Information System for Procurement of Goods and Services of the Politeknik Harapan Bersama (SIPHARBER)

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Article Info

ABSTRACT

The application of information technology in various fields, including higher education, is rapidly evolving and has extended to critical operational activities such as the procurement of goods and services. This research aims to design and implement a Procurement Information System at Politeknik Harapan Bersama (SIPHARBER), which is expected to enhance efficiency, transparency, and accountability in the procurement process. The system is designed to facilitate coordination between the procurement unit and vendors, reduce the time required for tender processes, and minimize errors in data processing. The development method used for this system is the Waterfall model, which involves stages from requirement analysis to system testing. The outcome of this research is a web-based information system accessible by all related units, enabling real-time monitoring of the procurement process by the leadership, and simplifying vendors' processes to offer their products or services. With the implementation of SIPHARBER, the procurement process at Politeknik Harapan Bersama is expected to be conducted more effectively and efficiently.

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1. INTRODUCTION

Advances in information technology have touched various areas of life such as the economy, health, security, and no exception in the field of education, especially higher education. In practice, it can almost be found in many universities the implementation of Management Information Systems (SIM) can be found in various forms, both very simple and even to a very high level of complexity [1]. Information systems in the field of higher education are a collection of people, software, hardware, procedures, and rules that work together to encourage the effectiveness of the higher education process both in carrying out the operational process and the teaching and learning process.

In an institution or company will not be spared with the operational activities of spending or commonly referred to as the procurement of goods and services, According to Backstrand, procurement and supply management are in the spotlight as important, strategic, and critical business activities [2]. Meanwhile, according to Budihardjo & Hayie [3], the procurement of

goods and services must be carried out based on the principles of procurement principles which are practiced in terms of efficiency, effectiveness, fair competition, openness, transparency, non-discrimination and accountability.

Higher education institutions such as the Politeknik Harapan Bersama, of course there are units or sections and teams that are responsible for the procurement of goods and services. The team, commonly called the Procurement Team, procures goods and services in direct coordination with the procurement subdivision to carry out based on operational needs and teaching and learning processes in the campus environment, such as office stationery, practical materials for student learning activities, campus operational needs and so on. The procurement of goods is legalized through a contract between an institution and a provider of goods or services. Broadly speaking, the procurement of goods is an effort by the user to obtain or realize the goods or services needed through a certain process. In order for the purpose of procurement of goods or services to be achieved, users and providers must be guided by ethics, norms, and philosophies and follow the applicable procedures and processes for the procurement of goods or services.

Currently, the procurement team carries out tender activities in a conventional way, namely receiving a written procurement request letter by the unit/study program that already has a disposition by the leadership so that procurement is carried out, where the next step is to invite all suppliers (Vendors) to make presentations related to their products and offer prices and then from the results are formulated by the procurement team which then the results are returned and reported to the leadership to ask for approval, it requires a long time vulnerability and is even an obstacle that is often faced by the procurement team, in the case of a website-based system so that the procurement team and leaders can coordinate easily without having to face up to face meetings, and the

data in the information system can be evidence of the implementation of procurement in a transparent manner that can be accessed by every unit or study program within the Politeknik Harapan Bersama

Therefore, it is necessary to have a system that manages to be more effective and transparent, this time we will design a Shared Hope Procurement Information System or what will be called SIPHARBER

2. LITERATURE REVIEW

Several studies for this information system have been carried out by previous researchers. One of them is Building an Information System for the Procurement of Goods or Services Using the Extreme Programming Method (Telkom University Logistics Case Study) At Telkom University, especially the logistics department, it still uses conventional methods to carry out the process of procurement of goods/services. The use of applications such as e-procurement is considered very appropriate considering that the procurement of goods/services at Telkom University can improve and ensure efficiency, effectiveness, transparency and accountability in spending university money. On the other hand, it can also save the time of the negotiation process with the provider of goods/services (usually called the partner) and the time of processing requests from the faculty and telkom university units, which are considered too long. However, there are several shortcomings in the system, namely the absence of a real-time auction feature where there is negotiation between logistics and the company. The application was built using extreme programming software design methods and has been tested with results in accordance with Telkom University's logistics requirements. [4]

In addition, there is also a research entitled Designing a WEB-Based Procurement Information System for Goods and Services at Andalas University, Andalas University in the implementation of procurement of goods and services, especially in the implementation of work until the payment of procurement of

goods and services still using Microsoft Word, Microsoft Excel and Microsoft Access in reporting, reporting that is still like this will be difficult and take a long time to find out the process the implementation of work and payment for the procurement of goods and services. With the existing problems, research was carried out with the aim of building and designing an information system that can petrify the parties involved in the process of carrying out work and paying for the procurement of goods and services at Andalas University. The research methods used are field research, library research and laboratory research. This research produces a web-based information system for the implementation of procurement of goods and services that produces reports in the form of recapitulation as well as reports on the implementation of work and payment of goods and services work that can be analyzed according to needs. With this information system, it is hoped that the implementation of work and payment for goods and services can run effectively and efficiently at Andalas University, so that the weaknesses that have existed so far can be overcome.[5]

Procurement information system research has also been carried out by Cindy Himawan et al with the title Procurement Information System for Goods and Services in the Purchasing Department of PT. Pasadena Metric Indonesia, Application of procedures and data processing in the procurement process of goods and services of PT. Pasadena Metric Indonesia still uses forms in manual form and is still not suitable for its approval system, thus causing difficulties in finding data, data filling errors, data loss and inaccurate report making. This research designs an application for the procurement of goods and services at PT. Pasadena Metric Indonesia was built to simplify the flow of business processes for the procurement of goods and services and minimize errors in filling in data and overcome system weaknesses. This system is expected to speed up business processes, data processing, reduce data entry errors, data loss and easier

access to the required reports. This information system for the procurement of goods and services can be accessed by all departments in accordance with the access rights and functions of users in carrying out the procurement process of goods and services. This system is built by providing information about transactions and reports on requests for goods and services in accordance with the requests for goods and services made by the department, there is something that needs to be added to this system, namely the need for an explanation of the inventory system and other procedures related to the procurement of goods and services [6].

Research conducted by Andharsaputri, R. L. [7] with the title Design and Build a Desktop-Based Procurement Information System for Goods and Services. The research was conducted to build an application that can minimize several problems including difficulties in processing, storing, and disbursing data, delays in presentation, information, time inefficiency, inaccuracy, data loss, and more workload for employees. The purpose of the research is to help companies in overcoming the above problems so that the implementation of company operations can run more smoothly. In this study, the researcher explained several methods including research design, data sources, data collection techniques, and analysis of the data obtained. The result of this research is a computerized information system for the procurement of goods and services and the user interface of a desktop-based application, it should be noted that the desktop-based system has a weakness, namely that in operating it cannot be done simultaneously in the same place, or only one computer has the application and database of the system

Research conducted by Vivi Afifah, Dwipo Setyantoro at the Institute of Technology and Business of Bank Rakyat Indonesia stated that one of the main activities in a company engaged in logistics is in the distribution and logistics sector. One of the processes carried out is in the form of logistics

distribution activities and procurement of goods by vendors. Given the density of activities carried out, the application of information technology is needed in the form of the use of an information system that manages data, especially to determine vendors in the process of procurement of goods and pricing. Therefore, in this study, a web-based information system was developed with the SDLC method and used UML for system modeling. The implementation of the system, which uses the PHP programming language and Oracle database, produces a vendor selection and pricing system in the process of procurement of web-based logistics goods and services, but the research has shortcomings, namely in addition to a less attractive appearance, the development of a selection and pricing system to determine vendors in the process of procurement of web-based logistics goods and services still needs to be done [8].

3. METHODS

The materials needed in this research proposal include data on vendors providing goods / services, as well as submission samples made by study programs or units at the Joint Hope Polytechnic in 2023.

3.1 Research Tools

1. **Hardware**

Several pieces of hardware are required in program design and implementation. The main hardware needed includes a computer with a minimum processor specification with a frequency of 1 GHz and 500Mb memory.

2. **Software**

In addition to hardware support, software is also needed to design and implement the program. The software is used in designing activities with UML, PHPmyadmin, dreamweaver and mysql databases.

3.2 Research Procedures

In the research, a research method is needed, the research method used by the author is the waterfall method, the waterfall method is one of the software development models in the SDLC model. Waterfall models are often also called linear sequence models or classic lifeflows. System development is carried out in order starting from analysis, design, coding, testing and supporting stages.
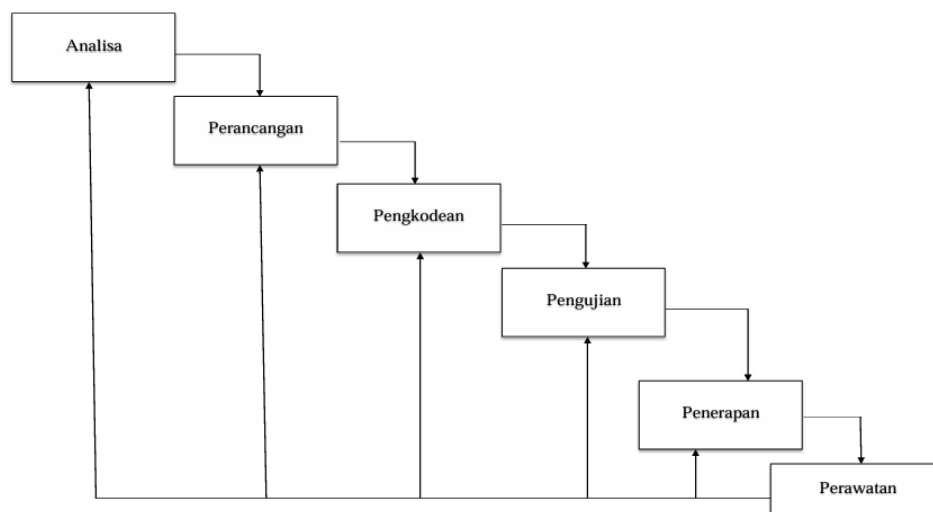

Figure 1. Waterfall Method

To get data that is truly accurate, relevant, valid and *reliable* , data collection is carried out by:

3.2.1 Primary Data Sources

It is data obtained directly from the research object, either through observation or recording of the research object. Include:

a. Observation

Data collection through related units in the procurement sector, namely the logistics sub-division and the Procurement Team

b. Interview

Data collection through face-to-face and direct questions and answers with data sources or interested parties related to research, for example to the Head of the Logistics Sub-Division and the Procurement Team of the Polytechnic of mutual hope.

3.2.2 Secondary Data Sources

Data taken from books, documentation, and literature, including:

a. Literature Studies

Data collection from books that are in accordance with the theme of the problem,

c. Documentation Study

Data collection from literature and documentation from the Internet, diktat, and other sources of information.

4. RESULTS AND DISCUSSION

The Goods and Services Procurement Information System is the result of research where the system is to manage the entire procurement process of both goods and services from the submission of the needs of each study program or unit which can be synchronized with the vendors involved in the offering. So that leaders at the Joint Hope Polytechnic can monitor the procurement process efficiently and effectively

4.1 Information System Menu Display

The Harapan Bersama Procurement of Goods and Services information system or referred to as SIPHARBER can be applied and operated in the procurement unit, where the results in it contain several displays as follows:

a. Start Menu Display

The following is an image of the initial menu display on the SIP Harber application where several menus such as Goods, Services and Contacts appear on the display.

Figure 4.1. Home Menu display

b. Item Menu Display

The following is a display of the goods provided by the vendor when viewed without logging in
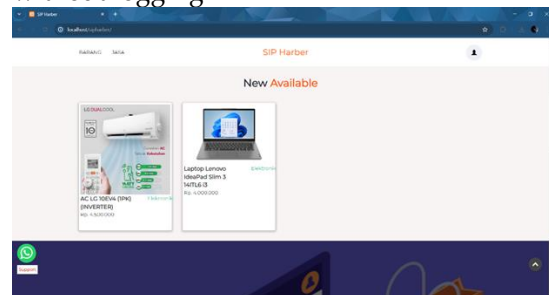

Figure 4.2. Item Menu Display

c. Service Menu Display

In addition to the Goods Menu that is displayed without logging in, there is also a service menu displayed by the provider vendor, with the following display:
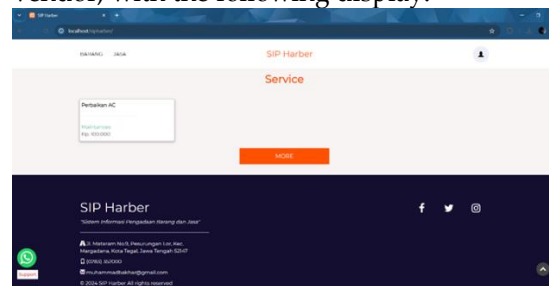

Figure 4.3. Service Menu display

d. Main Menu Display

After the display above, continue the display if you have logged in either as an admin or vendor or also a unit
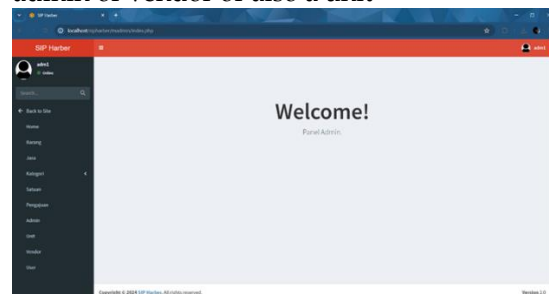

Figure 4.4. Menu Display
(Admin/Unit/Vendor)

Although the appearance is the same, not all menus in the display can be accessed by everyone, only certain parts according to the specifications that have been determined

e. Item Menu Display (admin)

Below is the display of the Item Menu displayed on the admin account, the admin can see all items offered by all vendors,
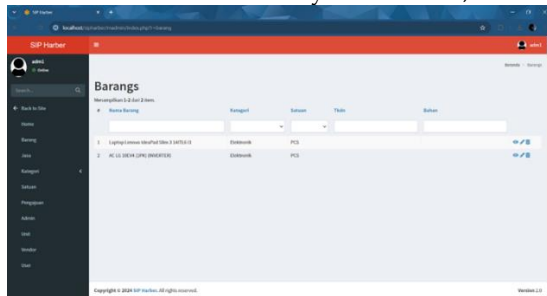

Figure 4.5. Item Menu Display (Admin)

f. Service Menu Display (admin)

In addition, there is also a Service Menu Display on the admin with the results as below:
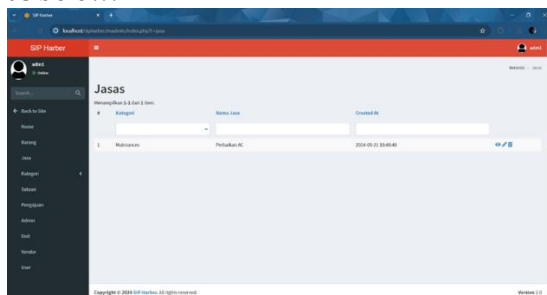

Figure 4.6. Service Menu Display (Admin)

g. Item Category View (admin)

On the admin page of this system, the display of Goods Category appears, so that admins can choose the category of goods needed more easily, here is the appearance
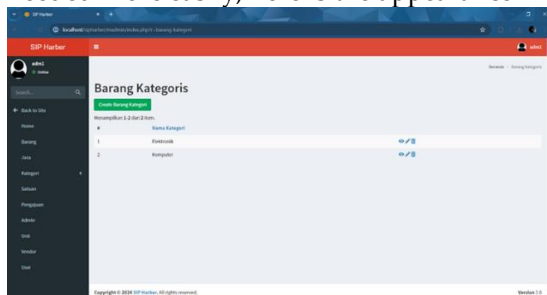

Figure 4.7. Item Category Menu Display (Admin)

h. Service Category Display (admin)

In addition, the display of the service category menu on the admin account page is also displayed, the appearance is as follows:
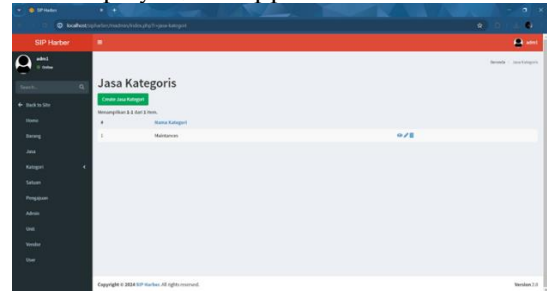

Figure 4.8. Service Category Menu Display (Admin)

i. Unit Menu Display (admin)

The following is the display of the unit menu on the admin account page, which serves to determine the type of unit of goods that will be displayed so that the calculation of prices and quantities is easier
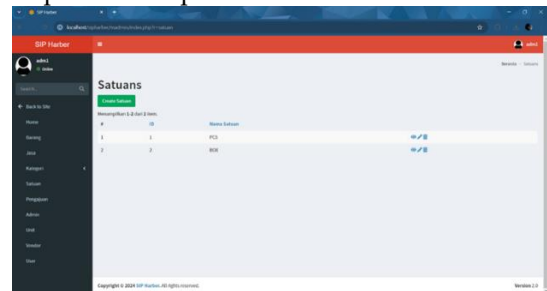

Figure 4.9. Unit Menu Display (Admin)

j. Submission View (admin)

The submission menu in the admin account functions to see vendors who bid for goods, with the following display:
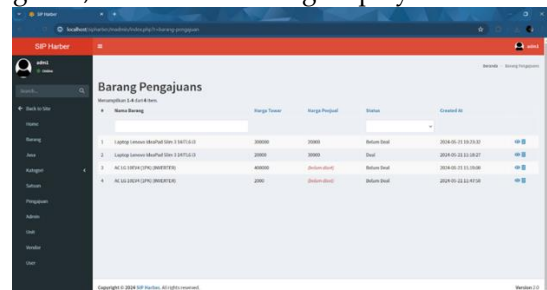

Figure 4.10. Submission Menu Display (Admin)

k. Admin Page View

The admin page is displayed in the image below which functions to create a new admin account to manage procurement in each unit:
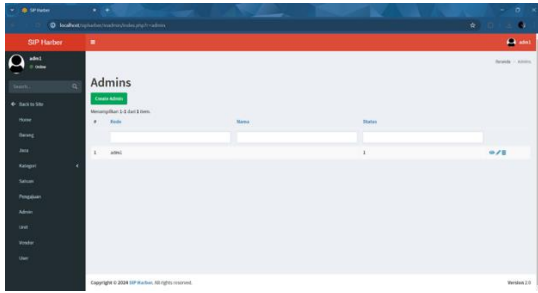
Figure 4.11. Admin Page Display

l. New Unit Input Display

The display of the unit below serves for the admin to register a new unit at the Harpan Bersama Polytechnic:
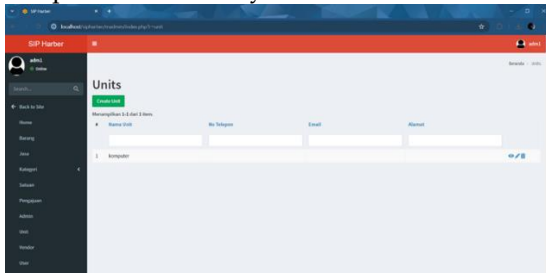

Figure 4.12. New Unit Input Display

m. Vendor Input Display

The display below is an admin view that functions for adding new vendors, the menu is in the admin account:
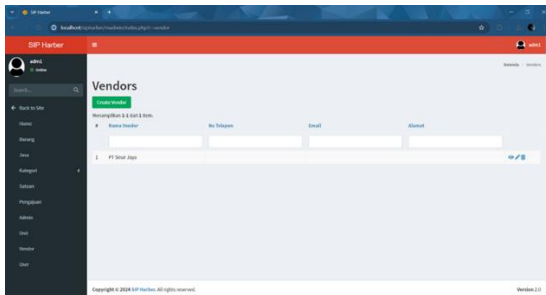

Figure 4.13. New Vendor Input Display

n. New User Addition Display

The display below is an admin view that functions for adding new users, the menu is in the admin account
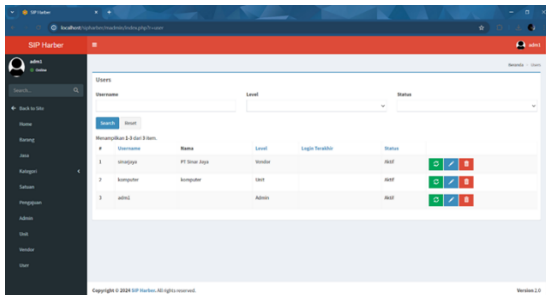
Figure 4.14. New User Input Display

o. Item Submission Display

The display below serves to input all items that will be submitted by the unit:
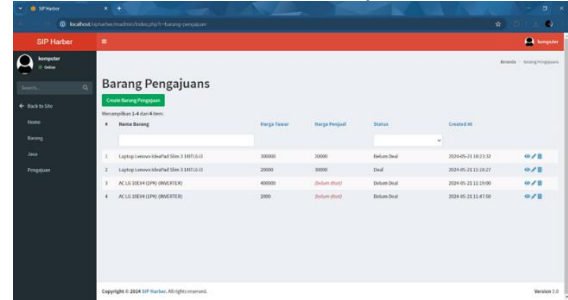
Figure 4.15. Item Submission Display

4.2 Data Flow Diagram (DFD)

a. Context Diagram

The design of the Procurement Information system of Shared Hope begins with the design of a data flow diagram with the display of the image as shown below

Figure 4.16. Contextual Diagram

b. DFD Level 0 (admin)

While DFD level 0 in the admin section of the information system with the following display:
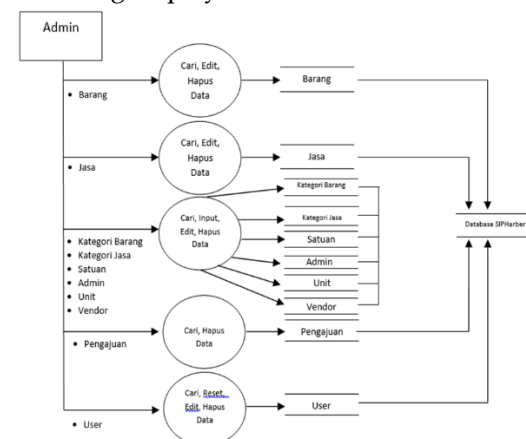
Figure 4.17 DFD Level 0 (admin)

c. **DFD Level 0 (unit)**

In addition, there is also a DFD level 0 on the unit, as in the picture below:
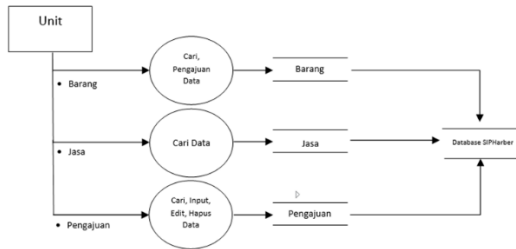
Figure 4.18. DFD Level 0 (unit)

d. **DFD Level 0 (vendor)**

Then there is also DFD Level 0 in the vendor section, with the display as below:
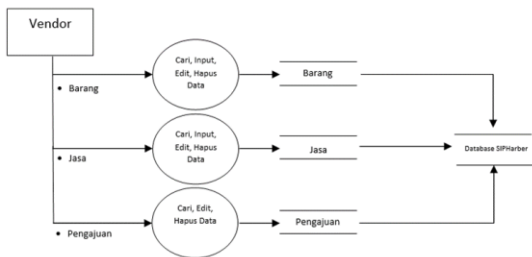
Figure 4.19. DFD Level 0 (vendor)

e. **Flowchart Log In**

The flowchart in this information system is as follows:
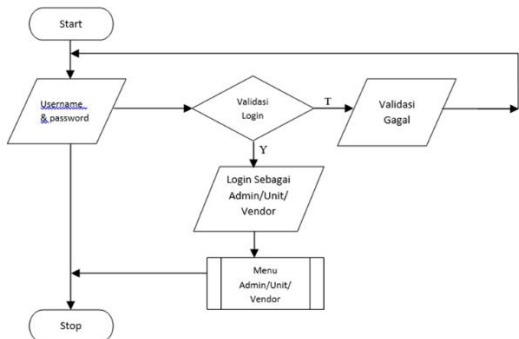
Figure 4.20. Log In Flowchart

f. **Flowchart Menu Unit**

The following is a flowchart on the menu in the unit/study program section in the Politeknik Harapan Bersama
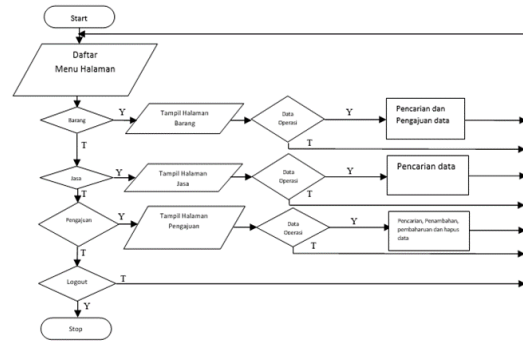
Figure 4.21. Unit Menu Flowchart

g. **Flowchart Menu Admin**

The Admin Menu Flowchart is quite complex in this information system, as for the appearance as below
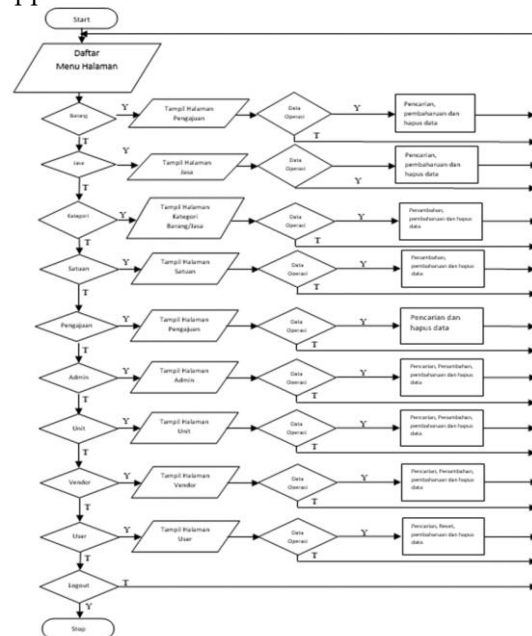
Figure 4.22. Admin Menu Flowchart

h. **Flowchart Menu Vendor**

The next flowchart is on the vendor menu with the following display:
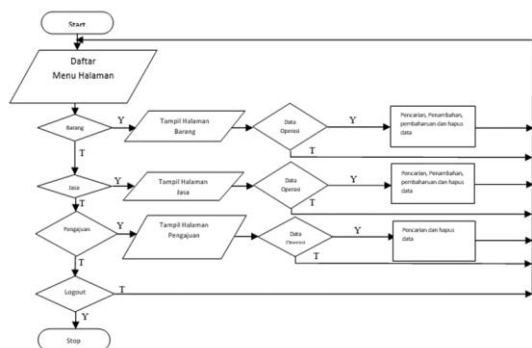
Figure 4.23. Vendor Menu Flowchart

4.3 Database design

a. Database admin

The following is a table for the admin

Table 4.1. Database design Admin table

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
user_id	int(11)	Yes	NULL	-> user.id ON UPDATE RESTRICT ON DELETE RESTRICT
code	varchar(250)	No		
name	varchar(250)	No		
status	tinyint(1)	No		
photograph	varchar(250)	Yes	NULL	

b. Item Database

Table 4.2. Designing the Database of Goods Table

| Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
user_id	int(11)	No	-> user.idON UPDATE RESTRICTON DELETE RESTRICT	
barang_kategori_id	int(11)	Yes	NULL	-> barang_kategori.idON UPDATE RESTRICTON DELETE RESTRICT
satuan_id	int(11)	No	-> satuan.idON UPDATE RESTRICTON DELETE RESTRICT	
nama_barang	varchar(250)	No		
TKDN	varchar(50)	Yes	NULL	
material	varchar(250)	Yes	NULL	
description	text	Yes	NULL	
created_at	datetime	No		
updated_at	datetime	No		

c. Database Barang_Gambar

Table 4.3. Database Design of Table Barang_Gambar

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
barang_id	int(11)	No	-> barang.idON UPDATE RESTRICTON DELETE RESTRICT	
picture	varchar(250)			

d. Database Barang_harga

Table 4.4. Database Design Table Barang_Harga

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
barang_id	int(11)	No	-> barang.idON UPDATE RESTRICTON DELETE RESTRICT	
harga_beli	int(11)	No		
harga_jual	int(11)	No		
created_at	datetime	No		
updated_at	datetime	No		

e. Database barang_kategori

Table 4.5. Database Design Table barang_kategori

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
nama_kategori	varchar(50)			

f. Database barang_pengajuan

Table 4.6. Database Design Table barang_pengajuan

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
barang_id	int(11)	No	-> barang.idON UPDATE RESTRICTON DELETE RESTRICT	
unit_id	int(11)	No	-> unit.idON UPDATE RESTRICTON DELETE RESTRICT	
vendor_id	int(11)	No	-> vendor.idON UPDATE RESTRICTON DELETE RESTRICT	
harga_tawar	int(11)	No		
harga_penjual	int(11)	Yes	NULL	
status	tinyint(1)	No		
created_at	datetime	No		
updated_at	datetime	No		

g. Service Database

Table 4.7. Database Design Service Table

Column	Type	Attributes	Null	Default

id	int(11)	No	auto_increment	
user_id	int(11)	No	-> user.idON UPDATE RESTRICTON DELETE RESTRICT	
jasa_kategori_id int(11)	Yes	NULL	-> jasa_kategori.idON UPDATE RESTRICTON DELETE RESTRICT	
nama_jasa	varchar(50)	No		
created_at	datetime	No		
updated_at	datetime	No		

h. Database Jasa_Harga

Table 4.8. Database Design Table jasa_harga

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
jasa_id	int(11)	No	-> jasa.idON UPDATE RESTRICTON DELETE RESTRICT	
price	int(11)	No		
created_at	datetime	No		
updated_at	datetime	No		

i. Database Jasa_Kategori

Table 4.9. Database Design Table jasa_kategori

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
nama_kategori	varchar(50)	No		

j. Contact Database

Table 4.10. Database Design Contact Table

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
nama_toko	varchar(250)	No		
description	varchar(250)	Yes	NULL	
no_telepon	varchar(250)	No		
email	varchar(250)	Yes	NULL	
facebook	varchar(250)	Yes	NULL	
twitter	varchar(250)	Yes	NULL	
instagram	varchar(250)	Yes	NULL	
address	text	No		
Remarks1	text	Yes	NULL	

Remarks2	text	Yes	NULL	
Remarks3	text	Yes	NULL	
cover	varchar(250)	Yes	NULL	
deskripsi_sampul	text	Yes	NOBODY	

k. Unit Database

Table 4.11. Unit Table Database Design

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
nama_satuan	varchar(50)	No		

l. Database Unit

Table 4.12. Unit Table Database Design

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
user_id	int(10)	Yes	NULL	-> user.idON UPDATE RESTRICTON DELETE RESTRICT
nama_unit	varchar(50)	No		
no_telepon	varchar(50)	Yes	NULL	
email	varchar(50)	Yes	NULL	
address	text	Yes	NULL	
photograph	varchar(250)	Yes	NULL	

m. Database User

Table 4.13. Database Design of User Tables

Column	Type	Attributes	Null	Default
id	int(10)	No	auto_increment	
username	varchar(250)	No		
password	varchar(250)	No		
level	int(2)	No		
login_terakhir	datetime	Yes	NULL	
auth_key	varchar(50)	No		
status	tinyint(1)	No		

n. Database Vendor

Table 4.14. Database Design Vendor Tables

Column	Type	Attributes	Null	Default
id	int(11)	No	auto_increment	
user_id	int(11)	Yes	NULL	-> user.idON UPDATE RESTRICTON DELETE RESTRICT
nama_vendor	varchar(250)	No		
no_telepon	varchar(250)	Yes	NULL	

email	varchar(250)	Yes	NULL	
address	text	Yes	NULL	
photograph	varchar(250)	Yes	NULL	

5. CONCLUSIONS

The conclusions in this study are as follows:

1. This Procurement Information System can be used to conduct online procurement involving several units and leaders on the Politeknik Harapan Bersama campus.

2. In addition, it can be used by vendors or service providers and goods to offer products or services easily without having to do correspondence as before.

3. This Information System is very helpful for the units and study programs involved in procurement and makes it easier for leaders to monitor more effectively.

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