu Tested	Test Scenario	Expected Results	Testing Results
Login Menu	Login Input (True)	Enter the main page	Success
	Login Input (Incorrect)	Restart the login page	Success
Dashboard	Click on the total assets menu	Data successfully displayed	Success
	Click on the Tangible assets menu	Data successfully displayed	Success
	Click on Asset menu to delete	Data successfully displayed	Success
Statistics	Click the Asset menu based on the condition	Only display results	Success
	Click the asset menu by type	Only display results	Success
	Click on the asset menu by category	Only display results	Success
Master Data	Input Item Data, Item Category, Asset Location, and User	Data successfully inputted	Success
	Input form not filled	A warning that data input is required	Success
Asset Data	Inputting tangible data	Data successfully inputted	Success
	Inputting deleted data	Data successfully inputted	Success
Procurement Decision	Inputting criteria data	Data successfully inputted	Success
	Inputting asset data	Data successfully inputted	Success
	Inputting grades/processing SPK	Data successfully inputted	Success
Procurement	Inputting Submissions	Data successfully inputted	Success
	Inputting submission data	Data successfully inputted	Success
Monitoring	View data	Display data that can be printed or exported in excel form	Success
	Display the monitoring page and import or	Display data that can be printed or exported in excel	Success

	print data	form	
Borrowing	Inputting loan data	Display data by selecting a set date	Success
Depreciation	Display depreciation data and import or print data	Display data that can be printed or exported in excel form	Success
Deletion	Inputting deletion data	Data successfully inputted	Success
Settings	Set up profile and password	Data successfully inputted	Success

From the test results obtained results and conclusions that this asset management information system can run well. The data input function is appropriate and functional even though the test cannot be said to be perfect, but it is enough to help facilitate the web-based asset management system. The hope for further research is to be able to do more diverse tests so that the results obtained are more accurate.

4. *Maintenance and Evaluation*

a. Comparison of the Old System with the New System at UNHASY and IAI Bani Fattah Jombang

Efficiency in recording, tracking, and maintaining assets after testing is declared more efficient using the waterfall method or the new system at UNHASY and IAI Bani Fattah Jombang. In other words, the new system makes the asset management process easier and faster than the manual method. It also reduces the error rate and is more durable in data storage and does not require a lot of space to store assets. Everything is easier with a web-based asset management system.

The speed of accessing information using the new method is very fast compared to the manual method. The process of data sharing and access in one application door that can access the whole can even filter who can access the data. This makes it easier for anyone who wants to get data quickly but still safe for the data. Ease of use for staff and asset managers is also easy because the features and menus presented are grouped according to asset management needs and can even add new menus as needed.

System scalability can be applied to other institutions because this application is a home. This means that anyone can inhabit it. This application is also relatively safe because institutions can change passwords or IDs according to the name of their respective institutions and developers cannot access them. Thus minimising data leakage or misuse.

b. User Feedback from UNHASY and IAIN Bani Fattah Jombang

Based on a survey conducted by researchers related to the level of satisfaction with the ease of use and benefits of the system, it was stated that 80% were very satisfied and 20% were satisfied at UNHASY while at IAI Bani Fattah Jombang 85% were very satisfied and 15% were satisfied.

c. System Constraints and Limitations

The technical constraints faced during development are that the system requires regular updates to ensure stability in use. Meanwhile, in its implementation, the storage space is limited, so it requires a certain time limit to store data. The limitations of the system in supporting certain features that have not been implemented are related to the capacity to add menus. For potential improvement or further development requires cooperation with the IT team owned by each agency to check and maintain the system regularly.

IV. CONCLUSION

The study examines asset management at Hasyim Asy'ari University and Institut Agama Islam Bani Fattah Jombang, highlighting their reliance on manual, Excel-based systems without automation. The research proposes a web-based asset management system using the Waterfall and Analytical Hierarchy Process (AHP) methods to enhance efficiency, organization, and decision-making. Key findings show that Hasyim Asy'ari University classifies assets into movable and immovable categories, whereas Institut Agama Islam Bani Fattah Jombang lacks systematic categorization. Both institutions face challenges in organizing, implementing, and evaluating asset management due to the absence of a structured management information system. The Waterfall method includes analysis, design, coding, testing, and implementation, while the AHP method involves defining problems, creating comparison matrices, calculating synthesis and consistency ratios, and ranking alternatives. The proposed system transition aims to optimize planning, organization, implementation, and evaluation stages through automation. Ultimately, this study emphasizes the importance of replacing manual processes with a structured web-based system to improve asset management efficiency and ensure better resource utilization at both institutions.

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