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Implementation and Evaluation of Purchase Module Using Odoo at The Directorate of Facilities and Infrastucture of Al-Azhar Indonesia University

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Abstract – **Enterprise Resource Planning (ERP) is an integrated management information system that can provide specific information system requirements for each department in a company. However, its implementation requires high costs, so some companies switch to using Open ERP. Seeing this, Al-Azhar Indonesia University began to integrate its data by creating an ERP system called Application World Wide (AWW) at the Directorate of Facilities and Infrastructure. However, based on the results of interviews with the staff, it was stated that, in the management process, all Purchase Order (PO) data recorded in the system could not be downloaded, so the staff recorded data manually. To overcome this, it is necessary to develop an ERP system to support the procurement process, so that the process of recording and storing documents can be well integrated. In this study, the authors used the ERP system implementation, namely Rapid Application Development (RAD) and used the Odoo software version 16.0. A User Acceptance Test (UAT) is also carried out to find out whether the system meets the user's needs or not. After implementing Odoo at the Directorate of Facilities and Infrastructure at Al-Azhar University Indonesia, it can be concluded that all procurement activities can be recorded in a complete, correct, up-to-date, and valid/legal manner due to the implementation of the Odoo ERP system which is integrated and adapted to user needs, such as customize 4 of 12 features in the purchase module. Then with the purchase report module it can simplify the process of recording, and reporting PO data. Based on the UAT results, it can be seen that the whole question have an average score of 4.22 so it can be said that the user understands how to operate the Odoo ERP system and the features in Odoo can meet user needs.**

Keywords *– Enterprise Resource Planning (ERP), Odoo, Rapid Application Development (RAD), User Acceptance Test (UAT).*

INTRODUCTION

The rapid development of information systems against the background of the industrial revolution 4.0, namely a work activity assisted by information technology so as to create effective and efficient work activities. One of the uses of information technology in every company is the application of an Enterprise Resource Planning (ERP) system. The ERP system is an integrated management information system that can provide specific information system requirements for each different department in a company. ERP consists of various modules that have been provided for various needs of a company, ranging from modules for finance to modules for distribution [1].

ERP users are expected to be able to make all systems within a company integrated with one database, so that the company can increase customer satisfaction in every unit within the company. However, implementing an ERP system requires expensive costs, so some companies switch to using Open ERP. Open ERP itself is open-source based ERP software and is free to a certain extent, so Open ERP can be used as another alternative for

companies. Open source is open to the public which has the characteristics of quality, flexibility, adaptability, infrastructure, no hidden costs, and is scalable.

Seeing this, Al-Azhar Indonesia University gradually began to integrate its data by creating an ERP system called Application World Wide (AWW) at the Directorate of Facilities and Infrastructure. However, based on the results of interviews with staff at the Directorate of Facilities and Infrastructure, it was stated that, during the management process, all Purchase Order (PO) data recorded in the system could not be downloaded. So that the staff has to recap the overall PO data manually, while the PO data has to be recapitulated annually on a regular basis. Based on this, the activities carried out by the Directorate of Facilities and Infrastructure are still less efficient.

To overcome these problems, it is necessary to develop an ERP system to support the process of recording, storing and reporting procurement documents that are accurate and real time, so that they can be well integrated. Besides that, a usability assessment was also carried out on the ERP system that had been developed, to find out whether the system was in accordance with user needs or not. In this study, the authors used the implementation of the ERP system, namely Rapid Application Development (RAD) and User Acceptance Test (UAT) for usability assessment. The RAD method is an information system development method with a short period of time. In developing the system, RAD uses an iterative (repetitive) method where the working model of the system is constructed early in the development stage with the aim of establishing user requirements and then eliminating them [2]. The RAD method was chosen because it excels in developing software quickly, precisely, and at a relatively more affordable cost. As well as UAT itself is a very innovative method to prevent IT project failure [3].

This study used the Odoo software version 16.0 because it is open source, easy to use and thoroughly integrated. Odoo is also a management system that is not only used by large companies, but also used by small and independent companies [3]. So that it is suitable and makes it easy to solve problems owned by the Directorate of Facilities and Infrastructure at Al-Azhar University Indonesia, especially in the purchase module. The purchase module is used to make the process of ordering and purchasing products or services from suppliers. In Odoo, the purchase module will be connected to the inventory module and the accounting module [4]. This module focuses on purchasing activities (purchase orders) from companies to business partners or suppliers. Purchase order (PO) is a purchase record owned by the company. If there is an order for a supplier, this order will be recorded in the PO [5].

METHOD

Research Framework

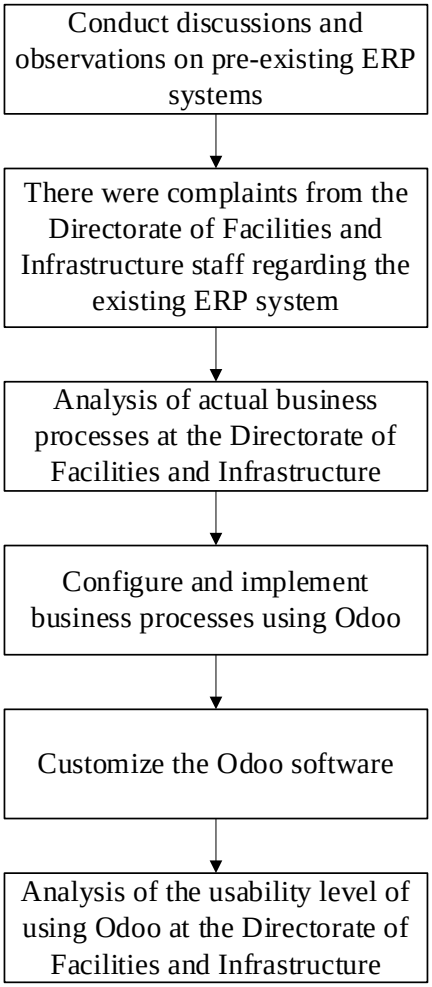

Figure 1. Research Framework

Initially, the authors conducted discussions and observations of the existing ERP system. From the discussion that was carried out, complaints were obtained in the form of several features needed that were not yet available, such as PO data recap. So an analysis of actual business processes is carried out at the Directorate of Facilities and Infrastructure to find out what data is needed for the PO process.

Next, configure and implement business processes using Odoo. The next step is to customize the Odoo software by adjusting the features available in the software to the needs of the Directorate of Facilities and Infrastructure. Then an analysis of the usability value is carried out to determine the suitability between the system and user needs.

Research Flowchart

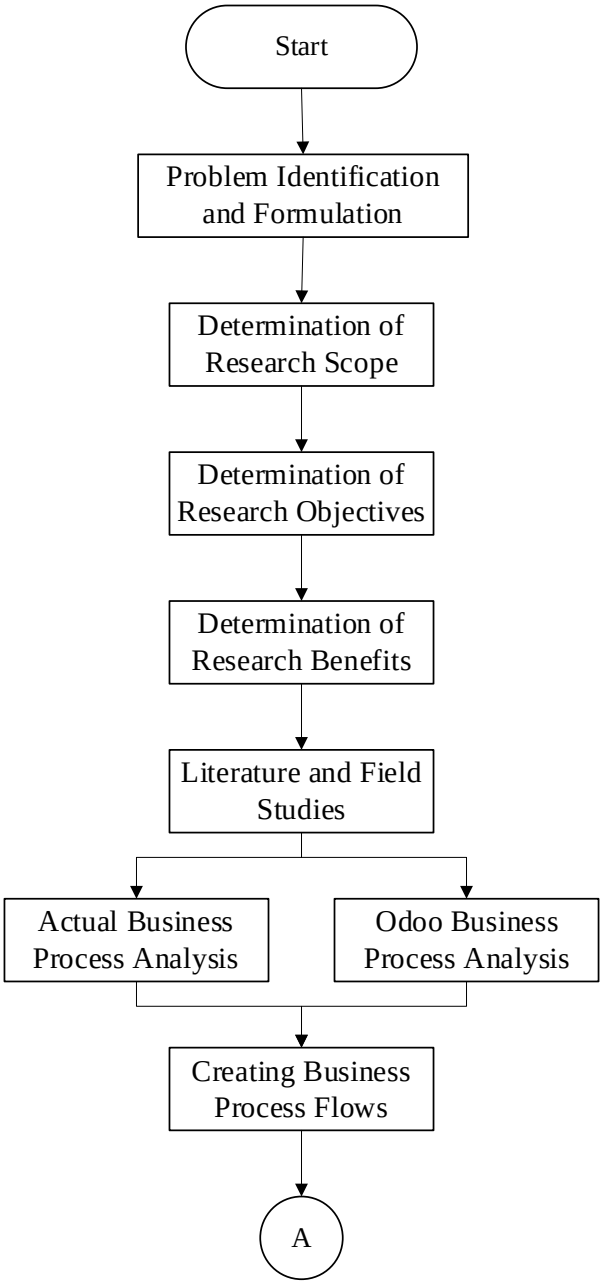

Figure 2. Research Flowchart

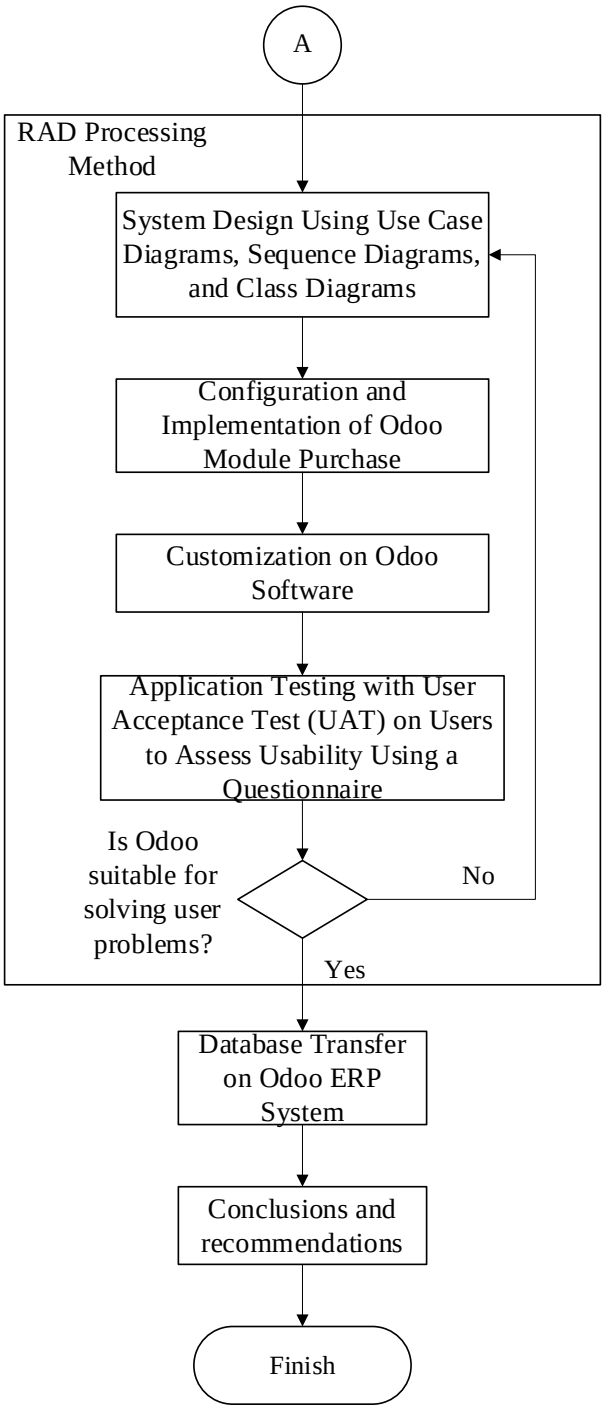

Figure 3. Research Flowchart (Continued)

This research was conducted at the Directorate of Facilities and Infrastructure at Al-Azhar University Indonesia which is the part that handles procurement related to facilities and infrastructure at Al-Azhar University Indonesia. This research begins with the process of identifying and formulating problems, determining the scope of the research, determining the research objectives, and determining the benefits of the research. The next step is that the writer conducts a literature study,

namely collecting learning material from various sources, both from related journals or other sources that can be accounted for.

The author also conducts a field study process, namely collecting information that can support the smooth running of the research conducted by the author. Field studies conducted by the author included conducting surveys and observations at the Directorate of Facilities and Infrastructure at Al-Azhar Indonesia University, interviews with related parties, as well as collecting data and information needed by the author. The next step is to create a business process flow with activity diagrams.

Next do the system design using use case diagrams as a representation of the functions based on user needs. Create sequence diagrams to describe the movement of an object and messages that occur in the current learning system, as well as class diagrams to describe the types of objects in the system and the various types of static relationships that exist between them. Then configure and implement the Odoo purchase module to describe the process of operating the Odoo software, and bring up the purchase report feature by installing the purchase report module add-ons.

After that, customization was carried out on Odoo to adapt the system to what was needed by the Directorate of Facilities and Infrastructure. The next step is software testing carried out by users, namely staff from the Directorate of Facilities and Infrastructure, and a User Acceptance Test (UAT) assessment is carried out using a questionnaire to assess the usability of the Odoo ERP system, and find out whether the system meets user needs or not. If it is appropriate, then proceed with the transfer of the database at the Directorate of Facilities and Infrastructure into the Odoo ERP system. The last step is making conclusions and suggestions.

RESULTS AND DISCUSSION

Identify Actual Business Processes

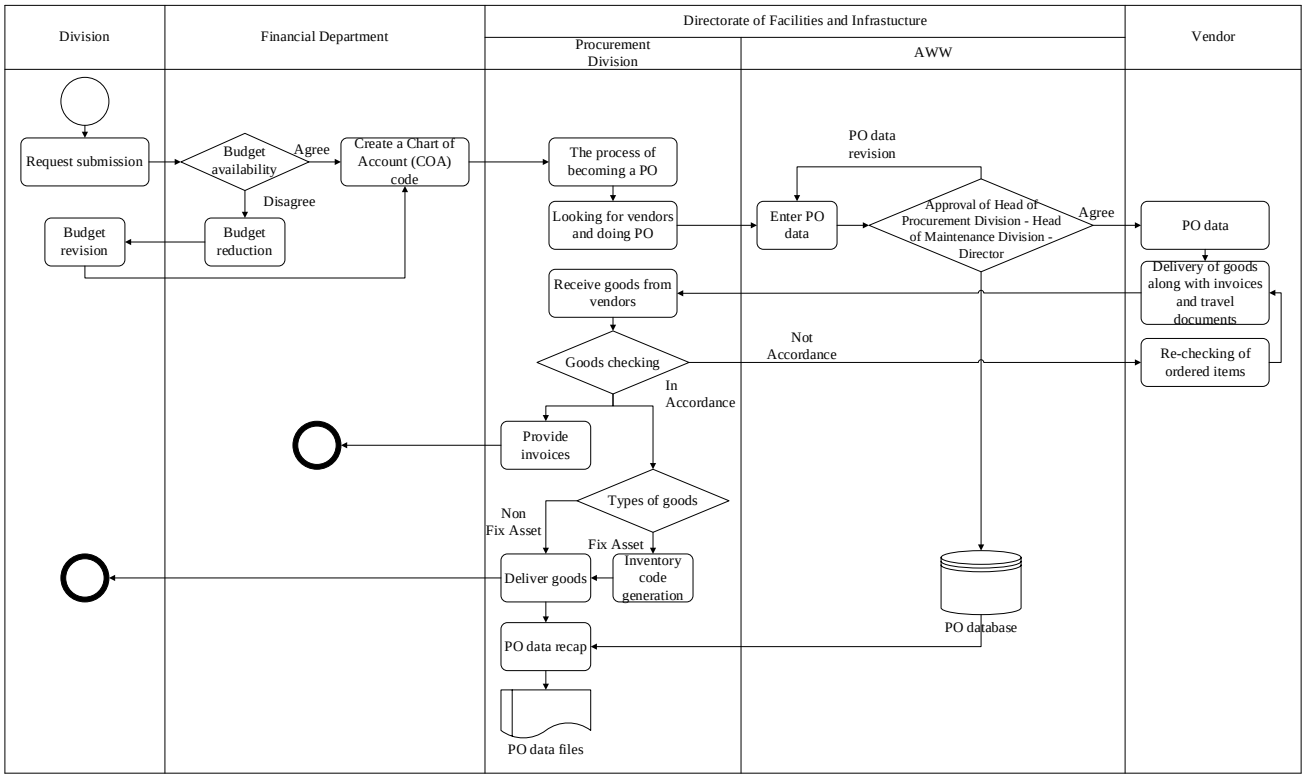

Figure 4. Actual Business Process of UAI Directorate of Facilities and Infrastructure

Figure 4 shows the actual business process flow at the UAI Directorate of Facilities and Infrastructure using activity diagrams. The initial process is that the Unit Section at UAI submits a request in the form of a letter of request for procurement of goods to the Finance Department. Furthermore, the

Finance Department will check the availability of the budget, if the budget is available, the Finance Department will provide the Chart of Accounts (COA) code in the request letter. However, if the budget is not available, the Finance Department will return a letter of request to the Section Unit to revise the budget amount.

After the Finance Department gives the COA code, the Procurement Department will then proceed to process the letter of request to become a Purchase Order (PO). Then the Procurement Section will look for vendors that match the goods to be ordered. After getting the appropriate vendor, the Procurement Department will input the PO data into the ERP Application World Wide (AWW) system. Furthermore, PO data will be requested for approval from Kep. Ch. Procurement, Kep. Ch. Maintenance, and Director. If any of the three parties disagree, then the PO data will be revised.

Once approved, the PO data will be sent to the vendor which will then be further processed by sending the ordered goods along with the invoice and travel documents to the Procurement Department. Then the Procurement Section will receive the goods from the vendor, and check the goods. If the goods do not match the PO data or are of poor quality, then the goods will be returned and re-checked by the vendor. However, if the goods comply with the PO data and are of good quality, the Procurement Section will provide an invoice to the Finance Department.

Furthermore, goods that have passed the checking stage will be categorized as fixed asset or non-fixed asset goods. If the goods are included in a fixed asset, then an inventory code must be made before being handed over to the Section Unit. However, if the goods are included in non-fixed assets, then the goods can be directly handed over to the Section Unit. Next, the Procurement Department recapitulates the PO data from the AWW system into an excel file and saves the PO data in hard file form.

System Design Using Use Case Diagrams

The design uses use case diagrams to determine and understand functional requirements in an information system.

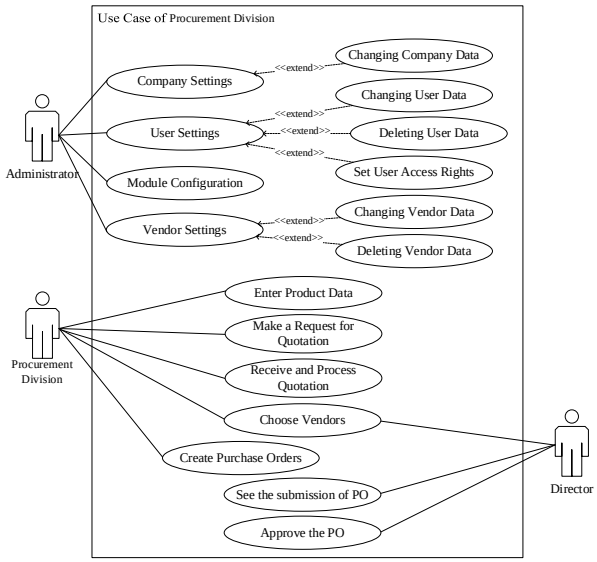

Figure 5. Use Case Diagram of the Procurement Section

Use case diagram for the Procurement Section at the UAI Directorate of Facilities and Infrastructure. There are 3 actors in this use case, namely Administrator, Procurement Section and Director. The administrator itself is an entity that acts as a manager in the management system of the UAI Directorate of Facilities and Infrastructure. The use case diagram illustrates that administrators have access to change company regulations, such as changing company data. Then manage the user, such as changing user data, deleting user data and setting user access rights. In addition, administrators have access to configure modules to support the interests and needs of the company. As well as making vendor settings such as changing and deleting vendor data.

In addition, the use case diagram illustrates that Procurement Department staff have access rights to enter product data, make Requests for Quotation (RFQ), receive and process quotations, select vendors, and make POs. Meanwhile, the Director has access rights to select vendors, view PO submissions, and approve POs.

System Design Using Sequence Diagrams

Sequence diagrams can describe the movement of an object and messages that occur in the procurement system.

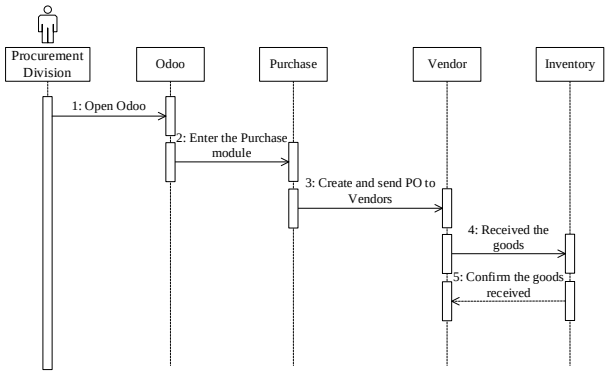

Figure 6. Sequence Diagram of the Procurement Section

The sequence diagram in Figure 6 describes the process that the Procurement Department staff went through. In the first process, the staff enters or opens the odoo software. The second process is the process of staff entering the purchase module, then proceeding with the process of making and sending POs of goods to vendors. Next, the staff receives the product from the vendor, which the staff then confirms or checks the goods that have been received

System Design Using Class Diagrams

Class diagrams are used to describe the types of objects in the system and the various types of static relationships that exist between them. The following is a class diagram of the purchase module on Odoo.

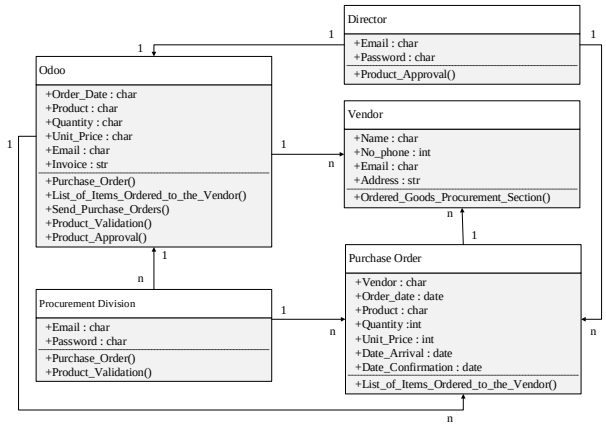

Figure 7. Class Diagram of the Procurement Section

Figure 7 shows the class diagram at the UAI Directorate of Facilities and Infrastructure which consists of 5 classes, namely Director, Procurement Section, Purchase Order, Vendor, and Odoo. In the Director class there are attributes in the form of an email and password to log in, and later this Director is tasked with approving the POs made. Furthermore, the Procurement Section class contains attributes in the form of an email and password to log in, later the Procurement Section creates a PO and validates the products that have been received.

In the Purchase Order class there are attributes such as vendor, order date, product, quantity, unit price, date of arrival, and date of confirmation. This class will contain a list of ordered items that will be sent to the vendor. In the Vendor class there are attributes in the form of name, telephone number, email, and address. The class will contain a list of items ordered from the Procurement Department. In the Odoo class there are attributes such as order date, product, quantity, unit price, email, and invoice. This class contains purchase order data, list of items ordered to vendors, sending purchase orders, validating products, and approving products.

Identify Business Processes Using Odoo

In the actual business processes of the Procurement Department, several weaknesses have been identified, namely:

a. The system used is still semi-manual based on Microsoft Excel and paper based
b. PO data recording (recording, processing and reporting) is still done manually by copying data from the AWW system to Microsoft Excel

The next step is to overcome these weaknesses by:

a. Using the Odoo ERP system to maximize the use of features that do not yet exist in the AWW system, such as sending data via email automatically and well-integrated inter-module databases.
b. Using add-ons modules that can facilitate PO data recording (recording, processing and reporting) and minimize PO data input errors during the recording process.

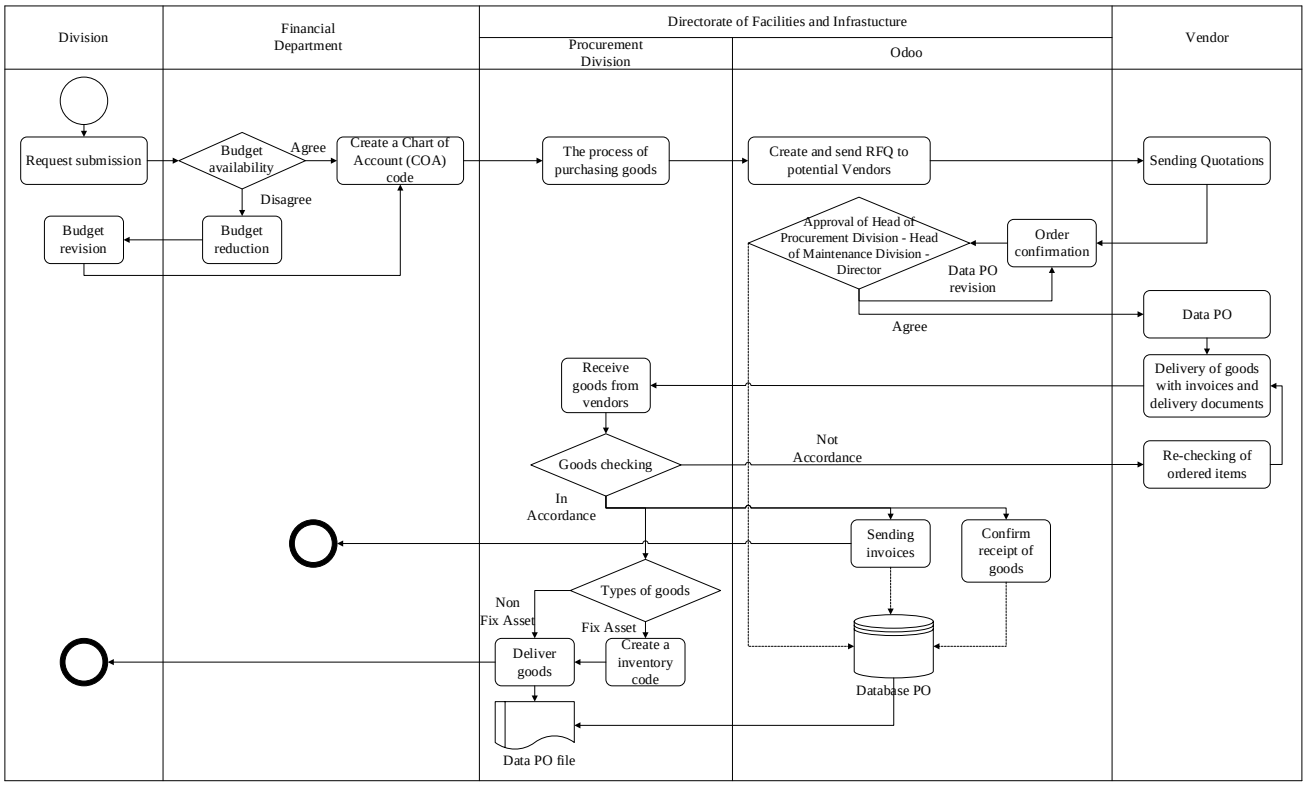

Figure 8. Business Process Using Odoo

Figure 8 shows the flow of business processes using the Odoo software at the UAI Directorate of Facilities and Infrastructure using activity diagrams. The initial process is that the Unit Section at UAI submits a request in the form of a letter of request for procurement of goods to the Finance Department. Furthermore, the Finance Department will check the availability of the budget, if the budget is available, the Finance Department will provide the Chart of Accounts (COA) code in the request letter. However, if the budget is not available, the Finance Department will return a letter of request to the Section Unit to revise the budget amount.

After the Finance Department gives the COA code, the Procurement Department will then proceed to process the letter of request into a Request for Quotation (RFQ) using the Odoo software. RFQ will be sent via email to potential vendors to meet these needs.

After that, the vendor will send a Quotation to the Procurement Department containing a price quote, promo or discount related to the item to be ordered. Furthermore, the Procurement Section will confirm the order, and proceed with seeking approval from Kep. Ch. Procurement, Kep. Ch. Maintenance, and Director. If any of the three parties disagree, then the data will be revised. In this process the RFQ has changed to a Purchase Order (PO), after which the PO data will be sent to the vendor via email which is then processed further by sending the ordered goods along with the invoice and delivery note to the Procurement Department.

Then the Procurement Section will receive the goods from the vendor, and check the goods. If the goods do not match the PO data or are of poor quality, then the goods will be returned and re-checked by the vendor. However, if the goods comply with the PO data and are of good quality, the Procurement Department will confirm receipt of the goods and send invoices to the Finance Department via Odoo. Until this stage, Odoo will record all PO activities that have been carried out previously in the PO database.

Furthermore, goods that have passed the checking stage will be categorized as fixed asset or non-fixed asset goods. If the goods are included in a fixed asset, then an inventory code must be made before being handed over to the Section Unit. However, if the goods are included in non-fixed assets, then the goods can be directly handed over to the Section Unit. Next, the Procurement Department prints the PO data and saves it in the form of a hard file.

Odoo Implementation and Configuration

Table 1. Odoo implementation

	Activity	Status
Installing Odoo	*Install Odoo Community Edition Vers 16.0*	✓
	Restart Odoo Server dan *Postgresql*	✓
	Database Management	✓
Install Basic Modules	*Install Purchase Module*	✓
Install Add-Ons Modules	*Purchase Report*	✓

a. Install Odoo
The first step of installation is to download Odoo version 16.0 on Odoo's official website, namely https://nightly.odoo.com/16.0/nightly/windows/. Then install odoo_setup_16.0.latest and the initial installation form will appear as shown below:

Figure 9. Installation Start Page

After clicking the Next button the installation process will start and will run like installing software in general.

b. Restart Odoo Server and Postgresql
Here's how to restart the server using the localhost server, open the service menu, then look for Odoo server and Postgresql then on the top left there is server management, namely stop, pause and restart.

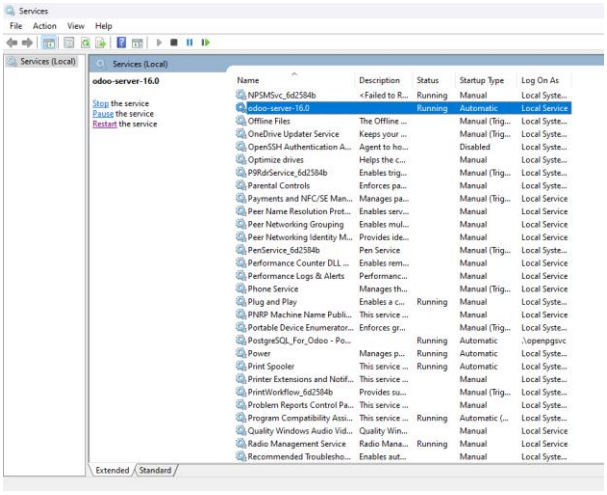

Figure 10. Restart Server

c. Database Management
Below is a form for creating a new database that is used in the Odoo software version 16.0. In this case, the researcher made settings using localhost. The information that must be filled in the database form is as follows:

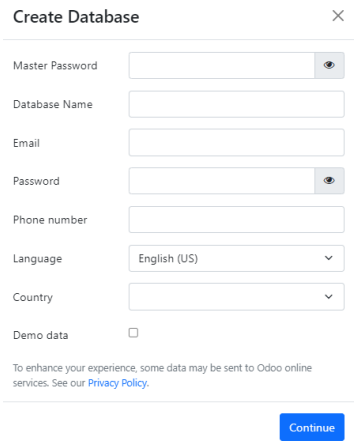

Figure 11. Database Form

d. Install Basic Modules
Basic modules are modules that are provided directly in the Odoo software. The basic module used in this research is the purchase module and how to install it is by clicking activate on the module.

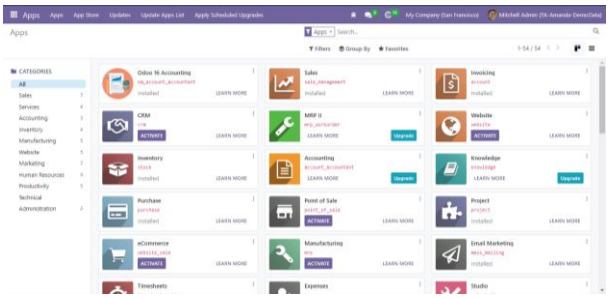

Figure 12. Installed Basic Module

e. Install Add-Ons Modules
To fulfill the customizations recorded in the business process needs analysis at the Facilities and Infrastructure Directorate, it is necessary to install the module via third-party apps provided by Odoo. This research uses free or unpaid module installations. Third-party apps themselves are applications/software created by developers who are not the manufacturer of the device on which the application runs or the owner of the website that offers them. The module used is a purchase report with the following details:

Table 2. Add-Ons Module

Modul Icon	*Technical Name*	*Third-Party*	*License*	*Version*
	Purchase _report_ generator	Cybrosys Techno Solutions	AGPL-3	16.0

The use of this Purchase Report module is to record and summarize PO data reports that have been completed. This module has the advantage of date range and report type which can be adjusted to user needs. The date range feature can be set by specifying the start date and end date. For report types, it consists of several types of reports as seen in Figure 14.

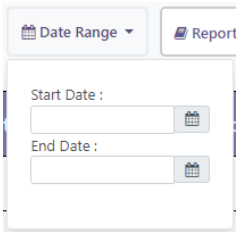

Figure 13. Date Range feature

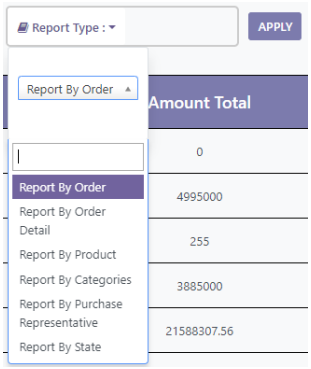

Figure 14. Report Type feature

- Add-Ons Module Installation Flow

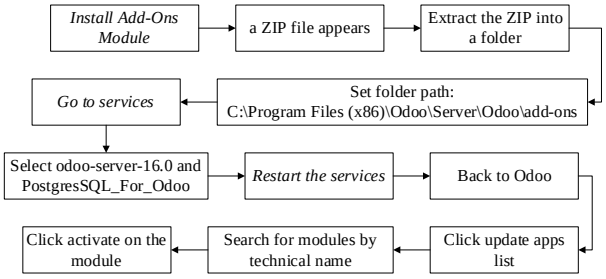

Figure 15. Flow of Installing Add-Ons Module

Odoo Software Customization

Odoo customization that was carried out in this research amounted to 33% in various menus in the purchase module. Table 3 shows that there are 4 of the 12 features that require adjustment. The Odoo customization steps can be seen in Figure 15 for customizing the purchase report module.

Table 3. List of Odoo Customization Requirements

No	Feature	*Default/ Custom*	Explanation
1	*Request for Quotations*	*Default*	No customization required
2	*Vendor*	*Default*	No customization required

No	Feature	*Default/ Custom*	Explanation
3	*Product*	*Default*	No customization required
4	*Purchase Order*	*Default*	No customization required
5	*Vendor Bill*	*Default*	No customization required
6	*Approve Order*	*Custom*	Activate *Purchase Order Approval*
7	*Receive Products*	*Default*	No customization required
8	*Purchase Report*	*Custom*	Installing the *add-ons module: Purchase Report*
9	*Users*	*Custom*	Add *User* and set *User authority*
10	*Companies*	*Custom*	Changing company data profile
11	*Addresses*	*Default*	No customization required
12	*Email*	*Default*	No customization required
Total Customization			4
Percentage			33%

Testing Using User Acceptance Test (UAT)

User Acceptance Test (UAT) is a test carried out to find out whether users can use the software and the available features well, and whether the software can meet the user's needs. UAT respondents were 5 people from the Directorate of Facilities and Infrastructure, namely the Director and staff of UPT Facilities and Infrastructure. This UAT was carried out on July 21 2023. Questionnaires were distributed to respondents and then they were filled in based on the respondents' understanding. Meanwhile, the UAT results are presented in Table 4.

Table 4. Recap of Usability Value Questionnaire Results

	Questions	Score	
		Decimal	Percentage
1	Is the functional Odoo software easy to operate?	4.2	84%
2	Is the display of the Odoo software easy to understand?	4.2	84%
3	Does the Request for Quotation (RFQ)/Purchase Order (PO) numbering system in the Odoo system make it easier for the Procurement Department?	4	80%
4	Does the Request for Quotation (RFQ)/Purchase Order (PO) numbering system automatically comply with the provisions of the Procurement Department?	4.2	84%
5	Is the appearance of the Request for Quotation (RFQ) form easy to understand?	4.2	84%
6	Does the automatic calendar system, sending emails, and receiving goods make it easy to make a Purchase Order (PO)?	4.6	92%
7	Is making a Purchase Order (PO) using Odoo faster than the system currently used?	4	80%
8	Is the Purchase Order (PO) approval system in accordance with the provisions of the Procurement Department?	4.2	84%
9	Does the date range and report type system in making a recap of all Purchase Order (PO) data make it easy to group data?	4.4	88%
10	Is making a recap of all Purchase Order (PO) data using Odoo faster than the system currently used?	4.4	88%
11	Does the Odoo system suit the needs of the Procurement Department?	4	80%
12	Does the Odoo system help the activities of the Procurement Department?	4.2	84%
	Average Score	4.22	84%

The UAT assessment uses a questionnaire designed with a Likert scale. The measurement scale for

levels of understanding is 1 (don't really understand), 2 (don't understand), 3 (quite understand), 4 (understand), and 5 (very understand). On the Likert scale, a formula is used to determine the numerical scale assessment interval.

Formula:

$$RS = \frac{(m-n)}{b}$$

$$RS = \frac{(5-1)}{5}$$

$$RS = \frac{4}{5}$$

$$RS = 0.8$$

Information:
RS : Scale range
m : The highest number in the measurement
n : The lowest number in the measurement
b : The number of classes/categories formed

Based on this formula, a Likert scale can be arranged as follows:
1.0 – 1.8 : really don't understand
1.9 – 2.6 : don't understand
2.7 – 3.4: quite understandable
3.5 – 4.2 : understand
4.3 – 5.0: very understanding

Based on the results of the usability value recap in Table 4 through filling out the questionnaire, it shows that all questions have an average value of 4.22 (= 84%). So that it can be said that the user understands how to operate the Odoo ERP system and the features available on Odoo can meet user needs.

CONCLUSION

After implementing the Odoo ERP system at the Directorate of Facilities and Infrastructure at Al-Azhar University Indonesia, it can be concluded that:

1. All procurement activities can be recorded in a complete, correct, up-to-date, and valid manner due to the implementation of the Odoo ERP system which is integrated and adapted to user needs, such as customizing 4 of 12 features (= 33%) in the purchase module.
2. Having a purchase report module can simplify the process of recording and reporting PO data, because the data will be directly integrated with the purchase module, and there are date range and report type features that can be adjusted to user needs.
3. Based on the results of the User Acceptance Test (UAT), it appears that the features owned by Odoo are in accordance with the needs of the Procurement Department. All questions have an average value of 4.22 (= 84%) so that it can be said that users understand how to operate the Odoo ERP system and the features available on Odoo can meet user needs.

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