Action Research Literate
Vol. 8, No. 3, Maret 2024
ISSN: 2808-6988

ASSET MANAGEMENT INFORMATION SYSTEM DESIGN FOR THE FACULTY OF INDUSTRIAL ENGINEERING USING SCRUM METHOD

Yonathan Janmorga[1], Luciana Andrawina[2], Afrin Fauzya Rizana[3]
Fakultas Rekayasa Industri, Universitas Telkom, Bandung, Indonesia
[*] Email untuk Korespondensi: yjanmorga80@gmail.com[1], luciana@telkomuniversity.ac.id[2], afrinfauzya@telkomuniversity.ac.id[3]

Kata kunci:
manajemen aset
scrum
ekosistem Google
kotak hitam

ABSTRAK

Studi ini membahas kebutuhan esensial untuk manajemen aset yang efektif di lingkungan Fakultas Teknik Industri Telkom University. Kegiatan pendidikan menuntut sejumlah besar aset untuk memastikan pengalaman belajar berkualitas tinggi. Menyadari semakin pentingnya aset-aset ini, Sistem Informasi Manajemen (MIS) disesuaikan dengan kebutuhan fakultas diusulkan. Kerangka kerja Scrum tangkas memandu metodologi sistematis, menggabungkan pengumpulan data, desain sistem, integrasi, validasi, dan evaluasi. Alat ekosistem Google seperti Google Spreadsheet, Google Forms, dan Google Apps Script digunakan untuk pengembangan sistem. Dimulai dengan analisis proses saat ini dan kebutuhan pengguna, sistem ini dirancang untuk mengelola aset secara komprehensif. Google Formulir berfungsi sebagai antarmuka input, sementara Google Spreadsheet dan Google Apps Script membangun database dan dasbor. Verifikasi dan validasi dilakukan melalui pengujian Blackbox dan tes penerimaan pengguna. Sistem Informasi Manajemen Aset yang dikembangkan untuk FRI di Telkom University secara efektif mencakup fungsi-fungsi penting, termasuk pelacakan aset, pengadaan, pemeliharaan, dan pelaporan. Sistem ini juga secara signifikan meningkatkan efisiensi manajemen aset dalam fakultas, memastikan proses pendidikan yang efisien dan efektif.

Keywords:
asset management
scrum
google ecosystem
blackbox

This study addresses the essential need for effective aset management within the Faculty of Industrial Engineering at Telkom University. Educational activities demand a significant number of assets to ensure a high-quality learning experience. Recognizing the growing importance of these assets, a Management Information System (MIS) tailored to the faculty's needs is proposed. The agile Scrum framework guides the systematic methodology, incorporating data collection, system design, integration, validation, and evaluation. Google ecosystem tools such as Google Sheets, Google Forms, and Google Apps Script are utilized for system development. Starting with an analysis of current processes and user needs, the system is designed to manage assets comprehensively. Google Forms serve as the input interface, while Google Sheets and Google Apps Script construct the database and dashboard. Verification and validation are conducted through Blackbox testing and user acceptance tests. The developed Aset Management Information System for FRI at Telkom University effectively covers crucial functions, including aset tracking, procurement, maintenance, and reporting. This system also significantly enhances the efficiency of aset management within the faculty, ensuring a streamlined and effective educational process.

PENDAHULUAN

Effective asset management is necessary in optimizing organizational processes and ensuring resource utilization. Managing assets within a faculty, such as office equipment, requires a systematic approach to support various stakeholders, including administrative personnel and leaders. The Faculty of Industrial Engineering (FRI) at Telkom University identified a need for an Asset Management Information System to optimize operations, improve data accuracy, and provide real-time information.

The assets owned by the Faculty of Industrial Engineering are spread over the B Building, the Karang Building, the Mangudu Building and some floor in the new building Telkom University Landmark Tower (TULT). Table I.1 shows the number of rooms for the Faculty of Industrial Engineering at Telkom University Landmark Tower:

Table 1. (Rooms Owned by FRI at TULT)

No.	*Floor*	*Purpose*	*Quantity*
1	*1st Floor*	*Administration*	*15 Rooms*
2	*4th Floor*	*Lecturer's room*	*20 Rooms*
3	*8th–9th Floor*	*Classes & Labs*	*40 Rooms*
4	*18th Floor*	*Officials room*	*20 Rooms*

The primary purpose of this study is to design, develop, and implement an Asset Management Information System tailored to the specific needs of FRI. The system aims to facilitate stakeholders, including Vice Dean 2, Finance & Human Resources staff, and the Head of Finance & Human Resources, in managing, tracking, and maintaining office assets effectively.

The formulation of the problem arises from the absence of a dedicated asset management system within the faculty, leading to challenges such as incomplete asset information, manual data updates, and limited accessibility. The need for an efficient solution prompts the exploration of how an Asset Management Information System can address these issues and improve overall asset management processes.

Figure 1. (Fishbone Diagram of Assets Management Information System Root Problems)

The conceptual framework guiding this endeavor draws from principles of effective information systems design, agile methodologies, and the integration capabilities of the Google ecosystem. By adopting the Scrum framework, known for its iterative and flexible nature, the development process aims to align closely with user needs and expectations. The Google ecosystem, including Google Sheets for database management, Google Forms for data input, and Google Apps Script for additional functionalities, forms the technological foundation of the system

METODE

The method oof the design in this project consists of five stages. These stages consist of the preliminary stage, data collection stage, the system design stage, the validation and evaluation stage, and the closing stage.

A. Data Collecting

The writer conducts a comprehensive analysis of the current asset management process within the Faculty of Industrial Engineering. This involves documenting the step-by-step procedures, roles and responsibilities of personnel involved, the flow of assets, and any existing documentation or records related to asset management. Observations and interviews with faculty staff, administrators, and stakeholders may be done to gather this primary data. Actively involving stakeholders in the data collection process is also crucial. Stakeholders, such as faculty staff, administrators, and lecturers, may have valuable insights into the current asset management process. Surveys or interviews may be utilized to gather their perspectives and feedback.

Secondary data collection focuses on the asset-related information specific to the Faculty of Industrial Engineering. This includes data such as the types and quantities of assets, their current conditions, maintenance histories, procurement records, asset locations, and any other relevant data. Existing records, databases, and digital repositories within the faculty are explored to extract this secondary data.

B. System Designing

The design starts with the making of Unified Modelling Language (UML) diagrams that serve as blueprints for the Management Information System (MIS). UML diagrams, such as use case diagrams, sequence diagrams, and activity diagrams, are made to visualize system components, interactions, and processes. These diagrams explain how different parts of the system will work together.

After the UML is completed, the design is continued according to scrum framework. Scrum Framework started with Product backlog or a list of all the features, functionalities, and enhancements that the MIS is expected to include. Then selecting a set of items from the Product Backlog to be included in the sprint. After the Sprint Planning, each sprint will also be given a backlog containing the specific tasks that the writer commits to completing during the sprint. Then, the sprints are executed to develop the

system. The completed system then reviewed by stakeholders. The last step in scrum is Sprint Retrospective where the development team reflects on the sprint's successes and challenges.

C. Validation and Evaluation

Throughout the Validation and Evaluation Stage, the focus is on ensuring that the MIS not only meets the technical requirements but also aligns with user expectations and improves asset management practices within the faculty. Feedback from Blackbox testing and User Acceptance Test is gathered, addressing any issues, and enhancing its usability. Following the evaluation, analysis is conducted to understand the strengths and weaknesses of the system.

HASIL DAN PEMBAHASAN

Business Process

1. Asset Procurement

The existing procurement process, the parties involved in this process are vice dean 2, finance and laboratory, and logistic center. The procurement process begins with the finance and laboratory department determining the assets that will be carried out in the procurement process, then a budget checking process is carried out. If the budget is available, proceed with creating an asset procurement proposal plan document to be submitted to vice dean 2.

Next, vice dean 2 will examine and determine the asset procurement proposal plan in accordance with the needs and budget that have been submitted. If the needs and budget are appropriate, the asset procurement proposal plan document will be submitted to the logistic center, for review. If the needs and budget are appropriate, a negotiation process will be carried out with the vendor. After the negotiations are declared successful, the logistic center will carry out the asset purchasing process from the vendor.

Then, when the assets are arrived, the finance and laboratory department will carry out an asset inspection. If the assets are as promised, the logistic center will issue a handover document (BAST) and billing documents from the vendor to the finance and resources department.

The process of creating an asset procurement submission plan is made into the system in the form of a form for asset procurement. Once submitted, the document will be sent to vice dean 2 via the system for inspection. The form enters the asset procurement list to find out whether the application is approved or rejected by the vice dean 2.

To make the process easier for stakeholders, some processes will be changed. There is also a new component added to the business process which is the system. The new business process is called the proposed business process. In the proposed business process of assets procurement, most of the processes are like the existing business process. The differences are, in the proposed business process, Finance and Resources only need to input the data to the system instead of creating and submitting the proposal manually. The system will then create the proposal documents to be checked by the vice dean 2. Then stakeholders can monitor the status of the proposal, whether it is accepted or rejected in the system. If the proposal is rejected, then finance and resources must be revised and go back to the first process. If the proposal is accepted, then vice dean 2 will print the documents and the process will continue as previously explained in the existing business process.

2. Asset Maintenance

The parties involved in the existing business process for the asset maintenance process at the Faculty of Industrial Engineering (FRI) Telkom University are Vice Dean 2, Finance, and Laboratory. The procurement process begins with the Laboratory department checking the assets that will be carried out in the maintenance process, then the Laboratory must create and submit an asset maintenance plan document to the Finance.

The Finance then checks the documents and then prepares the funds according to the documents. If the funds are unavailable, then the process ends, and Laboratory needs to resubmit the documents. If the funds are available, then Finance submit the documents and budget to Vice Dean 2 to be checked and approved. After the documents are approved then the Laboratory can carry out the maintenance process.

To make the process easier for stakeholders, some processes will be changed. There is also a new component added to the business process which is the system. The new business process is called the proposed business process. In the proposed business process of assets maintenance, most of the processes are similar to the existing business process. The differences are, in the proposed business process, Laboratory does not need to record the asset’s data since the system records it. The Laboratory only needs to input the data of the asset that is proposed to be maintenance, thus creating, and submitting the documents ure out manually is not necessary. The status of the maintenance proposal is also shown in the system, simplifying the communication process between parties.

Asset Data

Secondary data plays a vital role in figuring out the scope of assets within the Faculty of Industrial Engineering (FRI) at Telkom University, especially within the Telkom University Landmark Tower (TULT). This information provides a view of the assets distributed on various floors, covering the 1st floor housing student affairs rooms, the 4th floor dedicated to lecturer rooms, and the 18th floor serving as faculty leaders rooms and meeting spaces. This data will serve as a resource in the development of the Asset Management Information System for FRI, enabling tracking, management, and optimization of these assets. As the system's design takes shape, these insights will be helpful in ensuring that the solution aligns with the faculty's unique needs and asset distribution. The following is data on the assets of the Faculty of Industrial Engineering (FRI) office located in the TULT building.

Table 2. (Assets in LAA Room)

LAA Room (TULT-01-05)			
No.	*Asset*	*Qty.*	*Specifications*
1	*PC*	*2*	*Lenovo F0G1008HID*
		2	*Dell OptiPlex 7010*
2	*Printer*	*2*	*HP Laser Jet P1102*
		1	*HP Color Laser 150A*
3	*Scanner*	*1*	*Epson DS-410*
4	*Desk*	*4*	*Custom*
5	*Office Chair*	*3*	*Chairman*
		1	*Mubarix*
6	*Shelf*	*1*	*Custom*
7	*Drawer*	*4*	*Custom*
8	*Paper Shredder*	*1*	*Honeywell*
9	*Hard Drive*	*2*	*Seagate 2TB*
		1	*Spectra 500GB*
10	*Keyboard*	*2*	*Lenovo USB Calliope White*
		2	*Logitech K220*
11	*Mouse*	*2*	*Lenovo USB Calliope White*
		2	*Logitech M150*
12	*Tablet*	*1*	*Samsung S6 Lite*
13	*Chair*	*2*	*Mubarix*
14	*Glass Partition*	*1*	*Custom*

Table 2 shows the assets owned by the Faculty of Industrial Engineering that is in LAA Room with room code TULT-01.05. There are 37 objects with 14 different types.

Table 3. (Assets in Academics Affairs Room)

Academics Affairs Room (TULT-01-05)			
No.	*Asset*	*Qty.*	*Specifications*
1	*PC*	*2*	*Lenovo F0G1008HID*
		1	*Dell OptiPlex 7010*
2	*Printer*	*3*	*Epson L385*
3	*Scanner*	*1*	*Epson DS-410*
4	*Desk*	*3*	*Custom*
5	*Office Chair*	*2*	*Chairman*
		1	*Mubarix*
6	*Shelf*	*1*	*Custom*
7	*Drawer*	*2*	*Custom*
8	*Hard Drive*	*1*	*Seagate 2TB*
9	*Tablet*	*1*	*Samsung S6 Lite*
10	*Keyboard*	*2*	*Lenovo USB Calliope White*
		1	*Logitech K220*
11	*Mouse*	*2*	*Lenovo USB Calliope White*
12	*Webcam*	*1*	*Logitech M150*
		3	*Logitech C310HD*
13	*Speaker*	*1*	*Baretone*
14	*Microphone*	*1*	*Baretone*
15	*Projector*	*1*	*NEC*
16	*Tripod*	*1*	*Zomei*

Table 3 shows the assets owned by the faculty that is in Academics Affairs Room with room code TULT-01.05. There are 40 objects with 16 different types.

Table 4. (Assets in Secretary Room)

Secretary Room (TULT-18-03)			
No.	*Asset*	*Qty.*	*Specifications*
1	*Desk*	*1*	*Custom*
2	*Office Chair*	*4*	*Mubarix*
3	*Long Table*	*5*	*Custom*
4	*Chair*	*9*	*Mubarix*
5	*Water Dispenser*	*1*	*Miyako*
6	*PC*	*3*	*Lenovo F0G1008HID*
		2	*Dell OptiPlex 7010*
7	*Keyboard*	*3*	*Logitech*
		2	*Logitech*
8	*Mouse*	*3*	*Logitech*
		2	*Logitech*
9	*Cupboard*	*1*	*White Custom*
		2	*Brown Custom*
10	*Sofa*	*1*	*3 Seat Custom*
		2	*1 Seat Custom*
11	*Round Table*	*1*	*Custom*
12	*TV*	*1*	*LG*
13	*TV Stand*	*1*	*LG*
14	*Drawer*	*2*	*Custom*
15	*Trash Bin*	*1*	*Informa*
16	*Printer*	*1*	*Epson L385*
17	*TV Remote*	*1*	*LG*
18	*Scanner*	*1*	*Canon F173700*
19	*Shelf*	*1*	*Glass Custom*
		1	*Custom*
20	*AC*	*1*	*Daikin*

Table 4 shows the assets owned by the Faculty of Industrial Engineering that is in LAA Room with room code TULT-01.05. There are 53 objects with 20 different types.

Table 5. (Assets in Lecturer Room)

Lecturer Room (TULT-04)			
No.	*Asset*	*Qty.*	*Specifications*
1	*Desk*	*135*	*Custom*
2	*Office Chair*	*135*	*Chairman*
3	*Cupboard*	*135*	*Custom*
4	*Work Cubicle*	*135*	*Custom*
5	*Sofa*	*2*	*Custom*
6	*Water Dispenser*	*2*	*Miyako*
7	*Trash Bin*	*4*	*Informa*

Table 5 shows the assets owned by the Faculty of Industrial Engineering that is in LAA Room with room code TULT-01.05. There are 548 objects with 7 different types.

Stakeholder Identification

Stakeholders play a big role in the success of any system, and the development of an Asset Management Information System (MIS) is no exception. This section will identify and analyze the various stakeholders involved in this project. It's important to understand who the key players are, their roles, and their specific needs to ensure that the MIS can fulfill their requirements effectively. The role and the stakeholders in this system are shown on Table 6.

Table 6. (Stakeholders)

No.	*Role*	*Stakeholder*
1.	*Problem Owner*	*Vice Dean 2*

2.	*Problem Customer*	*Lecturers*
3.	*Problem User*	*Head of Finance and Resources and Staff*
4.	*Problem Analyst*	*MIS Developer*

User Requirements

Based on the results of collecting user needs listed in Table IV.6, a process of determining the features of the system will be carried out. The aim of the system feature design process is to meet the needs of system users in order to make it easier for users to access the system. The features are shown in Table 7.

Table 7. (Features of the System)

No.	*Feature*
1.	*Assets Data*
2.	*Assets Tracking*
3.	*Assets Deleting*
4.	*Proposal Submission*
5.	*Proposal Approval*
6.	*Monthly Report*

Designing features in the system aims to make the system accessible to its users. System use is grouped based on the access rights of each user. Access rights are rights given to users to be able to access (view, add, delete, change, reject, approve or print) the features contained in the system in accordance with the security policy contained in the system.

Unified Modeling Language

UML serves as a tool to model, document, and communicate the design and functionality of the Asset Management Information System. It ensures that all stakeholders have a common understanding of the system, which is necessary for successful development and implementation. UML diagrams clarify system requirements, design, and interactions, leading to an effective and user-friendly MIS for the faculty's specific needs.

1. Entity Relationship Diagram

   ERD is important in designing the database structure and data management processes of the Asset Management Information System. It ensures that data is well-organized, accurate, and supports the system's functionality, reporting, and data integrity. By using ERDs, the MIS can effectively manage, track, and optimize the assets of the Faculty of Industrial Engineering at Telkom University. The ERD for this system is shown in Figure 1 below.

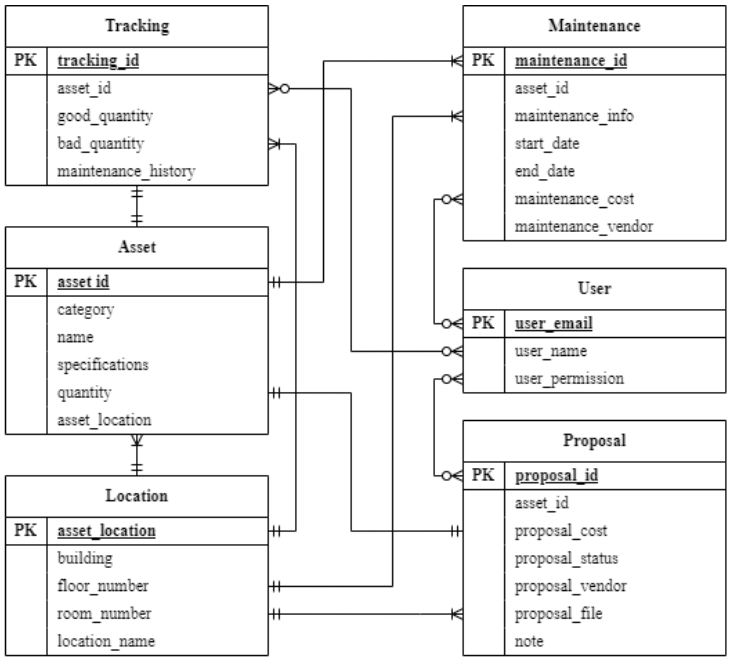

Figure 1. (ERD for Asset Management Information System)

2. Use Case Diagram

A Use Case Diagram in the context of Management Information System (MIS) helps illustrate the system's functionality from a user's perspective. It provides a detailed- overview of how users (actors) interact with the system to achieve specific tasks or goals. Below are the use case diagrams for asset management information system on FRI Telkom University.

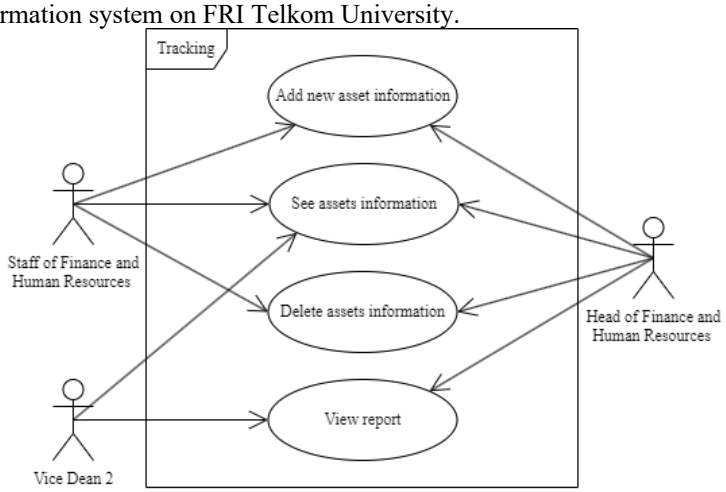

Figure 2. (Use Case Diagram for Tracking)

Figure 2 shows the Use Case Diagram for Tracking feature in the system. There are three actors which are Staff of Finance and Human Resource, Head of Finance and Human Resource, and Vice Dean 2. Staff of Finance and Human Resource can use the system to add new data, see assets information, and delete asset information. Head of Finance and Human Resource can use the system the same way as Staff of Finance and Human Resource but with addition to view report. Vice Dean 2 can use the system to see assets information and view reports.

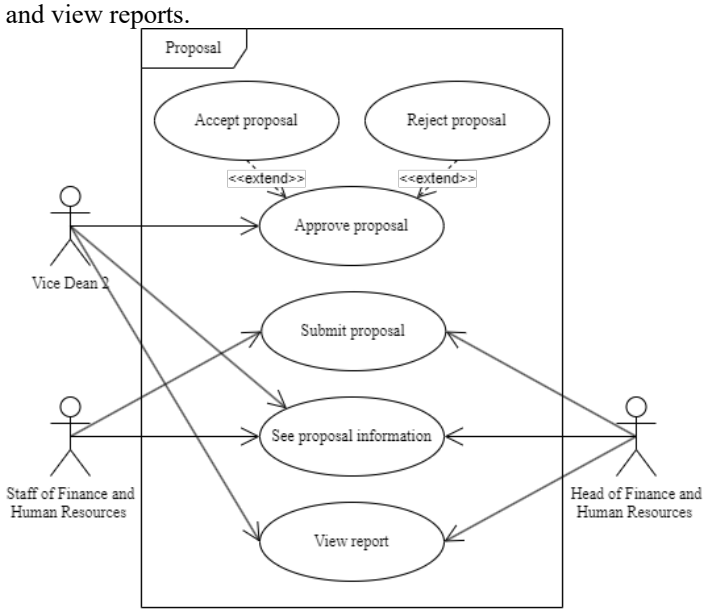

Figure 3. (Use Case Diagram for Proposal)

Figure 3 shows the Use Case Diagram for Proposal feature in the system. There are three actors which are Staff of Finance and Human Resource, Head of Finance and Human Resource, and Vice Dean 2. Staff of Finance and Human Resource can use the system to submit proposal and see proposal information. Head of Finance and Human Resource can use the system the same way as Staff of Finance and Human Resource but with addition to view report. Vice Dean 2 can use the system to see approve or reject proposals, see proposal information, and view report.

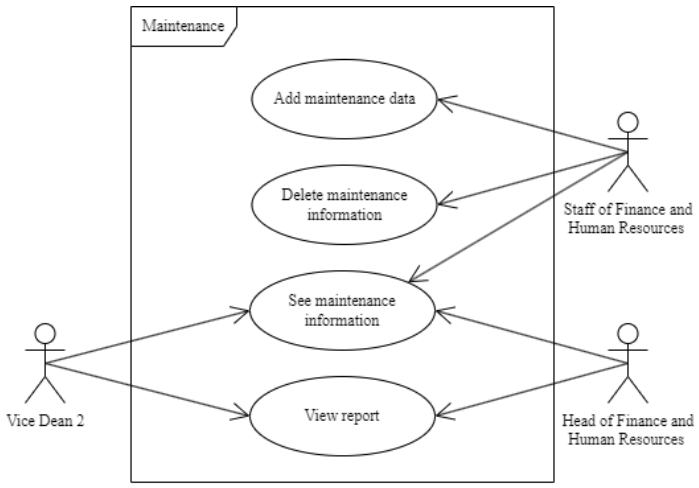

Figure 4. (Use Case Diagram for Maintenance)

Figure IV.4 shows the Use Case Diagram for Maintenance feature in the system. There are three actors which are Staff of Finance and Human Resource, Head of Finance and Human Resource, and Vice Dean 2. Staff of Finance and Human Resource can use the system to add new data, see assets information, and delete asset information. Head of Finance and Human Resource can use the system to see maintenance information and view report. Vice Dean 2 can use the system the same way as Head of Finance and Human Resource.

3. Activity Diagram

Activity Diagram helps illustrate the flow of activities, processes, and workflows within the system. It provides a visual representation of how various components or modules of the MIS interact to achieve specific tasks or goals, also identifying areas for improvement, and ensuring that the system operates efficiently to meet its objectives.

Figure 5 shows the activity diagram for tracking feature if used by Head of Finance & Human Resources. In the process, user first need to login to a google account and access the system, then the system will display the location menu. After the user selects the room, the system will display three option that are Tracking, Maintenance and Proposal. Users then can select the Tracking feature. In the Tracking feature, the user can print reports or input new asset data. If the user wants to input new data, the system will add the new data to the database and then display the new data on the dashboard.

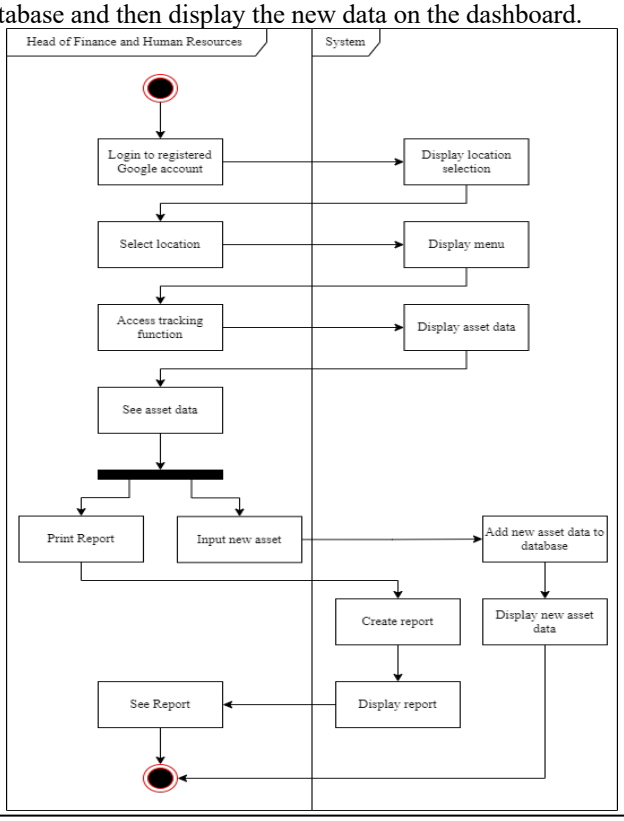

Figure 5. (Activity Diagram: Tracking for Finance & Human Resources)

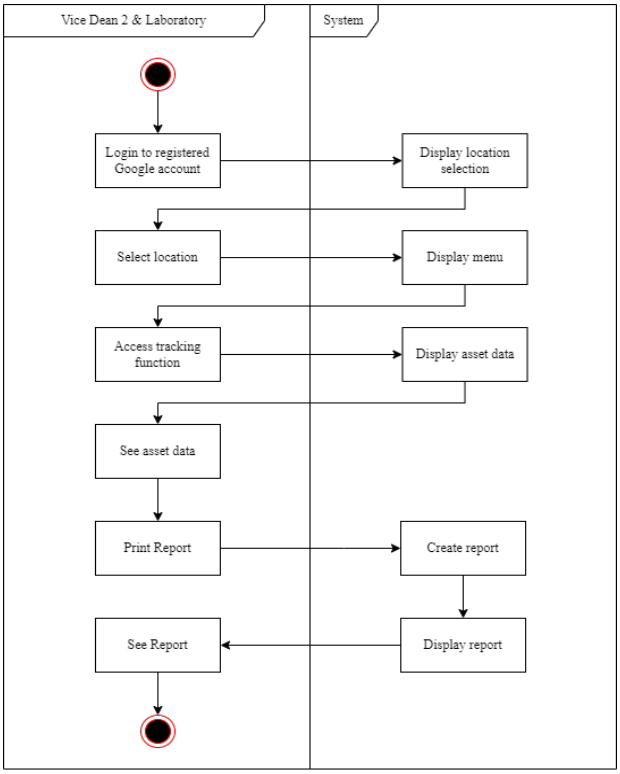

Figure 6. (Activity Diagram: Tracking for Vice Dean 2 & Laboratory)

Figure 6 shows the activity diagram for tracking feature if used by Vice Dean 2. In the process, user first need to login to a google account and access the system, then the system will display the location menu. After the user selects the room, the system will display three option that are Tracking, Maintenance and Proposal. Users then can select the Tracking feature. In Tracking feature, user can track information of assets in a room and print report.

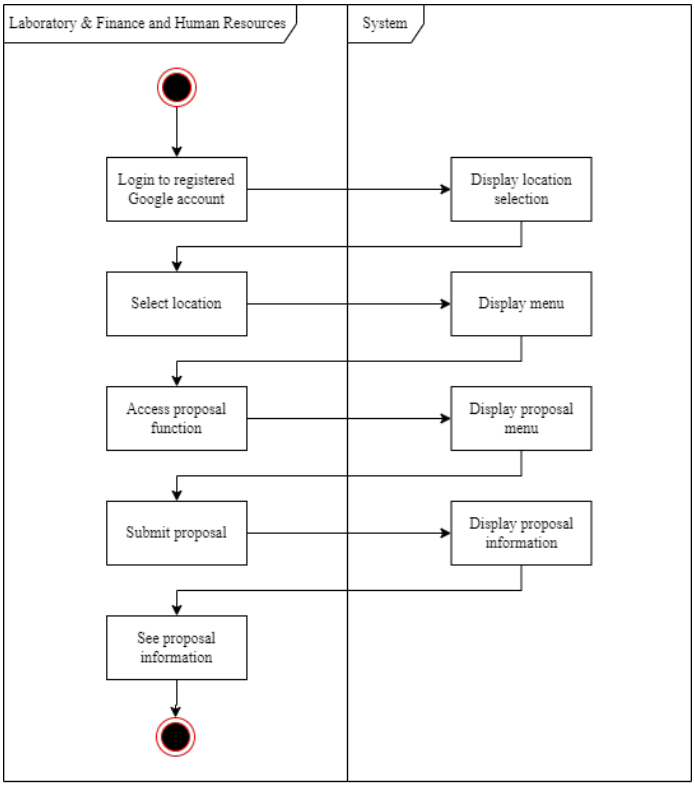

Figure 7. (Activity Diagram: Proposal for Finance and Human Resource)

Figure 7 shows the activity diagram for Proposal feature if used by Head of Finance & Human Resources. In the process, user first need to login to a google account and access the system, then the system will display the location menu. After the user selects the room, the system will display three options that are Tracking, Maintenance and Proposal. User then can select the Proposal feature. In Proposal feature, user can see the previously uploaded proposal, then submit a new proposal for procurement or maintenance of an asset, after the new proposal was uploaded, the system will display the new proposal information on the dashboard, then user can see the uploaded proposal.

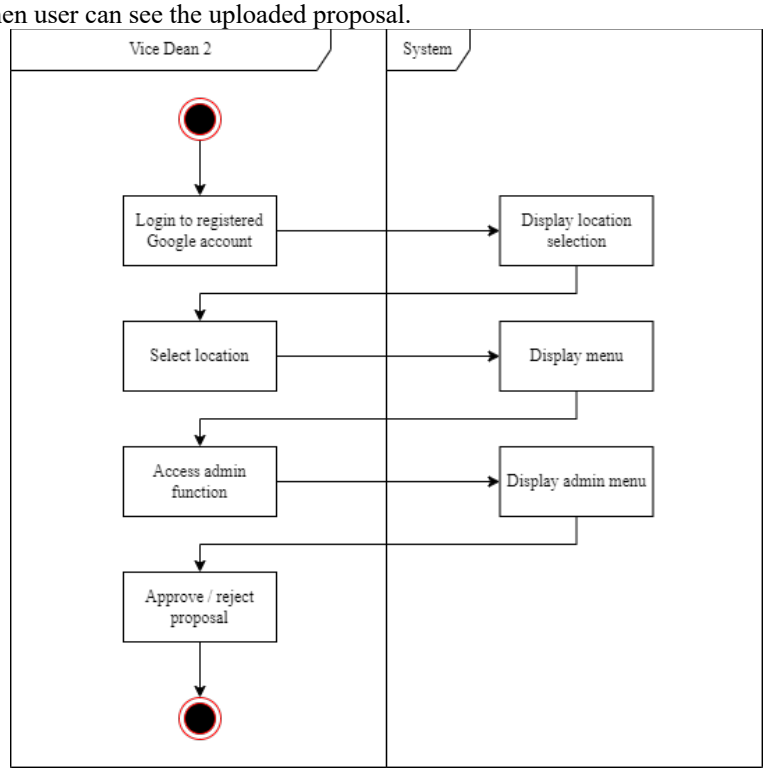

Figure 8. (Activity Diagram: Proposal for Vice Dean 2)

Figure 8 shows the activity diagram for Admin feature if used by Admin for Vice Dean 2. In the process, user first need to login to a google account and access the system, then the system will display the location menu. In the location menu, the User can select Admin feature. The system will then display a list of uploaded proposals that have not been approved nor rejected. In the Admin feature, users can make an approval or reject proposal that are uploaded to the system.

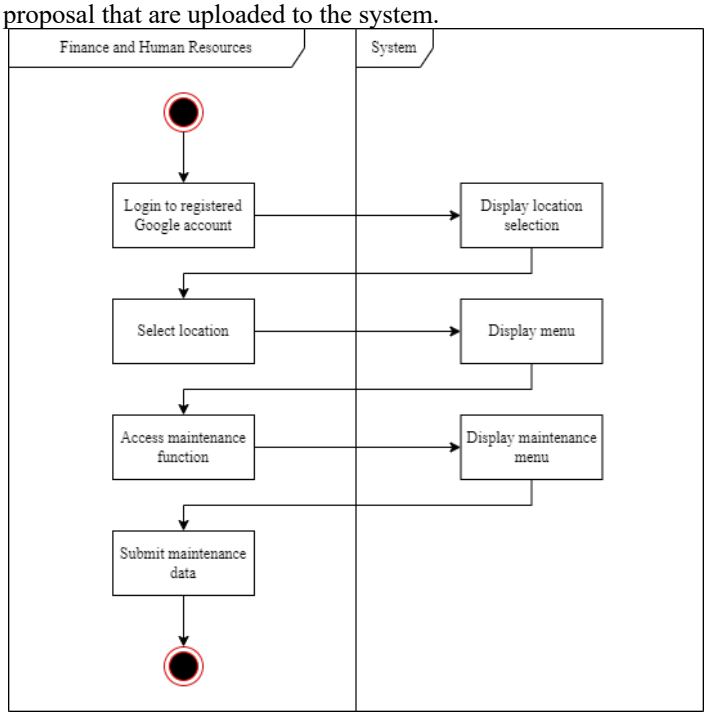

Figure 9. (Activity Diagram: Maintenance for Finance & Human Resources)

Figure 9 shows the activity diagram for Maintenance feature if used by Head of Finance & Human Resources. In the process, user first need to login to a google account and access the system, then the system will display the location menu. After the user selects the room, the system will display three option that are Tracking, Maintenance and Proposal. Users then can select the Maintenance feature. The system will then display the maintenance history of assets in a room. In Maintenance feature, user can add new maintenance data.

Scrum

1. Product Backlog

In the Scrum method, the Product Backlog stands as an important component. It is a repository that contains the requirements of the Asset Management Information System. The product backlog acts as a guide in making the system. Below are the backlogs for Asset Management Information System on FRI.

Table 8. (Product Backlog)

Features	*Functions*
Menu	*Page that directs the user to other features (Tracking, Proposal, Maintenance).*
Database	*Page to display and store a list of faculty office assets according to the room. This feature can be used to, view assets, edit assets, and delete assets*
Tracking	*Page to display assets information*
Proposal	*Page to display the approval status of proposed procurement and maintenance*
Admin	*Page to approve or reject proposed procurement and maintenance*
Maintenance	*Page to display faculty office asset maintenance data*
Input Form	*Form to add data to the system*

2. Sprint Planning

Sprint planning is the second step in Scrum method. Sprint Planning aims to determine what can be achieved during the sprint and the estimated duration to work on each sprint. The sprints are the features in the Asset Management Information System. Below is the Sprint Planning of Asset Management Information System in the Faculty of Industrial Engineering.

Table 9. (Sprint Planning)

Sprint	*Product Backlog*	*Duration*

Sprint 1	*Input Forms, Database*	*10 days*
Sprint 2	*Proposal, Admin*	*5 days*
Sprint 3	*Tracking, Maintenance, Menu*	*20 days*

In the initial sprint, the focus will be on developing elementary components such as the Input Form and Database, with an estimated duration of 10 days. In the second sprint, focus will be directed towards developing the Proposal and Admin functionalities, within a span of 5 days. The last sprint, spanning 20 days, will delve into the development of the Tracking and Maintenance features, alongside refining the overall system menu. This structured sprint plan ensures a phased and systematic approach, addressing key elements of the project in each sprint for optimal development.

3. Sprint Backlog

The third step in Scrum method is Sprint Backlog. In Sprint Backlog, the duration of each product backlog is estimated according to the sprint planning. Below are the Sprint Backlogs of Asset Management Information System in the Faculty of Industrial Engineering

Table 10. (Sprint 1 Backlog)

In Sprint 1, the primary focus is on two key features: Input Form and Database. The Input Form enables users to fill in asset data easily, taking an estimated 3 days for development. Simultaneously, the Database feature ensures secure storage and processing of asset data, with an estimated development time of 7 days. These features form the foundation of a functional asset management system within Scrum.

Table 11. (Sprint 2 Backlog)

In Sprint 2, the focus shifts to the Proposal and Admin features. The Proposal feature allows users to submit proposals through a user-friendly form, requiring an estimated 1 day for development. On the other hand, the admin feature, designed for authorized users, facilitates the approval of proposals, and necessitates approximately 4 days for development. This sprint focuses on enhancing user interaction and functionalities of the system.

Table 12. (Sprint 1 Backlog)

In Sprint 3, the development focus extends to features such as Tracking, Maintenance, and Menu. The Tracking feature enables users to access and view detailed information about assets in a designated room, requiring an estimated 9 days for development. Simultaneously, the Maintenance feature allows users to review maintenance-related details for assets in a room, also allocated 9 days for development. The Menu feature, spanning 2 days, facilitates user interaction by providing a selection mechanism for different functionalities within the system. This sprint prioritizes the refinement of essential asset tracking and user interface components.

4. Sprint Execution

The sprint execution is the core of the process where the system is developed. In this step, the focus is on utilizing the Google ecosystem, including Sheets, Forms, and Apps Script, to facilitate the development process.

The initiation of the asset management system involves the development of a dedicated folder within the Google Drive application. This folder serves as the central hub for storing essential components such as electronic forms, spreadsheets functioning as a database, and any uploaded documents relevant to the asset management process.

Creating electronic forms is a necessary step in the asset management system, facilitating the collection of asset data seamlessly through the Google Form application. The utilization of electronic forms brings about several advantages, primarily the ability to access the forms at any time of the day through the internet network, ensuring continuous and convenient data collection.

After the questions are added to the electronic forms, the sheet will display the questions and responses in columns with the first row consisting of the questions. To organize the forms and the sheets, then the name of the forms and the sheets will be renamed. When a new response is added to the sheet, the application will delete the row below the last added response. That will cause data loss if the processes are done on the same sheet. To mitigate that problem, it is necessary to create a new sheet where calculations, processes, and formulas are written.

The proposed maintenances and procurements will be displayed on a new page that can only be accessed by authorized users. The admin page consists of thirteen columns which are proposal id, building name, floor number, room number, asset name, asset specs, quantity, proposal type, vendor, cost, file, and link to approve. “FILTER” formula is used to import data to admin page. The data displayed on this page are only the data that has not been approved nor rejected. If a proposal is approved or rejected, then the admin page will not display the proposal.

One tracking page will display all registered assets in a room. The tracking page consists of eight pieces of information which are tracking id, asset category, name, specs, quantity, code, condition, and last maintenance date.

Similar to the tracking page, the maintenance page will display all maintenance information in a room. The first six information is the same information displayed in tracking page but there are seven additional information displayed in maintenance page. Additional pieces of information are status, start date, finished date, durations, cost, vendor, and repair number. To import the data from database to the page, the formula used is similar to the formula used in tracking page, with the range is adjusted for maintenance. There is also additional formula of "SORT" that is used to sort the information in descending order by date, so that the newest information will be placed on top.

The menu page functions as a directory for other pages in the system. There are two kinds of menu pages, the main menu that directs user to select the room and the menu page on a room that directs user to tracking, maintenance, or proposal page. In the main menu, there are several cells filled with hyperlinks to the file of each room and additional hyperlink to the admin page. On the room menu page, there are four cells filled with hyperlinks to the main menu, tracking, maintenance, and proposal page.

5. Sprint Review

Sprint review is a phase in scrum method that concludes each sprint. In this phase, the results of each sprint functionality are presented including the challenges faced. Below are the sprint reviews for each sprint.

Table 13. (Sprint 1 Review)

The implementation of the input forms feature allows users to add asset data. Users can fill in the necessary information through the form. The database feature, used for storing and processing assets data, has been successfully integrated. This enhances the system's ability to manage and organize asset information. A challenge encountered was to tune the formulas to accommodate additional functionalities.

Table 14. (Sprint 2 Review)

The feature enabling users to submit forms for maintenance and procurement proposals are successfully implemented. The admin feature, allowing for the approval or rejection of proposals, has also been integrated. This enables authorized users to manage maintenance and procurement requests.

Table 15. (Sprint 3 Review)

The tracking feature has been successfully implemented, allowing users to view detailed asset information in a room. The maintenance feature enables users to view assets undergoing maintenance in a room. The menu feature, allowing users to select different system features, has been implemented. A challenge identified is refining the menu interface for intuitive navigation, especially as more features are added to the system.

6. Sprint Retrospective

The sprint retrospective is the last phase in Scrum method. Sprint retrospective reflects on the achievements and challenges encountered during the implementation of the Asset Management Information System for the Faculty of Industrial Engineering. The process is done by answering four evaluation questions for each sprint.

In Sprint 1, successes were achieved in the development of the Input Forms feature, enabling users to seamlessly fill in asset data through a dedicated form. Additionally, progress was made in developing the database infrastructure, ensuring that asset data could be efficiently stored and processed. However, certain challenges emerged, particularly related to database integration and complexities associated with data processing. Addressing these challenges will be a key focus for improvement, aiming for a more streamlined and efficient database process in subsequent sprints. The upcoming plan includes revisiting and refining processes from Sprint 1 and progressing with the execution of Sprint 2. This iterative approach allows for continuous enhancement and optimization of the system.

In Sprint 2, significant achievements were made in the development of the Proposal Submission feature, allowing users to submit proposals for maintenance and procurement. The Admin Approval functionality was also successfully implemented, providing a mechanism for approving or rejecting proposals. However, challenges were encountered during the integration of the database into the admin page. To enhance the system, efforts will be directed towards minimizing errors. The next steps involve revisiting and refining processes from Sprint 2 and moving forward with the execution of Sprint 3, maintaining a focus on continuous improvement and advancement.

In Sprint 3, progress was achieved with the successful implementation of the Tracking, Maintenance, and Menu features. These features enabled users to view asset information in a room, access maintenance details, and navigate through various system functionalities. However, challenges arose during the integration of the database with the Tracking, Maintenance, and Proposal pages. The next step is to revisit

and refine processes from Sprint 3, fostering an improvement, and preparing for the next stage of development.

CONCLUSION

This final assignment represents the efforts of designing an Asset Management Information System developed for the Faculty of Industrial Engineering (FRI) at Telkom University. The primary objective is to facilitate and optimize the management processes of office assets within the faculty. Stakeholders, including Vice Dean 2, Finance & Human Resources staff, and the Head of Finance & Human Resources, are expected to benefit significantly from the implementation of this system.

The design process covers various steps. Initial phases involved data collection, including an analysis of current business processes and existing asset data. In the next step, user needs were gathered to ensure the system aligns with the requirements of the stakeholders.

To bring the designed system to life, design methodologies were done. This included the creation of Unified Modelling Language such as entity relationship diagrams, use case diagrams, and activity diagrams. The chosen framework is the Scrum method, known for its agile nature, providing a flexible framework for development.

The system was developed using google ecosystem such as Google Sheets, Google Forms, and Google Apps Script. Google Sheets is used to create the database to store and process the data, and the dashboard to show the information regarding assets in a room. Google Forms acts as input to the database. Google Apps Script is used to create new functions such as creating QR code to retrieve the link of the dashboard.

To make sure the system reliability and user satisfaction are excellent. Testing procedures, which are black box testing and user acceptance test, were done to validate the system's functionality. This testing process aimed to obliviate any potential issues and ensure a smooth user experience.

The result of the Asset Management Information System is a multifaceted solution covering several functions. From asset tracking and procurement to maintenance and reporting, the system was created to enhance the efficiency of asset management within the faculty. There are some features that are not covered in this design. As the landscape of technology and educational needs evolves, future studies or designs with a similar focus could explore additional features to enhance the effectiveness of asset management systems. These might include considerations for emerging technologies or other methods of design. Below are the suggestions and recommendations for the next study or design with similar topic: Add a feature to automatically create a new room page. Add feature to input data from other sources other than forms. Add a feature to create a templated report. Add a feature of code of asset that can create code automatically. Add a feature to reduce typos human errors

REFERENCES

- Books
- Booch, G., The Unified Modeling Language User Guide, 2nd Edition. Boston: Addison-Wesley, 2005.
- Elmasri, R., & Navathe, S. B., Fundamentals of Database System. Pearson, 2015.
- Fowler, M., UML Distilled: A Brief Guide to the Standard Object Modeling Language. Boston: Addison-Wesley, 2003.
- Freeman, R. E., Managing for Stakeholders: Survival, Reputation, and Success. Yale University Press, 2007.
- Laudon, K., & Laudon, J., Management Information Systems: Managing the Digital Firm, 15th Edition. Harlow: Pearson, 2018.
- Nugroho, A., Analisis dan Perancangan Informasi dengan Metodologi Berorientasi Objek. Bandung: Informatika Bandung, 2004.
- O'Brien, J., & Marakas, G., Management Information Systems. New York: McGraw-Hills/Irwin, 2011.
- Pressman, R. S., & Maxim, B. R., Software Engineering: A Practitioner's Approach. New York: McGraw-Hill, 2015.
- Rochaety, E., Sistem Informasi Manajemen. Jakarta: Mitra Wacana Media, 2017.
- Rubin, K. S., Essential SCRUM: A Practical Guide to the Most Popular Agile Process. Upper Saddle River: Addison-Wesley, 2012.
- Siregar, D. D., Manajemen Aset: Strategi Penataan Konsep Pembangunan Berkelanjutan Secara Nasional dalam Konteks kepala Daerah sebagai CEO's pada Era Globalisasi & Otonomi Daerah. Jakarta: Gramedia Pustaka Utama, 2004.
- Sugiama, A. G., Manajemen Aset Pariwisata: Pelayanan Berkwalitas agar Wisatawan Puas dan Loyal. Bandung: Guardaya Intimarta, 2013.
- Journal

- Aguilar-Savén, R. S., "Business Process Modelling: Review and Framework," International Journal of Production Economics, pp. 129-149, 2004.
- Alter, S., "Defining Information Systems as Work Systems: Implications for the IS Field," European Journal of Information Systems, pp. 448-469, 2008.
- Rahmah, A., et al., "Developing Distance Learning Monitoring Dashboard with Google Sheet: An Approach for Flexible and Low-Price Solution in Pandemic Era," International Conference on ICT for Smart Society, 2020.
- Shien Lin, J. G., "Developing a Data Quality Framework for Asset Management in Engineering Organisations," International Journal of Information Quality, pp. 100-126, 2007.
- Supriyono, "Software Testing with the approach of Blackbox Testing on the Academic Information System," International Journal of Information System & Technology, pp. 227-233, 2020.
- Symons, V. J., "Impacts of Information Systems: Four Perspectives," Information and Software Technology, pp. 181–190, 1991.
- Watson, G., "The Legacy of Ishikawa," Quality Progress, pp. 54-57, 2004.