Design Application System of B2G Sales Internal Management Using Waterfall Method

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Abstract Technological developments in the era of globalization have triggered developments in various important sectors of the environment. The development of technology in the current economic sector is increasingly rapid where technology has been used in business development systems. PT Dwi Srikandi Nusantara, a medical device sales company, is now one of the providers in the sale of e-catalog procurement for the type of businees to government sales. But the problem arises because the company does not yet have a B2G sales management system and can be used as a monthly report. So from this research an application is designed that can be an internal B2G sales management application and can be used as a monthly report. The research was conducted using the waterfall method as a system development method designed. The research starts from the requirements stage by analyzing customer needs, then making a system design that is built, implementing the design into coding, and testing the functionalities of each part of the system. From the research that has been done, it is found that the results of the application system design have been successfully carried out and from the results of functional testing, the overall results of the system in the application are successfully functioning according to user needs.

***Index Terms*— Company Information Management, Management Application, Waterfall, Web Application**

I. INTRODUCTION

The development of technology is currently very fast and has entered the aspects of human life. Economic and business aspects are one of the aspects affected by technological developments where currently technology helps a lot in facilitating human tasks in the fields of economy and business [1]. One example of the application of technology in business is the application of system applications that help employees compile reports or work in a structured manner [2]. System management is very important in business in order to ease the work of employees to improve work efficiency. [3] PT. Dwi Srikandi Nusantara is a subsidiary of PT. Baliyoni Saguna where the company is engaged in the sale of medical devices and consumables.

Currently PT. Dwi Srikandi Nusantara has participated in becoming a supplier in procurement sales in E-Catalog which is an electronic information system that contains lists, types, technical specifications and prices of goods and services from government goods and services providers. E-catalog is a new method of procuring government goods and services [4]. The problem that arises from this is where PT. Dwi Srikandi Nusantara does not have an internal system for compiling, storing documents and monitoring the sales stages of the E-catalog.

From these problems, a research was conducted on the making of internal management applications for B2G sales from PT. Dwi Srikandi Nusantara who uses the waterfall method as a step in making applications. Research carried out based on the stages of the waterfall method because it has a definite sequence so that the development of each stage can be seen with certainty [5]. The use of the waterfall method is also used because it is clear in the declaration of each stage [6]. It is hoped that the research that will be carried out can help the B2G sales process at PT. Dwi Srikandi Nusantara has become more efficient and effective in its implementation.

II. STUDY LITERATURE

A. Waterfall Metode

The waterfall method is a method that can be said to be a classic life cycle method which describes a systematic and sequential approach to software development[7]. The use of the waterfall method begins with analyzing the requirements specifications then the planning stages, then modeling and construction. In its development, the waterfall method has several successive stages according to their respective processes[8]. The following are the stages of the waterfall method.

1) Requirements

Requirements stage is the stage needed to understand the software that is expected by users with the software limitations[9]. In this stage, good communication between

the user and the developer is needed to be able to make the system as desired. Information obtained from this stage can be obtained by conducting interviews, discussions and surveys with system users. The information obtained from the user will then be summarized and become input at a later stage.

2) Design

The design stage is the stage where the data that has been obtained from the previous stage is collected and studied and prepares the design of the system to be built[10]. System design helps define requirements and define the overall system architecture.

3) Implementation

In the implementation stage, at this stage it is the developer stage to create a small program called a unit and integrated. Each unit developed[11]. The results of this stage really depend on the previous stage to be able to create a system that suits the needs and desires of the user.

4) Verification

At the verification stage, testing and integration is carried out from the results of the previous stages of development[12]. The verification stage tests the system that has been completed previously to look for failures or errors that occurred in the previous stage to become data for the next stage of improvement or development.

5) Maintenance

The maintenance stage is the last stage of the waterfall method where at this stage the errors and failures that have been tested in the previous stage are repaired[13]. At this stage, the design can return to stages that require improvement. Improvements are made to ensure that all systems that have been created can function as desired by the user. At this stage the system can also be updated according to the system development required by the user.

The waterfall method allows departmentalization and control where the development process is a one by one phase model so as to minimize errors that may occur[14]. But the waterfall method also has disadvantages where it does not allow for many revisions if there is a problem in the process because after the testing stage it will be difficult to return to the previous stage to change something that is not well documented.

B. Blackbox Testing

Blackbox testing is a method that is often referred to as behavioral testing, in which this method tests the functionality or usability of the software. Black box testing is sufficient to review the input and output of the software system without paying attention to the internal program[15]. Blackbox testing is used to test the specific functions of a software. Black box testing has advantages where in this method the identification of the deficiencies of a system can be quickly found so that this method can be more effective in testing the usefulness of the system. Blackbox testing also allows developers to work independently without interrupting each other's work processes. In addition to the advantages of blackbox testing, there are drawbacks to this method, which is because the test does not have technical knowledge, allowing aspects with potential errors to be missed without realizing it.

III. RESULT AND DISCUSSION

A. Requirement

The system analysis to be built is made by involving system users consisting of the e-catalog helpdesk, marketing division, purchasing division, admin division, warehouse division, finance division and accounting division. The analysis is carried out by interviewing the requirements required in the system. Design is a very important stage in the waterfall method because at the design stage, the system to be built and used by users must be very carefully considered and communicated to avoid new adjustments in the next stage which will take a long time. From the design stage analyzed the needs of each user who will use the system designed. The following is the result of a system requirements analysis.

Tabel 1. Requirement Analysis

No		Analisis Requirement
1	Administrator	Mampu menambahkan User Baru
2		Mampu Menghapus User
1	Helpdesk	Mampu menambah Paket Baru
2		Mampu Melihat Paket Berjalan
3		Mampu Melihat Paket Selesai
4		Mampu Melihat Permohonan Update
5		Mampu Mendownload Laporan Paket Bulanan
6	Divisi Marketing	Mampu Melihat paket Berjalan
7		Mampu Melihat Paket Selesai
8		Mampu Menngubah tahap Paket
9		Mampu Mengupload Dokumen SO
10	Divisi Purchasing	Mampu Melihat paket Berjalan
11		Mampu Melihat Paket Selesai
12		Mampu Menngubah tahap Paket
13		Mampu Mengupload Dokumen PO
14		Mampu Mengupload Dokumen DO
15	DivisiAdmin	Mampu Melihat paket Berjalan
16		Mampu Melihat Paket Selesai
17		Mampu Menngubah tahap Paket
18		Mampu Mengupload DokumenAwal
19	Divisi Finance	Mampu Melihat paket Berjalan
20		Mampu Melihat Paket Selesai
21		Mampu Menngubah tahap Paket
22		Mampu Mengupload Dokumen Pembayaran
23	Accounting	Mampu Melihat paket Berjalan
24		Mampu Melihat Paket Selesai
25		Mampu Menngubah tahap Paket
26		Mampu Mengupload Dokumen Pencatatan Keuangan /pajak

From the results of the needs analysis that has been made based on interviews with respondents, a usecase diagram can be made to describe the interaction between one or more actors and the system to be created. The following is a usecase diagram of the designed research.

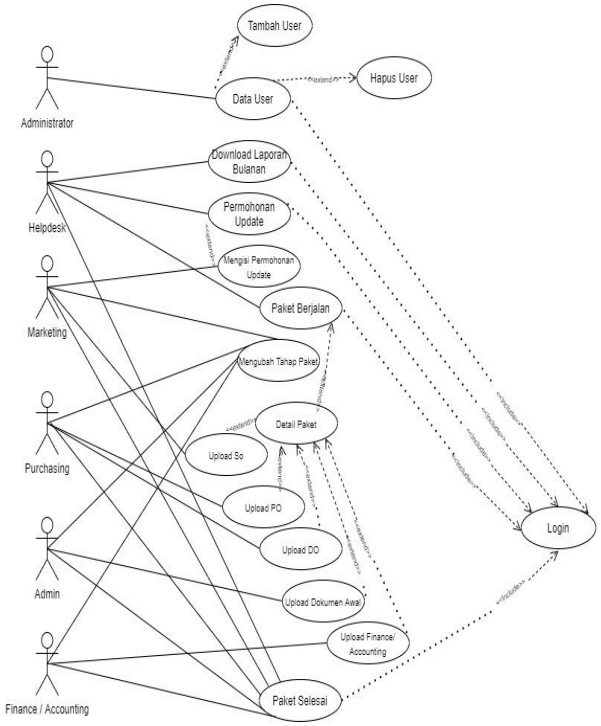

Figure 1. Usecase Diagram

Based on the usecase diagram above, it can be seen the relationship between actors and the system created. There were 6 actors in this study who interacted with the system according to the needs that were made in the previous stage. Making usecase diagrams can help research in carrying out the next stage of the design method using a waterfall, namely design

B. Design

Design is the second stage of the waterfall method where everything related to the conceptual creation of the system to be built will be done at this stage in the design. Design is very important which is the basic stage of a design pattern. In the design research, the design was made on the system and database. The following is the design of the research conducted.

1) Activity Diagram

Activity Diagram merupakan bentuk visual dari alir kerja dari sistem yang dibangun dimana pada activity diagram berisikan aktivitas dan tindakan yang dilakukan, pilihan dari sistem yang dibangun, pengulangan sistem dan concurrency sistem yang dibangun. Pembuatan acivity diagram sangat penting untuk dapat menjelaskan proses yang berlangsung pada system. Berikut merupakan contoh activity diagram yang dibangun sesuai dengan sistem yang dirancang.

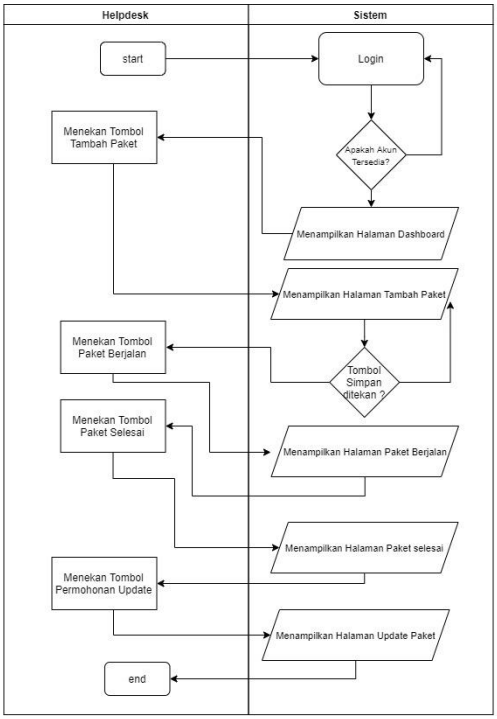

Figure 2. Activity Diagram Helpdesk

The picture above is an activity diagram of a system intended for helpdesk, here is an activity diagram used in marketing

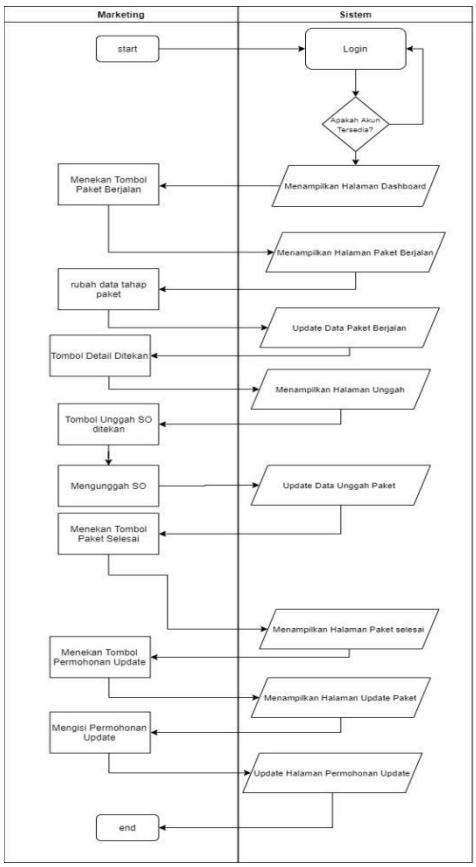

Figure 3. Activity Diagram Helpdesk

From the two activity diagrams above, it can be seen that the process carried out for each user is different according to user needs that have been designed before. In the activity diagram above, you can also see the choices and actions that are built for each user. From the results of the activity diagram above, it can be concluded that the design of the system designed is successful and can go to the next stage.

2). Entry Relationship Diagram

The next stage of this research is making an entity relationship diagram. Entitiy relationship diagrams are diagrams that function in shaping the design or modeling of the database which can then be developed in a project that has been designed. Making the ERD design is needed to explain the relationship between data objects that have relationships between relationships so that the database is designed to be more structured and make it easier for developers to build the system to be created. The following is the entity relationship diagram of the system designed in this study.

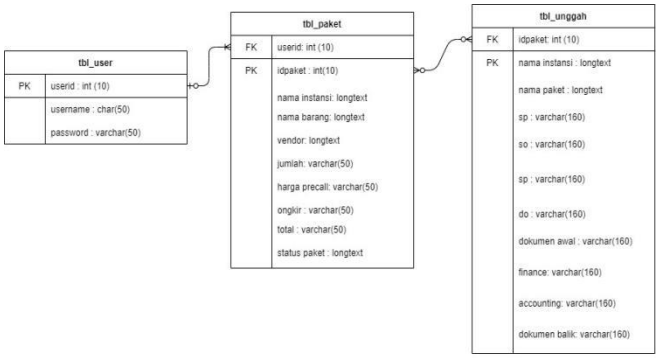

Figure 4. Entity Relationship Diagram

It can be seen in Figure 4 above where in the system being built there are three tables needed to store data from the system being designed. Relationships between tables are relationships that occur between one table and another[17]. The tables required are user, package and upload. Each table has a relationship with other tables in the need to store and upload data to the designed application. After designing the application design, the research can be continued to the next stage, namely implementation.

C. Implementation

The implementation stage is the system development stage where the previously designed system is converted into codes according to the designed system. This stage is the initial stage the system is developed into a small program called a unit and is integrated with the next stage. In the implementation stage of this research, bootstrap is used as the user interface of the application which functions as a medium that connects humans to machines. In the backend, the PHP language is used as a programming language to define programs and systems that humans want or design to be understood by machines. In the database, use Msql with XAMPP as the webserver of the database used. From the implementation, the final result is an application that is built according to the design in the previous stage. The following is the interface of the system application page that was built in this study.

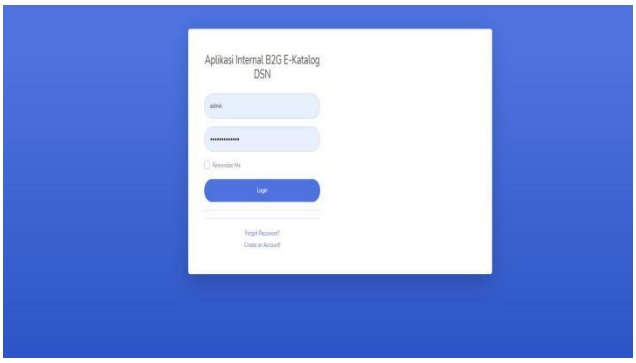

Figure 5. Login Page

It can be seen from Figure 5 above where the login menu interface of the designed application was successfully created. Users who can log into the system are only users who already have an account created by an administrator. When the page opens, the application will continue to be connected to the database to match user data from the database with the data entered on the login page. If the data received is the same, the user can enter the dashboard page according to the type of user used to log in.

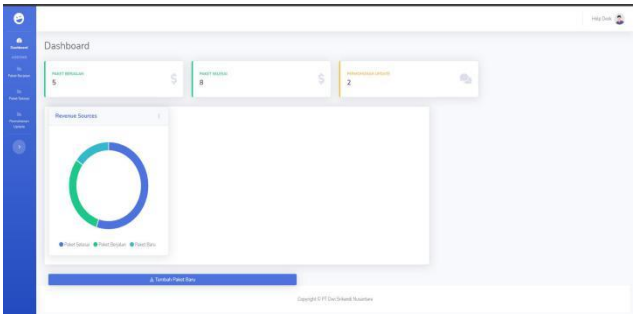

Figure 6. Dashboard page

Figure 6 above is the dashboard page of the helpdesk account where on the dashboard there is a navbar that contains addons, running packages, completed packages and requests for updates. The header of the helpdesk dashboard page also contains the number of packages and requests that have been running on the system. In the page footer, there is a button that functions to add a new package where when the button is clicked, the page will move to the add package page.

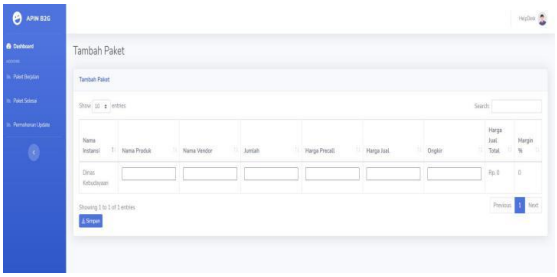

Figure 7 Add Package Page

In Figure 7 above, you can see the add package page where the helpdesk can add purchase packages that enter the e-catalog. On that page, there is a textbox that can be filled in and when all data is filled in and the click button is pressed, the package created will be added to the database and the number of running packages will increase.

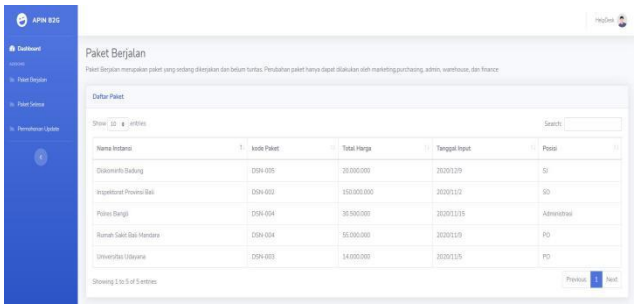

Figure 8. Running Package Page

In Figure 8, you can see the running package page where packages that have been inputted and in the sales process will be displayed on that page. On this page, details of the packages are listed, such as the name of the agency, package code, total price, date of input and package position.

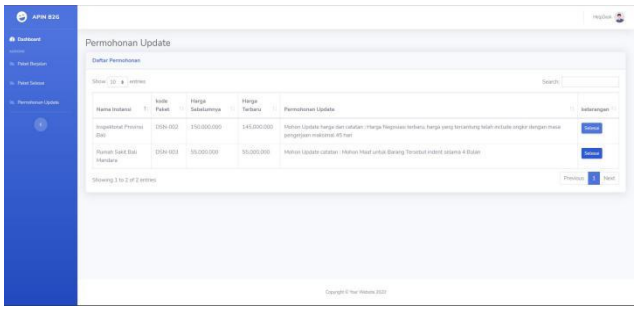

Figure 9. Request Page

It can be seen in Figure 9 where on the request for update page there is the name of the agency, package code, previous price, latest price and negotiable request. On that page there is also a complete button where when the update request has been made and the button has been clicked, the update request data will be deleted to indicate that the update request has been completed.

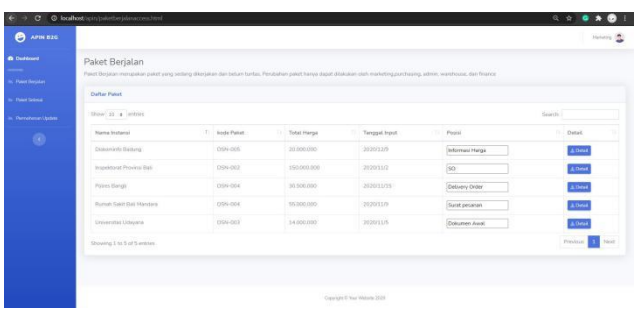

Figure 10. Marketing Running Package Page

In Figure 10 above, you can see the display package running to marketing users where the position of the package can be changed according to the package process being worked on. This page is also equipped with a detail button that functions to go to the document upload page required in the sales package.

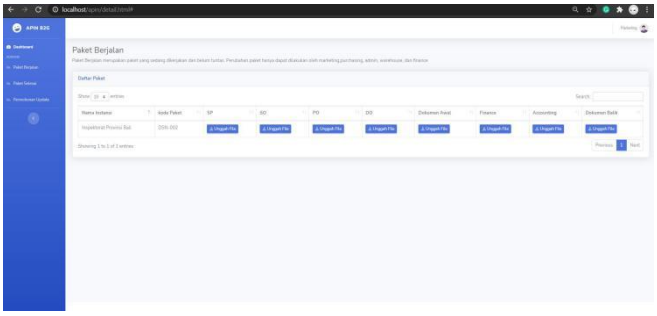

Figure 11. Upload Page

It can be seen in Figure 11 where there is a page to upload the necessary e-catalog sales documents such as SP, SO, PO, initial documents, finance, accounting and reverse documents. The upload button when clicked will open a pop up to upload data that can be selected from the user's computer. When the upload is complete, the uploaded data will be automatically saved in the application database.

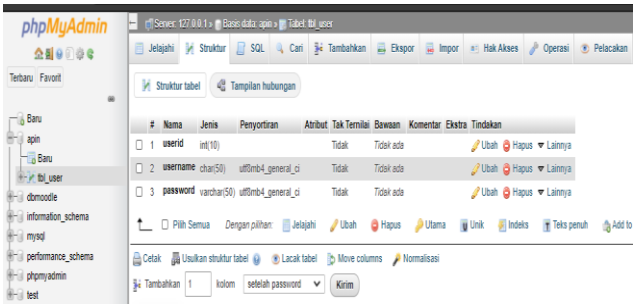

Figure 12. User Table

It can be seen in Figure 12 where there is a user table from the database created for the application being built. In the user table there is a userid, username and password where user data will be stored as user verification to be able to log into the designed application.

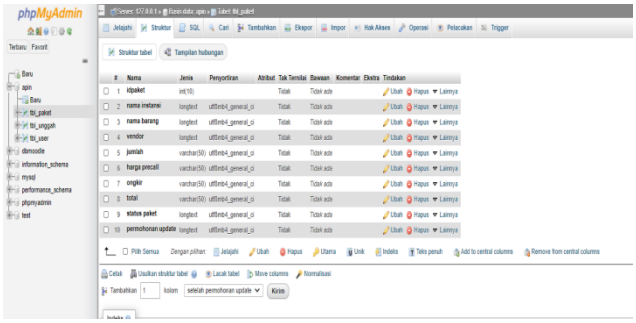

Figure 13. Package Table

It can be seen in Figure 13 where there is a package table that contains data from packages contained in the application. Package data consists of package id, agency name, item name, vendor, quantity, precall price, postage, total, package status and request updates. The data in the packet table is the core of the data contained in the running packet

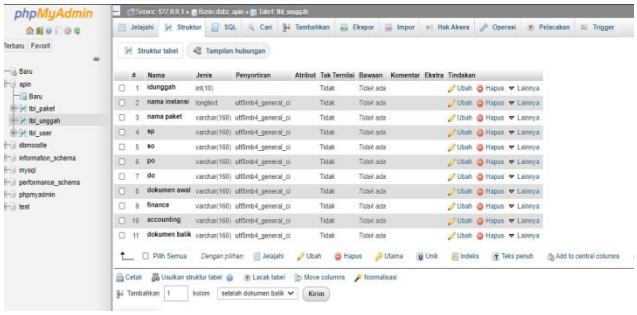

Figure 14. Upload Table

Figure 14 is a display of the database in the upload table where document upload data will be stored in this table. In the upload table there are types of documents that can be uploaded such as upload id, agency name, package name, sp, so, po, do, initial documents, finance, accouting and reverse documents. The data in the upload table can be used as bookkeeping of purchases that have been made and become monthly reports of sales that have been made.

D. Verification

At the verification stage, integration and testing are carried out on every aspect of the system being built. At this stage all units developed at the implementation stage will be integrated into the system after testing is carried out on each unit. Testing at this stage is carried out to check for any failures or errors in the system being built. At this verification stage, testing is carried out using the black box testing method where software testing will be carried out based on application functionality regardless of the structure or internal workings. This method is applied to see the results of execution on the system which is done by testing existing functions in the system to see the suitability of the workflow of a function with user needs. The following is the blackbox testing results of the system being designed.

No	Responden	Fungsi	Hasil yang diinginkan	Hasil Pengujian	
				Berhasil	Gagal
1	Helpdesk	Login Sebagai Helpdesk	Fungsi login sebagai helpdesk dapat dijalankan dengan benar	✓	
2		Menambahkan paket Baru	Fungsi menambahkan user baru dapat dijalankan dengan benar	✓	
3		Melihat Paket Berjalan	Fungsi melihat paket berjalan dapat dijalankan dengan benar	✓	
4		Melihat Paket Selesai	Fungsi melihat paket selesai dapat dijalankan dengan benar	✓	
5		Melihat Permohonan Update	Fungsi melihat permohonan update dapat dijalankan dengan benar	✓	

Figure 15. Blackbox Testing Helpdesk

From Figure 15 above, it can be seen that in researching system functions with helpdesk users, each desired function based on the test results is in accordance with the wishes of the user so that the development of the system application for helpdesk users can be said to be successful.

No	Responden	Fungsi	Hasil yang diinginkan	Hasil Pengujian	
				Berhasil	Gagal
1	Marketing	Login Sebagai Marketing	Fungsi login sebagai Marketing dapat dijalankan dengan benar	✓	
2		Melihat Paket Berjalan	Fungsi melihat paket berjalan dapat dijalankan dengan benar	✓	
3		Mengubah tahap Paket	Fungsi mengubah tahapan paket dapat berjalan dengan benar	✓	
4		Mengungga dokumen SO	Fungsi mengunggah dokumen SO dapat berjalan dengan benar	✓	
5		Melihat Paket Selesai	Fungsi melihat paket selesai dapat dijalankan dengan benar	✓	
6		Melihat Permohonan Update	Fungsi melihat permohonan update dapat dijalankan dengan benar	✓	
7		Menambah Permohonan Update	Fungsi menambah permohonan update dapat dijalankan dengan benar	✓	

From Figure 16 above, it can be seen that in the research on system functions with marketing users, each desired function based on the test results is in accordance with the wishes of the user so that the development of system applications for marketing users can be said to be successful.

IV CONCLUSION

Based on the research that has been done, it is concluded that the development of B2G sales applications that can manage purchases received from the E-catalog as well as a monthly sales report has been successfully carried out. The waterfall method used in this study helps identify the stages of implementing system development. There are six actors who become users in the application along with 3 database tables as places to store data from the application. The functional testing of the application shows that the application designed in this study has been running well according to the user's wishes. The use of the waterfall method has limitations where the method is inflexible which does not allow much. Based on these shortcomings, it is necessary to initialize the requirements in detail to minimize the possibility of system changes in the development process.

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