DESIGNING WAREHOUSE INVENTORY MANAGEMENT APPLICATION WEB-BASED ON BATIK SINUWUN SME WITH THE AGILE SCRUM DEVELOPMENT METHOD

Muhammad Yumna Majdina(1), Budi Praptono(2), Maria Dellarosawati Idawicaksa(3)

(1), (2), (3) Bachelor of Industrial Engineering, Faculty of Industrial Engineering, Telkom University Telekomunikasi Street No.1, Terusan Buah Batu, Bandung, West Java, Indonesia, 40257

1myumnamajdina@student.telkomuniversity.ac.id, 2budipraptono@telkomuniversity.ac.id, 3mariadellarosawati@telkomuniversity.ac.id

ABSTRACT

In this era, technology develops rapidly. More adequate and modern technology displaced old technology and indicates high competition. This competition requires changes in the management of a particular business in order to keep up with developments and take advantages of the application of technology. Sinuwun Batik is SME engaged in the production of batik clothes and selling batik clothes. The increasing number of requests and various types of SME make Batik Sinuwun overwhelmed in regulating the supply of raw materials for production, because there is no warehouse record. This study aims to design a website-based application that can help Batik Sinuwun SME to manage warehouse inventory. This inventory application is designed using the Agile Scrum Development method. The stages of making the system begin with collecting the required data by eliciting user needs, this data is the basic data in determining the features of application. This application is made based on websites using the PHP framework CodeIgniter and MySQL as data storage. The application system is tested using the Blackbox Testing method and ISO: 9126. The result of this research is a website application to simplify the management of raw materials in and out of the warehouse so that the latest stock of raw materials can be found, but it can also minimize recording errors due to manual calculations.

Keywords: Agile Scrum Development, Warehouse Supply Application, Raw Material Stock
I. INTRODUCTION

Sinuwun Batik is a Small and Medium Enterprise (SME) which is engaged in the production of batik clothing and sales of batik cloth located in Sukoharjo, Central Java, Indonesia. At this time, Sinuwun Batik has 36 employees and 3 shops for product sales activities, namely batik cloth and batik clothing. Income of Sinuwun Batik SME in January to October 2019 is as shown in the Figure 1 below:

Figure 1 Monthly Income of Sinuwun Batik SME 2019
(Source: Batik Sinuwun SME Internal Data)

Figure 1 above shows that in June 2019 there was a decrease in SME income, because orders were not fulfilled which was caused by data errors in warehousing between stock data and actual data which resulted in the absence of batik cloth as the main raw material, so the production process could not run.

In addition, Sinuwun Batik SME also face other problems, the absence of a data recording process for warehouse goods, in and out goods, and also finished goods stocks. If the shop in Jakarta gets an order it will contact the warehouse in Sukoharjo to ask about the availability stock. This process requires special attention from the SME warehouse to respond. In this case, the stock data which should be updated continuously can be a problem for Sinuwun Batik SME.

One of the ways to solve the warehouse problem is using an application that can accommodate the above problems in order to record incoming and outgoing raw materials and finished materials that are more accurate and up-to-date. Some of the most regularly used application development methods for warehousing problems are the Waterfall method (Fatmawati, 2018; Joko, 2017; Agusvianto, 2017), the FAST method (Framework For The Applications) (Sari & Nuari, 2017; Abdullah, Setiawan, & Ummi, 2013), the Extreme Programming method (Priskila, 2018; Rahmi & Sari, 2016), the Agile Scrum method (Ruslan, Hasibuan, & Alam, 2018; Susilo & Witarsyah, 2016).

Scrum method is an iterative approach to software development that carries the principle agile (Hadinata, 2017) where users are actively involved in the information system development process, so the information system result actually meet user needs and optimal completion time (Mahalakshmi & Sundararajan, 2013).

Based on this description, the formulation of the research problem is: How to design warehouse inventory application website at Batik Sinuwun SME. With the design of this application, it is hoped that it can be useful for SME to simplify the process of collecting inventory of goods in warehouses and helping Batik Sinuwun SME in managing the availability stock items in their warehouses.

II. METHODOLOGY

According to Ken, Scrum method using the periodic approach (iterative) and incremental is to improve predictability and control risk (Sutherland, 2016). While the stages and parties involved in Scrum are as shown in the Figure 2 below:

Figure 2 Stages and Parties involved in Scrum
(Beck, 2000)

The Approach Scrum consists of activities:

1. Backlog

Backlog is a list of needs or features that the user wants and can increase, using elicitation of user requirements in order to
obtain a list of features that are needed by users.

2. Sprints
Sprints are units of work to fit the time specified in the time-box. During this process, there was no additional features. In this study the design and programming of the application was conducted for 4 weeks.

3. Scrum Meetings
This activity is a routine meeting held every day to evaluate what is being done, the problems, and the target completion for the next meeting.

4. Demo
Demonstrating software improvements to the user and evaluated by the user.

Meanwhile, to achieve the research objectives, stages to be conducted in this study are as follows:

1. Input Stage
This stage is the process of collecting the data required for the application design process, to obtained inventory data in the warehouse with the actual amount.

2. Process Stage
This stage is to managing the data obtained, then processed into an application design with the Agile Scrum method, which created the database first as the main data storage. It will be detailed into 4 diagrams; use case diagrams, activities diagrams, sequence diagrams, and deployment diagram to explain the relationship between software and hardware in application operation. Furthermore, the application development is based on a diagram design used CodeIgniter Framework.

3. Output Stage
Testing the application through the Blackbox method and ISO:9126 is the application of inventory in the warehouse which will help Batik Sinuwun SME to managing the inventory of goods.

III. RESULTS AND CONCLUSIONS

A. Data Processing
To identify system requirements, elicitation of user needs is conducted through interviews with user applications. After passing the elicitation stage of user needs, the final results of the elicitation of user needs are obtained. The final draft elicitation is shown in the table 1 below:

<table>
<thead>
<tr>
<th>Functional No.</th>
<th>Requirements Analysis:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I want the application to get</td>
</tr>
<tr>
<td>2</td>
<td>There is access to Admin login.</td>
</tr>
<tr>
<td>3</td>
<td>Admin can display the main page menu (Management User).</td>
</tr>
<tr>
<td>4</td>
<td>Admin can input the master data.</td>
</tr>
<tr>
<td>5</td>
<td>Displays the Home page.</td>
</tr>
<tr>
<td>6</td>
<td>Displays the Entry of goods.</td>
</tr>
<tr>
<td>7</td>
<td>Displaying Outgoing items.</td>
</tr>
<tr>
<td>8</td>
<td>There are functions to Add, Update, and Delete data from incoming goods.</td>
</tr>
<tr>
<td>9</td>
<td>Displays the amount of raw material stock.</td>
</tr>
<tr>
<td>10</td>
<td>Displays the incoming goods report.</td>
</tr>
<tr>
<td>11</td>
<td>Displays outgoing goods reports.</td>
</tr>
<tr>
<td>12</td>
<td>There is logout access to Admin.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-functional No.</th>
<th>Requirements Analysis:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I want this web application to be able to</td>
</tr>
<tr>
<td>2</td>
<td>Security report guaranteed</td>
</tr>
<tr>
<td>3</td>
<td>Easier to search warehouse data</td>
</tr>
<tr>
<td>4</td>
<td>Can be used on Windows Operating Systems</td>
</tr>
<tr>
<td>5</td>
<td>Runs properly</td>
</tr>
</tbody>
</table>

In table 1 are features in the system that are really needed by the user and can be done by the application maker. In this final elicitation result, there are 11 functional system features and 4 non-functional system features that will be made.
A.1. Database Design

Database design is made based on the elicitation stage of user needs in the previous stage, as well as on the theory of the purpose of inventory which there is a human interaction structure, tools control method and control arranged to achieve the following goals (Adelia, 2011):

- Supporting activities and work routines in a section within a company.
- Supporting decision actions for individual and inventory control departments.
- Supporting the preparation of internal reports as well as external reports.

Therefore, database design is obtained in the following Figure 3 below:

![Figure 3 Database (Data Storage)](image)

A.2. Use Case Diagram Design

Use Case describes the actors in the system (Mulyani NS, 2016). In this system there is only an actor, the warehouse admin involved in the application as in the Figure 4 below.

![Figure 4 Use Case Diagram](image)

B. Results and Discussion

Based on the results of the tests, the warehouse inventory management application is running well according to user needs. The results of system testing can be seen in Table 2 to find series of input conditions that match the program requirements (Laurie, 2006).

<table>
<thead>
<tr>
<th>No</th>
<th>Scenarios</th>
<th>Test Case Test</th>
<th>Expected Description</th>
<th>Results Testing Results</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>User does not fill in the username and password then chooses login button</td>
<td><img src="image" alt="Image" /></td>
<td>System will deny login access by displaying the message &quot;Please fill in the field&quot;</td>
<td>Succeed</td>
<td></td>
</tr>
</tbody>
</table>
Wrongly filling in the username and password, system will deny login access by displaying the message "Username has not been registered".

Displays the Home page after successful login, system will display the Home page or dashboard properly.

<table>
<thead>
<tr>
<th>No</th>
<th>Scenarios</th>
<th>Test Case Test</th>
<th>Expected</th>
<th>Results Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Successfully save data input goods</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Incoming goods data input stored in the database</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Succeed</td>
</tr>
<tr>
<td>5</td>
<td>Successfully created outgoing goods from warehouse</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Outgoing goods reducing stock inventories</td>
<td><img src="image4.png" alt="Image" /></td>
<td>Succeed</td>
</tr>
<tr>
<td>6</td>
<td>Successfully Add, Update, and Delete incoming goods table</td>
<td><img src="image5.png" alt="Image" /></td>
<td>Successful Saving, Modify, and Delete data in the incoming goods table</td>
<td><img src="image6.png" alt="Image" /></td>
<td>Succeed</td>
</tr>
<tr>
<td>7</td>
<td>Successfully displaying stock raw goods</td>
<td><img src="image7.png" alt="Image" /></td>
<td>Stock of raw goods is displayed completely</td>
<td><img src="image8.png" alt="Image" /></td>
<td>Succeed</td>
</tr>
<tr>
<td>8</td>
<td>Successfully logged out from system</td>
<td><img src="image9.png" alt="Image" /></td>
<td>Successful to exit from application</td>
<td><img src="image10.png" alt="Image" /></td>
<td>Succeed</td>
</tr>
</tbody>
</table>

In addition to testing the system also using ISO: 9126 to evaluate software quality (Banjarahor, 2018). The analysis is as follows:

1. Functionality, this application has been created and according to the user needs because at each stage of manufacture confirmed by the user.
2. Reliability, the application in testing practice has minimal errors because it has been tested.
3. Usability (Ease of User), the use of features is easy to understand because the user is directly involved in the application creation process.
4. Efficiency, the application can be used by new user because there is a manual book as a guide to using the application.
5. Maintainability, maintenance activities is not needed yet, because the usage time is still short, which is less than a month and there is no problem.
6. Portability, applications can be accessed anywhere and anytime, so it can be accessed with a personal computer, laptop, or smartphone.

To evaluate the warehousing system after the application, interviews are conducted with users, there are several differences in warehousing systems, as in the table 3 below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Old System</th>
<th>New Application System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Additional human resource is needed for physical checking in the warehouse to find out the raw materials availability</td>
<td>User can check directly through the application without physical checking so it can save human resource</td>
</tr>
</tbody>
</table>
It is necessary to manually recalculate to find out the amount of raw material inventory when needed. Amount of raw material inventory has been recorded in the application. It isn’t need manual calculation.

It takes between 15 minutes to more than 2 days to find raw materials. It only takes approximately 3 minutes to find raw materials.

Raw materials can run out at any time without being monitored, thereby reducing the productivity of SME. Reducing the risk of running out of raw materials with a system that can be monitored.

The process of checking the number of raw materials can only be done during working hours so limited in time and place. The process of checking the number of raw materials can be accessed from anywhere and anytime without limitation of time and place.

There are no reports of entry and exit of raw materials. There are reports of entry and exit of goods with easy access.

In table 3 above shows that there are several benefits for Sinuwun Batik SME. With this application is proven to increase the level of efficiency and effectiveness of Sinuwun Batik SME, especially in the warehousing section.

IV. CONCLUSION

The result of this study is the warehouse inventory management application website with the Agile Scrum Development Method from the initial process of collecting user requirements until the application is completed and has passed the Blackbox testing and ISO: 9126, so the application can run without problems and features according to user needs. In addition, this application can help Batik Sinuwun SME to manage inventory easier in their warehouses as well as improve the efficiency and effectiveness of warehousing, for example efficiency time when user searches stock of goods previously reaches a minimum of 15 minutes, with this application becomes less than 3 minutes.

REFERENCES


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