DESIGN AND IMPLEMENTATION OF INVENTORY INFORMATION SYSTEM IN PUTRA MARIYO TRADING BUSINESS

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Abstract—Technological advancement in information technology applications allows the data recording process to become easier. Putra Mariyo Trading Business is a business institution that sells wood as a building material in various types and sizes. Data processing of incoming and outgoing goods in this business is performed only by writing goods data into a specific book. Consequently, some problems such as the loss of data and miss calculation in processing transactions usually occur. Therefore, in this research, we design a system to address the problems. The system is developed by following the Waterfall software development method. To build the system, we opt to use PHP programming language, CodeIgniter framework, and MySQL as the database server. To determine system reliability, this information system testing uses black box testing which focuses on the functional requirements of the system. To evaluate the performance of the system two testing steps i.e., black-box testing and System Usability Scales (SUS) are adopted. Black-box testing results show that the error percentage of our system is 0%. The SUS testing is conducted to obtain responses from users and the SUS score obtained is 70.1 indicating that the system is at the "good" level and reliable to use.

Keywords: inventory, website, information system.

Abstrak—*Kemajuan teknologi seperti saat ini memungkinkan pencatatan data barang dapat dilakukan dengan menggunakan sebuah sistem agar proses pengelolaannya lebih mudah. Usaha Dagang Putra Mariyo merupakan sebuah usaha yang menjual kayu sebagai bahan bangunan dengan berbagai jenis dan ukuran. Pengolahan data barang masuk dan keluar pada usaha tersebut hanya dengan menyalin data barang kedalam buku sehingga sering terjadi permasalahan seperti hilangnya data dalam proses pengolahannya. Oleh karena itu, dibutuhkan sebuah sistem untuk mengatasi permasalahan tersebut. Sistem ini dikembangkan menggunakan metode pengembangan perangkat lunak Waterfall. Selanjutnya sistem akan dibangun menggunakan bahasa pemrograman PHP, framework CodeIgniter serta MySQL sebagai database server. Untuk mengetahui kehandalan sistem, pengujian sistem informasi menggunakan black box testing yang mana memfokuskan pada keperluan fungsional dari sistem. Hasil black box testing menunjukkan persentase eror sebesar 0%. System Usability Scale (SUS) dilakukan untuk mendapatkan respon dari pengguna yang melakukan percobaan terhadap sistem yang telah dikembangkan. Skor akhir SUS yang diperoleh adalah 70,1 yang berarti sistem berada pada tingkatan "good".*

Kata Kunci: *inventori, website, sistem informasi.*

INTRODUCTION

The rapid development of technology brings various benefits because it can help people in completing their work [1]. Information technology allows access to information and data faster, more effective, and more efficient. The use of the technology has proven to be very helpful in one's work specifically in processing data, such as inventory data such that the data can be better organized [2].

Putra Mariyo Trading Business is a business that sells wood as a building material of various types and sizes. To explore the problem, several interviews with the owner of the Putra Mariyo trading business have been conducted. Interesting information is obtained that the data processing of incoming and outgoing goods rely on a simple way i.e., by simply copying reports from notes into notebooks. This activity is very risky since the notes in the book are prone to get damaged and even lost. Accordingly, trading business owners need more time when they want to know the product inventory.

Inventory is a list of goods as a whole from an institution including companies in the form of inventory of goods or stock accompanied by types,

conditions, and prices [3]. The inventory information system is an information system that is used to find out the number of certain items in the warehouse [4]. The information system is usually developed using web technology such as HTML, PHP, and MySQL. The development of HTML and PHP versions adapting to technological developments where the latest developments are that a website can be developed with various development facilities including PHP, HTML5, Cascading Style Sheet (CSS), and Javascript [5]. CodeIgniter is a popular framework that can speed up the development of web applications, therefore, in the development of inventory information systems, we adopt the framework [6].

The processing of products' information at the Putra Mariyo Trading Business is conducted in a simple way in which it is manually written into certain books. Therefore, we are motivated to develop a website-based information system that makes it easy for business owners to process products' data, transactions, and reports of incoming and outgoing goods. In addition, the web-based application allows the data processing becomes much faster and lowers data inaccuracy. To make the application becomes more useful we add it with several features, including the printing reports. incoming and outgoing goods transactions reports, and filtering transactions that occurred within a certain period.

MATERIALS AND METHODS

The software development method that is used to develop the inventory information system at the Putra Mariyo Trading Business is the waterfall method. The waterfall method is a design process in developing sequential and systematic software that looks like a waterfall flow which consists of stages namely requirements analysis, system design, implementation, testing, and system maintenance. [7]. The adoption of the waterfall method is it provides a clear software development flow so that the work on the system will be more detailed and the tasks to be carried out become more detailed [8]. In addition, the method is simple to understand and implement.
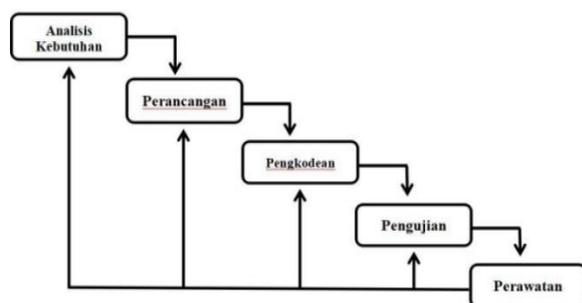
Figure 1. Illustration of the Waterfall Model

A. Requirement Analysis

The initial stage is performing requirement analysis by collecting data from the business owners through interviews, the data in the form of data on goods, suppliers, consumers, wood, and species. From the results of the interview, information was obtained that the owner of the Putra Mariyo Trading Business needed an information system that could be used to store data (goods, suppliers, and consumers) and transactions that had occurred to prevent data/transaction records from being lost if one day they would be needed again.

In addition, there is an analysis of system requirements consisting of functional and non-functional requirements. The functional requirements of this system are by the function of the system to be able to insert, update, and delete data managed by the admin. Then non-functional requirements related to the software and hardware needed to develop this system.

B. Design

After all the requirements have been collected, the following step is designing a Unified Modeling Language (UML) diagram which includes use case diagrams, activity diagrams, and Entity Relation Diagrams. This stage is carried out to describe what the actor will do and the design of the display system [9]. Figure 2 is a use case diagram design that displays the activities carried out by actors from the information system. Figure 3 is a diagram of admin activity, the administrator of the system is required to log in to the inventory information system. Figure 4 shows admin activity when viewing a short report on the dashboard page.
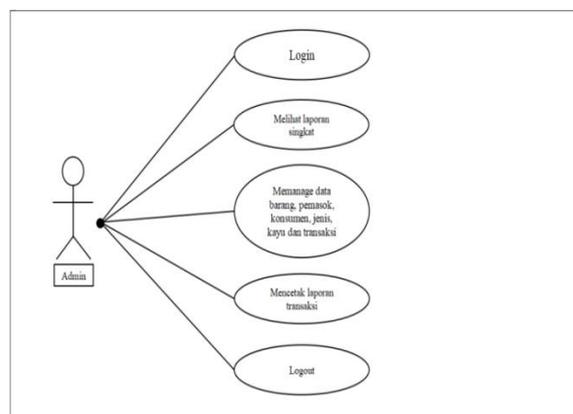

Figure 2. Use Case Diagram
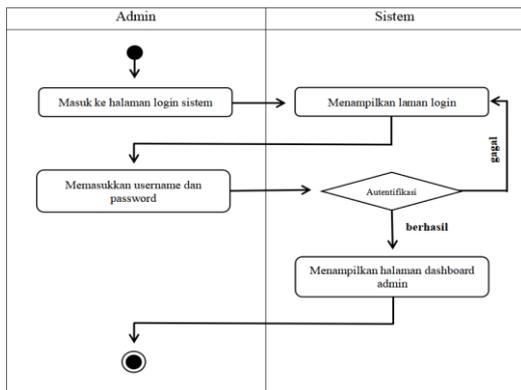
Figure 3. Admin Activity Diagram Login
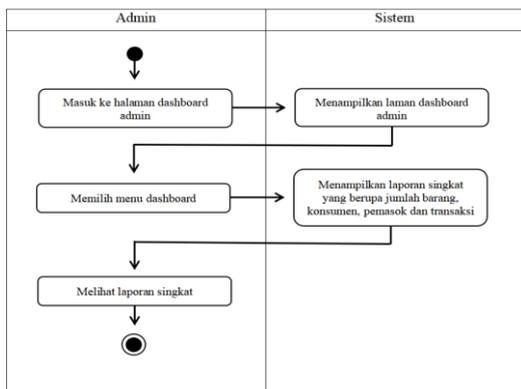
Figure 4. Admin Activity Diagram Viewing a Brief Report

After logging in and viewing a short report on the inventory information system on the dashboard page, the admin can manage the product data for the transactions process, including data on goods, suppliers, consumers, wood, and types. The admin activity diagram managing data can be seen in Figure 5. After the admin manages the data above, the admin can fill in the fields contained in the transaction menu. Figure 6 describes a diagram of the admin activity in filling the transaction data.
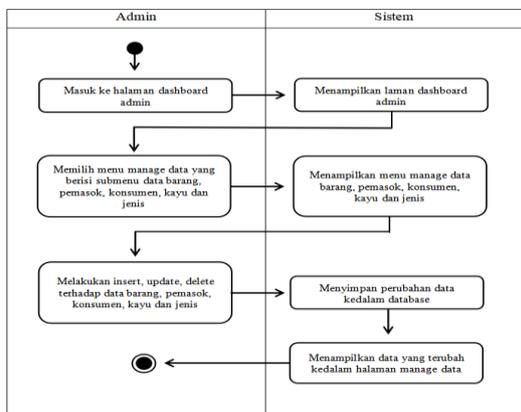
Figure 5. Admin Activity Diagram Managing Data
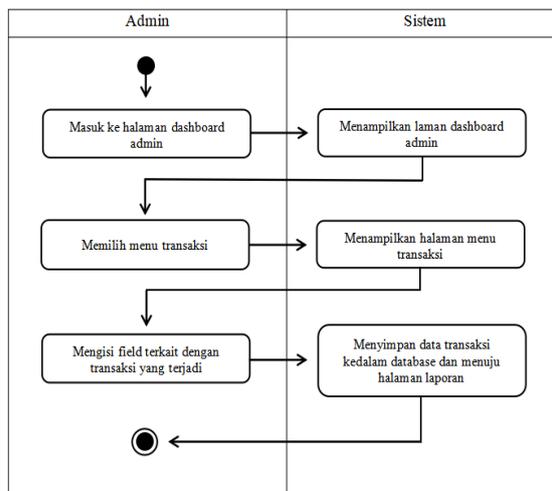
Figure 6. Admin Activity Diagram Filling Transaction Data

In this inventory information system, the admin can print out transaction reports that have been recorded, both incoming and outgoing transactions. The activity diagram of printing transaction reports can be seen in Figure 7. Once the admin is finished these activities, the admin can log out from the system and log in at a later time. Figure 8 below shows a diagram of the admin activity logging out of the inventory information system.
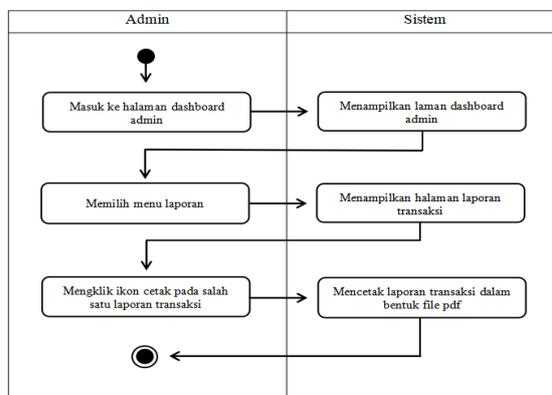
Figure 7. Admin Activity Diagram Printing Transaction Reports
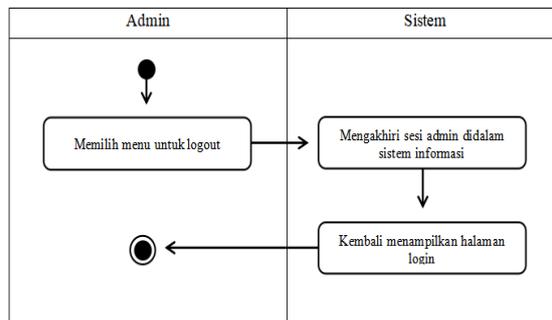
Figure 8. Admin Logout Activity Diagram from the System

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To successfully manage the inventory data in a proper manner, a database should be designed carefully. The database design for the inventory information system is depicted in Figure 9 where it consists of 11 tables that have a relation among them.
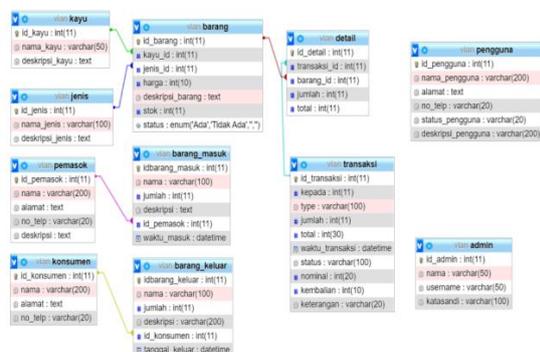

Figure 9. Database Design

C. Coding

This stage is writing program code or translating the system design into a computer language that has been designed in the previous stage into an application program [10]. The coding of this information system uses web application programming like PHP, HTML, CSS, and JavaScript programming languages.

D. Testing

Ensuring free error code using proper testing is crucial in the development phase. The testing process is taken after the completion of writing the code. This test is carried out to determine whether the system that has been designed can run properly and to find errors in the system [11]. Several tests are carried out on this information system such as Black Box Testing and System Usability Scale. Black box testing is conducted by entering input to the system according to certain conditions and then the system will do the tasks of its entire function [4]. System Usability Scale (SUS) is a testing method developed that has a function to measure the usability of a system according to the user's subjective.

E. Maintenance

The last stage in the waterfall method is maintenance. After the information system has been completely developed, the next step is running the system and carrying out maintenance. At this stage, the Putra Mariyo Trading Business admin is trained so that he can understand the system that has been developed specifically regarding the features in the inventory information

system. This maintenance stage includes fixing errors that were not found in the previous stage [12].

RESULTS AND DISCUSSION

As the system development is completed, we proceed with the implementation of the design into the system. The first page of this system is the admin login page because the actor of this system is only an admin. Figure 10 shows the login page for the admin to enter the dashboard of this inventory information system.
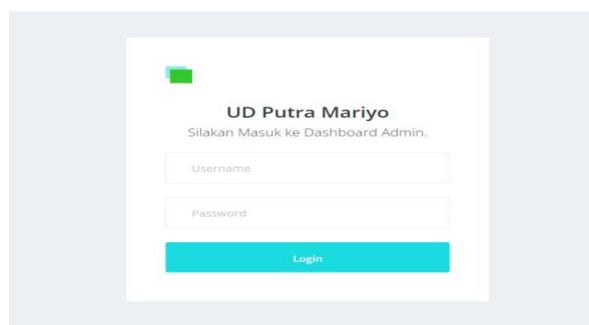
Figure 10. Login Page Display

As the admin is successfully logging in, the admin will be directed to the dashboard page that contains several menus as shown in Figure 11.

Figure 11. Dashboard Page Display

On the dashboard page, there is some information such as the number of transactions, suppliers, consumers, and goods that have been stored in the system. Then in the sidebar, there are menus such as dashboards, transactions, manage data, reports, and data backups. In the transaction menu, several fields must be filled in by the admin, including the date of the transaction, supplier or consumer, type of transaction, goods and their amount, and nominal money. The transaction menu page can be seen in Figure 12.
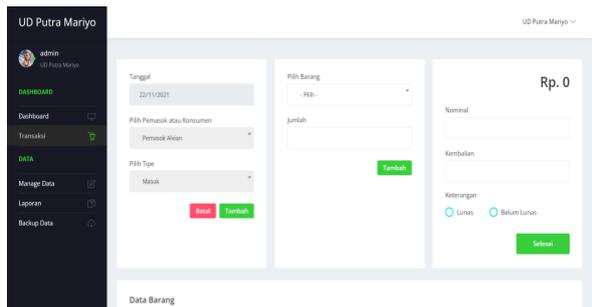
Figure 12. Transaction Page Display

Then the manage data menu is used by the admin to manage data such as data on goods, suppliers, consumers, wood and wood types which will later be used to complete the data on the transaction menu. Figure 13 below shows the display of the goods data manage page.
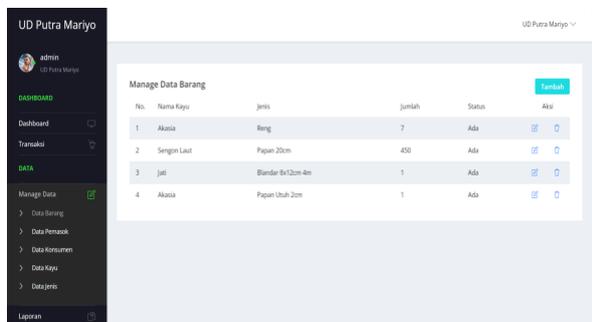
Figure 13. Display of the Manage Item Data page

After the transaction is completed by the admin, the transaction data will be entered into the report menu. In the report menu, there are 3 submenus, namely transaction reports, incoming goods reports, and outgoing goods reports. By the type of transaction carried out previously, later the transaction data will be entered into the incoming goods report or outgoing goods report. Then in the transaction report submenu, there are 2 features, namely the print and delete features, this print feature allows the admin to print transaction reports that have occurred into a pdf format file. The report page display and transaction printout can be seen in Figures 14 and Figure 15.
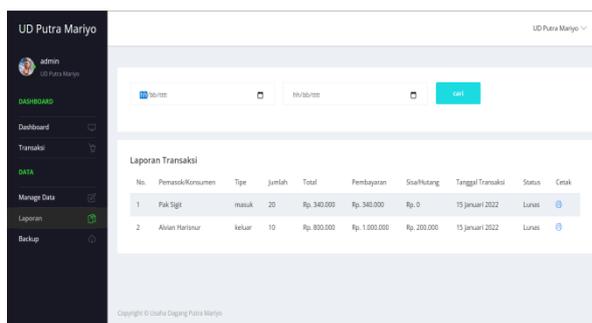
Figure 14. Report Page Display

Figure 15. Display of Report Print Results

The last feature is data backup. The feature serves to download the system database and can later be used as a data backup if the system experiences damage or some error functions. The result of the download is a zip format file in which there is a database file from this information system. Figure 16 below is the result of downloading backup data.
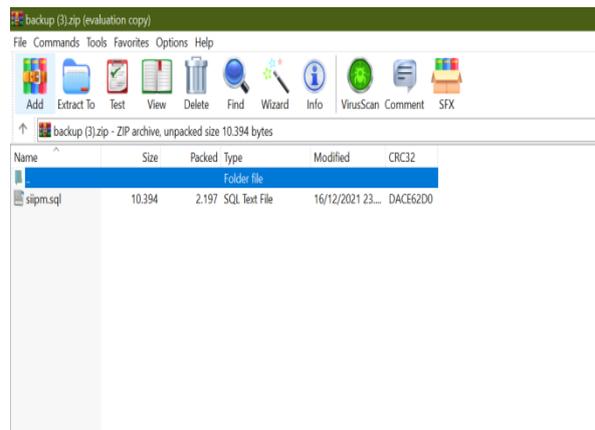
Figure 16. Data Backup Download Results

After the implementation of the design into the system has been completed, the next step is to test the system. In its development, this system was tested using 2 methods, namely Black Box Testing and System Usability Scale. Black Box Testing focuses on system input and output, not code for the implementation of the system, in other words, this test focuses on the output results of the input values that have been inputted. Below is a table of Black Box Testing :

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Table 1. Black Box Testing

No	Testing	Test Case	Hope	Description
		Admin		
1	Login	The username and password are correct	Go to the dashboard page	Success
		The username and password are incorrect	Stay on the login page	Success
2	Logout	Admin presses the logout option	Back to log in page	Success
3	Master Data	Admin presses the master data sidebar	Master data appears with a dropdown	Success
			Data of goods, suppliers, consumers, wood, and types appear	Success
4	Data on Goods, Suppliers, Consumers, Timber, and Species	The admin presses the item data menu, suppliers, consumers, wood, and types		
		Admin presses the add button	Show form to add data	Success
		Admin presses edit action	Show form to edit data	Success
		Admin presses delete action	Selected data deleted	Success
5	Transaction	Admin presses the transaction menu sidebar	A form appears to add a transaction	Success
		Admin presses the "Selesai" button	Item data stored in the table	Success
		Admin delete transaction	Deleted transaction data	Success
		Admin presses the report menu sidebar	The transaction report menu, incoming goods, and outgoing goods appear with a dropdown	Success
6	Report	The admin presses the transaction report menu, incoming goods, and outgoing goods	Transaction report data, incoming goods, and outgoing goods appear	Success
		Admin prints transaction reports	Report output in the form of a pdf file	Success
		Admin delete transaction report	The selected transaction is deleted	Success
7	Backup data	Admin presses the sidebar menu backup data	Downloaded and backed up system data	Success

To ensure that the system is useful for the user, testing called System Usability Scale is conducted. The System Usability Scale focuses on users' evaluation of the system that has been developed. In the application, the testing method uses a questionnaire consisting of 10 questions that should be answered by the respondents [13]. The assessment is carried out using a Likert scale point from 1-5 where it indicates "strongly disagree" to "strongly agree", then the usability aspects that will be assessed by respondents including effectiveness, efficiency, and user satisfaction to the system that has been developed [14]. Tabel 2 contains a set of questions in the questionnaire:

Table 2. Table of System Usability Scale Questions

No	Pertanyaan
1	I think will use this system again.
2	I find this system difficult to use.
3	I think this system is easy to use.
4	I think that I need the help of someone else or a technician to use this system.
5	I think there are too many inconsistent things in this system.
6	I think there are too many inconsistent things in this system.
7	I feel that most people will understand how to use this system quickly.
8	I find this system very confusing.
9	I feel confident in using this system.
10	I need to learn many things before I can use this system.

Table 3. System Usability Scale Test Results

Rsp	System Usability Scale Score Results										Total	FS
	1	2	3	4	5	6	7	8	9	10		
1	3	3	4	2	3	2	4	2	4	1	28	70
2	4	2	4	3	4	1	3	3	3	3	30	75
3	3	4	3	4	2	1	3	2	4	2	28	70
4	2	2	3	2	3	2	2	3	3	3	25	62,5
5	4	3	4	3	2	3	3	3	3	2	30	75
6	3	2	3	2	3	1	3	3	2	3	25	62,5
7	4	4	3	3	3	2	4	4	3	3	33	82,5
8	1	2	2	0	2	2	2	1	2	2	16	40
9	3	3	3	2	2	2	3	3	3	3	27	67,5
10	3	3	3	3	3	2	4	2	3	3	29	72,5
11	3	3	3	3	3	3	4	3	2	2	29	72,5

Rsp	System Usability Scale Score Results										Total	FS
	1	2	3	4	5	6	7	8	9	10		
12	4	4	3	3	2	2	3	3	3	3	30	75
13	3	3	4	4	3	2	4	3	3	3	32	80
14	4	3	4	3	3	3	2	2	3	2	29	72,5
15	3	2	3	2	2	1	3	2	2	2	22	55
16	3	3	3	3	3	3	4	3	3	3	31	77,5
17	3	4	4	2	3	1	3	2	4	4	30	75
18	4	3	3	3	2	2	3	3	3	3	29	72,5
19	3	4	3	4	2	1	3	2	4	2	28	70
20	3	3	3	2	3	2	3	3	3	4	29	72,5
21	3	3	4	3	2	2	4	3	3	3	30	75
22	2	3	3	3	2	1	3	3	2	3	28	70
23	3	3	3	3	3	2	3	3	2	2	28	77
24	4	3	3	3	3	3	2	2	3	3	28	70
25	3	3	4	3	2	1	3	3	2	3	27	67,5
										Total		1752,5
										Final Score		70,1

The collected assessment data from the respondents is calculated to determine whether the system is categorized as good or not [13]. Accroding to the System Usability Scale calculation, the scale value for odd numbers is reduced by 1 and for even numbers the score position is 5 which is then reduced by the scale value, after getting the total value from questions 1-10, the total value is multiplied by 2.5 and the value of the System Usability Scale is the average value. The average of the total value that has been multiplied in advance [15]. There are several assessment categories in the System Usability Scale test, including acceptability (not acceptable, marginal and acceptable), grade scale (A, B, C, D and F) and adjective rating (worst imaginable, poor, acceptable, good, excellent and imaginable) [16].

Referring to the test results in Table 3, it can be concluded that the inventory information system in Putra Mariyo's trading business obtains an average value of 70.1. Thus, the system is classified as acceptable for the acceptability category, then the grade scale gets a C value and based on the adjective rating it is at the good level.

CONCLUSION

The development of an inventory information system in Putra Mariyo's trading business is based on the objectives and needs, namely so that trading business owners can improve data accuracy in processing data on goods, transactions, reports of incoming goods and reports of goods going out compared to the previous method, namely copying into books which will be potentially damaged or even lost. In the development process, the information system is tested using Black Box Testing and System Usability Scale. In the Black Box Testing, it can be concluded that the features available in the system can run well and with an error percentage of 0%, while the System Usability Scale testing gets 70.1. In terms of acceptability this

system is classified as acceptable, then in terms of the grade scale it gets a C value and for the adjective rating system, it is classified as good. So it can be concluded that the developed information system is feasible to use.

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