Asset management information system for higher education

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Abstract. Asset management is the process of recording, collecting data, reporting and documenting assets at a specific time based on existing provisions, proper asset management can support operational activities especially in the maintenance, repair, and procurement of assets for the organization. This study aims to design an asset management information system for the process of managing asset data and integrated asset depreciation calculation methods for universities. The methodology used in this research is Scrum, which can accommodate changes during the system design process, by taking samples based on the business process of asset management in one of the private universities. This study produced a web-based asset management information system prototype that can assist in managing asset data and calculating asset value depreciation.

1. Introduction

The progress of technology both Information Technology and Information Systems (IT & IS) from time to time has a significant impact on the process of activities of an organization, where IT & IS has become an organization's needs [1,2]. In carrying out its activities, an organization is supported by essential assets that must be maintained and managed correctly [3]. Assets are economic resources that are controlled or owned by an organization that provides benefits and can be measured by units of money [4]. Asset management is the process of recording, data collection, reporting, and documentation of assets at specific times according to existing provisions [5,6]. For the asset management process to be carried out efficiently, there must be a system that can help the asset management process. Asset Management Information System (AMIS) is a management information system that collects inventory assets for all organizational bodies to ensure an orderly administration of administration and data collection of goods [7]. Implementing an asset management information system is an effort to order documents relating to data collection on the existence of assets and asset management processes [8].

Higher education is one of the highest educational institutions in Indonesia, with the main business processes of education, research, and community services[9,10]. With the development and utilization of IT & IS, demanding higher education to be able to manage the potential of all resources by utilizing IT & IS effectively and efficiently to face competition. Higher education has essential assets that must be managed well and regularly so as not to interfere with the business processes that are carried out, especially activities that use assets. Several previous studies have developed asset management information systems with various types of organizations, among others, focusing on computer lab assets [11], recording the status of computer repairs [12], loans and asset returns [13], and asset data collection with asset life [7]. The results of the study can only be used by research objects and cannot be
implemented by other organizations, and only one study uses depreciation in the calculation of assets [7]. The focus of this study in addition to collecting incoming asset data, also calculating depreciation of assets, and information systems created can be used by other organizations with a customized organizational profile, by taking a sample of cases at a higher education institution in the West Java region, where asset management at the institution is not appropriately managed, both in asset data recording, procurement time, and asset value calculation.

2. **Methodology**

In this study, the method used in software development techniques based on the Scrum method, which based on user input used by the software development team to provide products that meet user expectations [14–16]. Scrum is a repetitive workflow methodology that has an innovative and accessible product development approach. Scrum starts with making product guarantees, registering features or capabilities, and prioritizing the features that were needed [17–19].

![Scrum artifacts](image1)

**Figure 1.** Scrum artifacts [18,20].

![Conceptual research framework](image2)

**Figure 2.** Conceptual research framework.

- Data Retrieval: This stage is carried out to identify components related to research by conducting observations and study of documents used in the process of AMIS design activities.
- Product Backlog: Contains a list of all the features, functions, needs, enhancements, and improvements that are the changes that will make to the product in future releases. In this study, the product backlog feature is created and compiled by the product owner.
Sprint: At this sprint stage, there will be further analysis of the product backlog stage by developing a backlog of items produced in the previous step.

Scrum Meeting: At this stage of the Scrum meeting, it is to discuss the sprint results that will be evaluated at this stage, to meet the application requirements.

Scrum Review: This stage is carried out by all Scrum teams to review completed sprint activities to improve their performance in the next sprint.

3. Results and discussion

At this stage, system development is implemented using the Scrum model, from determining the Product Backlog, Determining the Sprint, Conducting Scrum Meetings, to demonstrating the results of development, the focus of this research is to develop a system to calculate asset values with useful life in accordance with the Decree of the Minister of Finance of the Republic of Indonesia No : 59 / KMK.6 / 2013 with a straight line depreciation formula [21] in equation (1):

\[
D = \frac{A - S}{n}
\]

- A: The cost of acquiring assets is the number of expenses incurred by the company to obtain assets until the assets are ready to operate;
- S: Estimated residual value of assets, namely the estimated amount that may be obtained through assets that have passed their usage period
- D: Depreciation expense for each period
- n: Age of benefits / economic life of assets in years

3.1. Product backlog

At this stage, the team led by Scrum Master determines the main features of the product to be developed according to the needs of the product owner. Table 1 shows the detail of the product backlog of the product developed by estimating the time agreed on by the Development Team.

**Table 1. Product backlog.**

| No | Block Item           | Description                                                                 | Priority | Estimated (Hour) |
|----|----------------------|-----------------------------------------------------------------------------|----------|-----------------|
| 1  | Login                | This module is used for user authentication processes and determines user access rights. This module equipped with a session to monitor activities carried out by the user so that if there is no activity within a specified period, the system will log out automatically and give a warning. | Very High | 24              |
| 2  | Logout               | This module is used as a user facility to exit the system.                  | Very High | 12              |
| 3  | Institution          | This module is used to replace biodata or profiles of agencies that use this system. | Very High | 32              |
| 4  | Asset Data Collection| This module is used as a page for managing asset data.                      | Very High | 40              |
| 5  | Type Asset           | This module is used for the asset type data collection process that is adjusted to the asset period in government regulations | Very High | 40              |
| 6  | Aset Provider        | Module to record asset providers                                            | Very High | 32              |
| 7  | Location             | This module is used as a page to determine the site of a saved asset        | Very High | 32              |
Table 1. Cont.

| No. | Module       | Description                                                                 | Security Level | Value |
|-----|--------------|-----------------------------------------------------------------------------|----------------|-------|
| 8   | Admin        | This module is created as a page to determine the system user and its access type | Very High      | 32    |
| 9   | Backup & Restore | This module is used as a system security page to backup and restores databases | Very High      | 32    |
| 10  | Report       | This module is used to make reports: Aset Data Report, Report Aset Depreciation, Aset Type Report, Aset Location Report, dan Aset Provider Report | Very High      | 40    |

3.2. Sprint
This stage is the stage of product design by involving the Product Owner and the team, to provide understanding to the Product Owner, a model is made in the form of diagrams that represent the product prototype. In Figure 3, the AMIS System Use Case produced is based on the product backlog and needs to agree upon between the Team and the Product Owner.

![Figure 3. Use case diagram AMIS.](image)

3.3. Scrum review
After evaluating through the Scrum meeting, the next step is a scrum review, which again involves the Product Owner as a user to assess each product deposit that has been agreed upon previously. Figure 4-7 is a display of AMIS that has been completed and approved by the Product Owner.
In Figure 4 is the AMIS start page where on this page the verification will be carried out according to the user's access level, while in Figure 5 and Figure 6 is the user dashboard display with a different login access level. Figure 7 is the implementation of the formula (1) with the results of the asset depreciation report. The implementation results are adjusted to the useful life according to the rules of the Decree of the Minister of Finance of the Republic of Indonesia Number: 59 / KMK.6 / 2013, the regulation regulates the classification of asset types and periods determined based on the type of asset. The system created can accommodate asset depreciation calculations based on that regulation by completing the collection of assets in and out [7,11,12]. This system uses a web platform for easy access without depending on the operating system used, and makes it easy to configure client-server based systems [9,22].
4. Conclusions
This research resulted in the Management Information System Assets (AMIS) which were built using Scrum which had the advantage of being able to accommodate very rapid changes based on user needs by involving product owners during system development. AMIS can provide asset depreciation calculations with provisions determined by the government in determining the useful life; besides that, AMIS can be used for other organizations with an institutional data change module equipped.

Acknowledgments
Thanks to Sekolah Tinggi Teknologi Garut which inspiring support the publication of this article.
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