



PURCHASING APPLICATION FOR PT OMEGA NUSA ERA BASED ON ANDROID USING MOBILE DEVELOPMENT LIFE CYCLE (MADLC)

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Abstract

PT Omega Nusa Era is a production company that collaborates with many suppliers as suppliers of raw materials needed to carry out their production. The large number of suppliers who need to be contacted to get raw materials hampers the company's goods production process. Therefore, it is necessary to develop a system that can help overcome these problems. This research begins with data collection by conducting interviews, literature studies, observation, and similar studies. Furthermore, system development uses the method Mobile Application Development Life Cycle Model (MADLC) which includes Identification, Design, Development, Prototyping, Testing, Deployment, and Maintenance Phase. System design using Object Oriented Programming (OOP) approached with Unified Modeling Language tools (UML) and application design using software Android Studio. This application is expected to help with the problem of ordering efficiency for raw materials produced by the PT Omega Nusa Era company by providing features for managing stock warehouse and selecting the items you want to order in one application, so you don't waste time contacting many suppliers to order goods. The conclusion obtained from this research is that this product purchase application can help overcome the problem of ordering goods faced by companies with various menus and features contained in the application

Keyword: Purchase Application, Android, MADLC, Ordering Raw Materials

1. INTRODUCTION

The use of mobile is now quite widespread in various activities, needs, and users. Not only to send messages or social media, the use of these "smart" devices has a huge impact on daily human activities. Along with the increasing interest in the use of mobile devices, there are also new innovations in utilizing the usability and efficiency of these handheld devices.

By combining the fields of business and technology, now the act of buying and selling can be done in the hands of anybody, or commonly known as e-commerce. As a result of the development of user competition and the development of the internet in the 1990s, the term electronic commerce [1] was introduced. In short, e-commerce is conceptualized as a platform for buying and selling carried out on the internet.

PT Omega Nusa Era is a production company based in Taiwan. This distributor company started its business in Indonesia in 2014. However, with all the advantages and quality of the goods it produces, there are several problems that hinder the process of producing goods so that the time required is longer. The ineffectiveness of inventory (data collection of goods going out and entering the warehouse) is due to the recording stock and data collection of goods going out or entering the warehouse are still recorded manually (in the form stock opname) thus causing a difference in income between the stock of goods and the physical number of goods cards in the warehouse, ordering production equipment to many suppliers by telephone causes many obstacles to ordering, namely: spending a lot of time, the absence of written evidence of ordering, sometimes goods that were ordered are not delivered, and difficulties in the ordering process became the main problem causing delays in the production of goods; need to contact several suppliers to order products so it takes a lot of time, forms that are not stored, lost, or damaged cause discrepancies in recording goods, and suppliers who are difficult or cannot be contacted.

By making an application for purchasing goods by mobile hoped that it can overcome the problem of efficiency in the production process in the company and can help in inventory, by using mobile expected to facilitate the activities of selecting and ordering goods that can be done anywhere and anytime without the need for many additional devices.



2. RESEARCH METHOD

Mobile Application Development Lifecycle (MADLC)

The method of designing an application for purchasing goods in this study uses the Mobile Application Development Life Cycle (MADLC) method. which consists of the following stages:

- a. **Identification Phase**
The first step that needs to be done in making this purchase application is to analyze the specifications of how it works and system requirements that can meet user needs to get an idea of the application description. The results of the idea will be described in use case, class, sequence, activity, state, and collaboration.
- b. **Design Phase**
This process is the process of transforming system requirements in detail. Focusing on ways to fulfill the various functions required by this system of purchasing goods. This stage is the implementation of system requirements. In this study, the design that will be made is in the form of an application user interface design based on the design idea diagrams that have been made in the identification phase.
- c. **Development Phase**
At this stage, coding is carried out based on the results of application design in the previous stage. This study uses Java as a programming language.

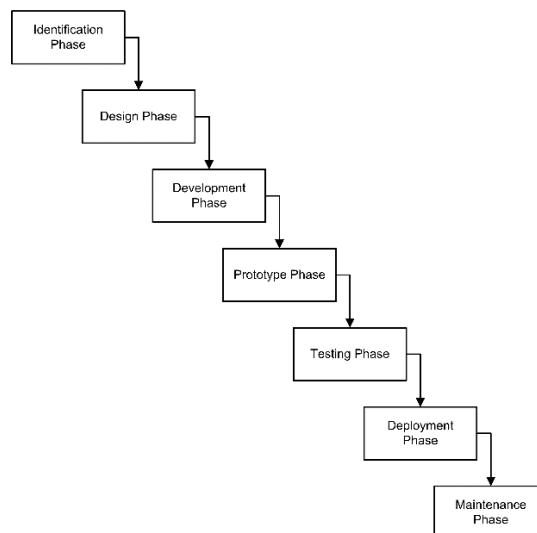


Figure 1. Mobile Application Development Life Cycle Model [1]

- d. **Prototyping Phase**
Analysis for the prototype will be analyzed at this stage, to ensure the application is designed according to user needs.
- e. **Testing Phase**
This stage contains testing of the prototype to ensure prototype runs well. In this study, testing will be carried out with an emulator in Android Studio to ensure the appearance of the application is in accordance with the desired design.
- f. **Deployment Phase**
After the testing and development phase of the application is complete, the application is ready to be published.
- g. **Maintenance Phase**
In this phase, maintenance is carried out based on the input provided by the user.



3. RESULT AND DISCUSSIONS

3.1. Proposed Business Process

Business Process Modeling Notation (BPMN) is a standard model for describing business processes with graphical notation. BPMN describes a business process in a diagram based on a flow engineering diagram, graphically designed to model a business process where there are activities and flow controls that model the work sequence [2]. The main objective of BPMN is to provide a standard notation that is easily understood by all business people including business analysts who create and refine business processes, developers who are responsible for implementing these business processes and business managers who monitor and manage business processes [3]. The production process of the proposed goods at PT Omega Nusa Era can be described by the following *Business Process Model and Notation (BPMN)*.

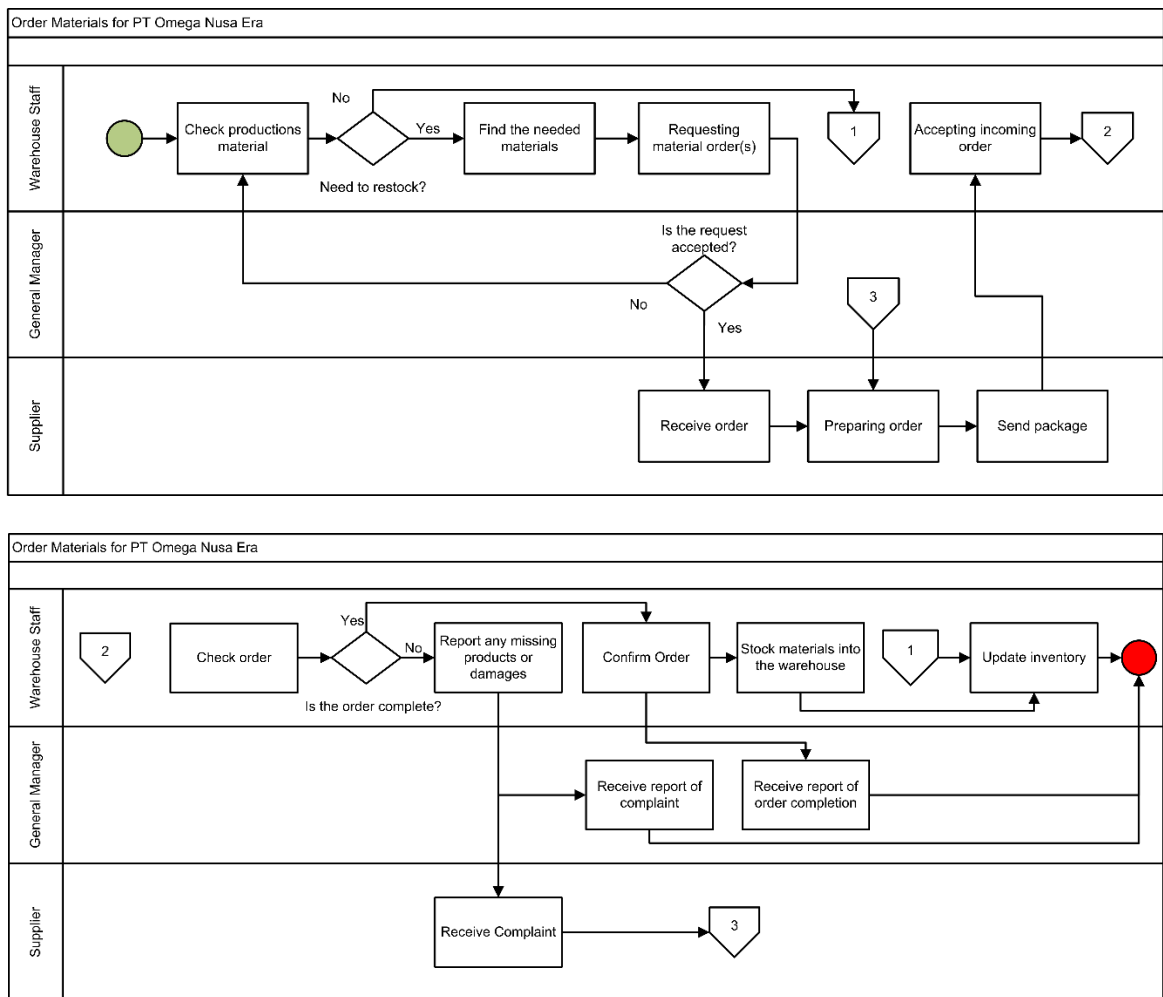


Figure 2. BPMN of Proposed Business Process

Based on Figure 2, the business process that the author proposes starts from staff checking materials and production goods in the warehouse. If stock of goods is sufficient and there is no need to order goods, the staff will continue to update stock items on the inventory in the application. If it is deemed necessary (sold out / almost out) to order goods, then the staff can choose the items that need to be ordered. After getting all the items you want to order in the purchasing cart, the staff can send an order request to the general manager. If the general manager rejects the booking request, the order is canceled. On the other hand, if the order request is confirmed, the order will be sent to the supplier, the relevant supplier will send the goods after receiving the order.



After the goods ordered arrives, the warehouse staff will check on the conditions of the. The appropriate goods will be put into the warehouse by the staff, if there is damage or discrepancy, staff can make a complaint to the supplier. The order will be re-sent by the supplier if needed. After all the goods have arrived and are complete, staff can confirm the order arrives on the application, put the goods into the warehouse, and update data inventory. All orders arrive and complaints will be sent to the general manager as a report.

3.2. Use Case Diagram

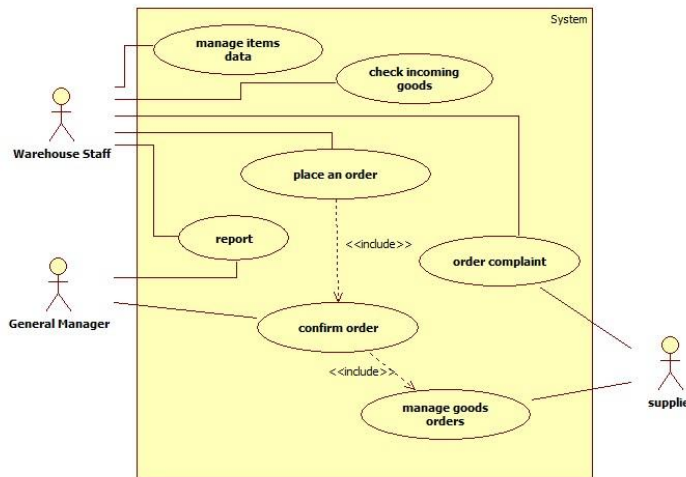


Figure 3. Proposed Use Case Diagram

Use case describes what the system does, how the system interacts with users without explaining how the system does it [4]. Use case depict actors who initiate events, events that trigger system use and use cases that perform actions triggered by events. Figure 3 is a use case diagram for the proposed business process for PT Omega Nusa Era, with five use cases and three actors involved in the system, namely: Warehouse Staff, General Manager, and Supplier. In use case diagram , there are five use cases , namely managing goods data, checking incoming goods, ordering goods, reports, and complaints.

3.3. Entity Relationship Diagram

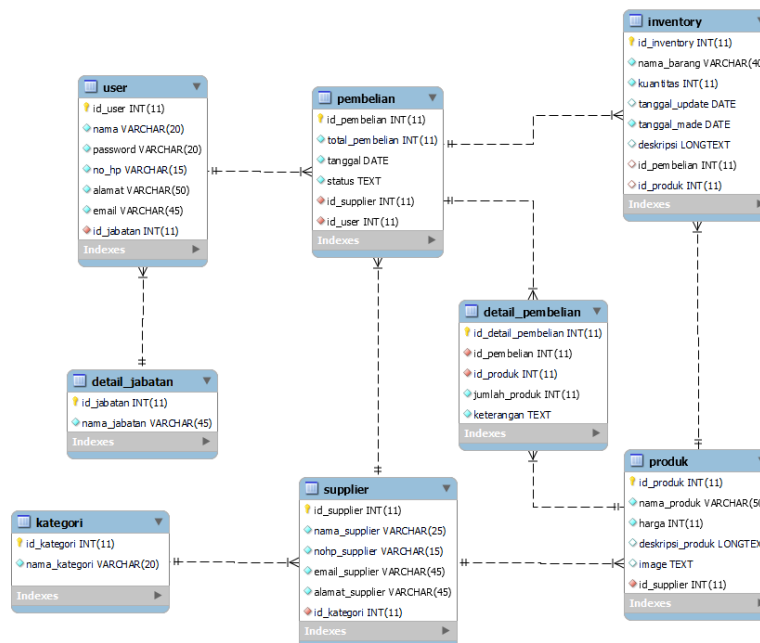


Figure 4. Entity Relationship Diagram



Entity Relationship Diagram (ERD) can be defined as a structural diagram to describe a database. An ERD models the data to be stored in a system and its boundaries [5]. It can be seen from Figure 4, the relations between tables that have been normalized or transformed from UNF to 3NF, to produce an ERD diagram that displays the relationship between tables in each of its attributes. There are eight tables generated, including: *detail_jabatan*, *user*, *pembelian*, *keterangan*, *supplier*, *inventory*, *produk*, dan *detail_pembelian*.

3.4. Application User Interface

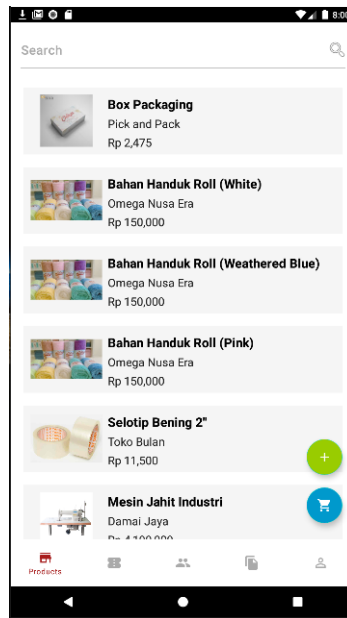


Figure 5. Products User Interface

The main view of the staff’s dashboard is the Products, which contains a list of existing products. In this view, products are displayed in the form of a list, which contains product photos, product names, supplier, and product prices. Users can select products to view product details and add them to the cart.



Figure 6. Detail Products User Interface



In this view, users can view product details which include photos, names, product prices, supplier, along with product descriptions. In addition, users can add products to the cart by entering the quantity and pressing the “Add to Cart” button.

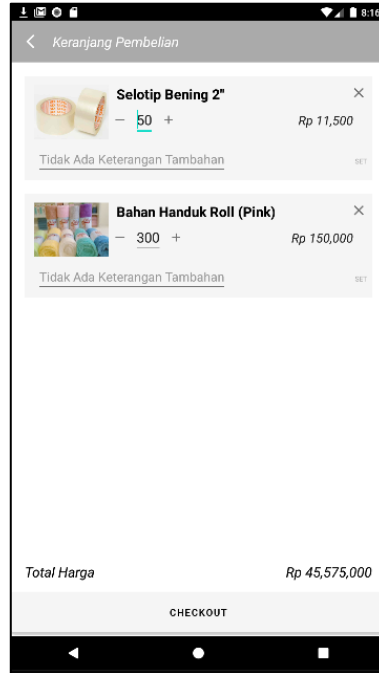


Figure 7. Cart User Interface

This menu displays the items that have been added to the cart for further selection to be ordered. In this menu, the user can change the quantity and add additional information.

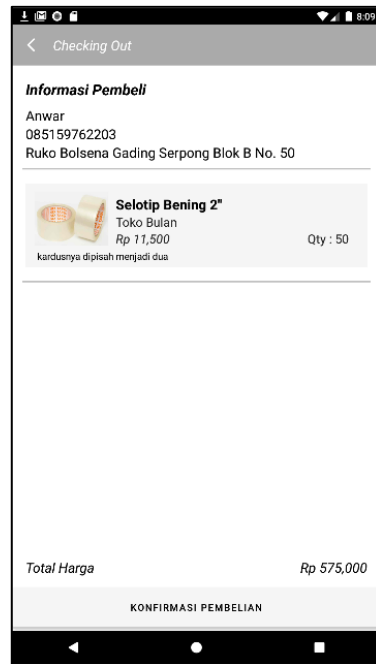


Figure 8. Checking Out User Interface

This view is the last page for the user to check the completeness and suitability of the items to be ordered before sending the order request to the manager.

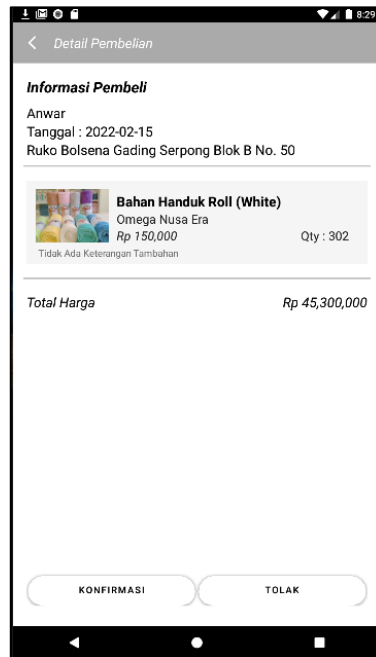


Figure 9. Order Details User Interface

This view displays the details of the booking request, and a button for the manager to confirm or reject the order. If the order is rejected, a screen will appear to fill in the reason for the rejection of the order as shown below.

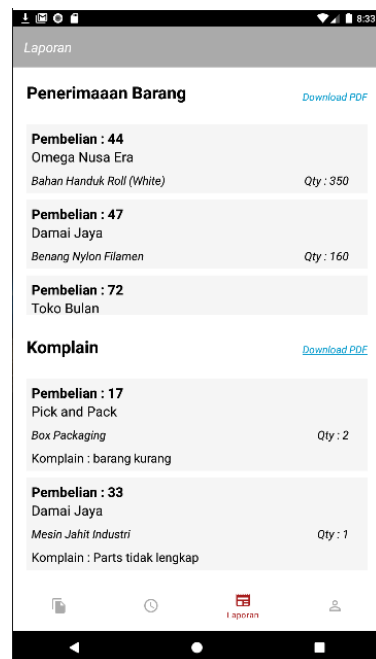


Figure 10. Reports User Interface

This view displays several types of reports, namely the Goods Receipt report and the Complaint report. Goods Receipt displays orders that have arrived and are confirmed by staff. Complaint report is a report of goods that are complained by staff.



Figure 11. Report PDF User Interface

The display above is a PDF report that has been downloaded from the report menu. Goods receipt reports and complaint reports can be downloaded as PDF to facilitate the recording process.

3.5. Proposed Access Rights

In this application there are 2 types of users with different access rights. The two access rights will be described in the following points:

- a. **Manager**
 Manager has access to the Inventory menu, Purchase Request menu, Reports, and Profile. Managers can view stock, can manage purchase requests (confirm and reject), view reports on receipt of goods and order complaints, and view profile data.
- b. **Staff**
 Staff have access to supplier product lists, lists, inventory, and profiles. The staff can view the details of the product and add it to the cart. In addition, staff can see orders that are being processed and orders that have arrived. In the inventory, staff can change data and delete data. In the profile, users can view order confirmation history, and user data.

3.6. Integration Testing

Integration testing is an application test performed by the user, in this case, the general manager. Thus, we can assess whether this application can be used / implemented or not.

Table 1. Integration Testing

No	Test Case	Description	Expected Result	Actual Result	Status
1	Login	User enters username and password	User successfully enters the application	User successfully enters the application	Successful
2	Changing Password	User enters new username and password	User has successfully changed password	User has successfully changed password	Successful
3	Products	Displays item data	Application	Application	Successful



	Menu	from the database	successfully displays a list of items	successfully displays a list of items	
4	Product Detail	Displays details item product	User successfully accesses item data detail view	User successfully accesses item data detail view	Successful
5	Adding New Product and Supplier	User adds new product and supplier	New product and supplier successfully saved	New product and supplier successfully saved	Successful
6	Add Product to Cart	Select product to put into cart	User successfully put items in cart	User successfully put items in cart	Successful
7	Supplier Menu	View a list of supplier	User can see a list of supplier	User can see a list of supplier	Successful
8	Supplier Detail	View supplier detail data	User can see supplier detail	User can see supplier detail	Successful
9	Inventory Menu	View inventory list	User can view inventory data list	User can view inventory data list	Successful
10	Update Inventory	Update inventory	User can update inventory data	User can update inventory data	Successful
11	Check Out	Do a purchasing confirmation	Send purchasing request to manager	Send purchasing request to manager	Successful
12	Checking Orders	View purchasing list	User can view purchasing list that has been made	User can view purchasing list that has been made	Successful
13	Order Request	view purchasing request by staff	User can view request for purchase and its detail	User can view request for purchase and its detail	Successful
14	Confirm Order	Confirming purchase request	User can confirm a purchase request	User can confirm a purchase request	Successful
15	Decline Order	Declining purchase request	User can decline a purchase request	User can decline a purchase request	Successful
16	Confirm Delivered Order	Confirming delivered order	User can confirm a purchase that has come / delivered	User can confirm a purchase that has come / delivered	Successful
17	Reports	View reports of received order and complaint	User can view data on completed orders and complaint	User can view data on completed orders and complaint	Successful
18	Complaint Order	Fill out complaint form	User can fill out a complaint form	User can fill out a complaint form	Successful
19	Download Report	Download received goods and complaint reports	Completed order and complaint report can be downloaded in PDF	Completed order and complaint report can be downloaded in PDF	Successful
20	Profile	View user data	User can view user data and detail	User can view user data and detail	Successful
21	Order History	View order history as well as the details	User can view the detail of completed order or order history	User can view the detail of completed order or order history	Successful

4. CONCLUSION

Based on the results of the discussion that the author has done, the following conclusions are obtained. Applications for purchasing raw materials with inventory, complaints, and product selection from various suppliers can help overcome the



problems faced by PT Omega Nusa Era by making it easier to manage goods data and order goods and production materials. It has also been designed simple so that the staffs are able to work with the software and little-to-no training needed. This application helps users in ordering materials needed for producing goods. Managing goods are faster and more convenient because this app has a simple inventory menu built-in. Workers can work more efficiently by skipping the needs to write down stock updates, manually count stock, and they can order the materials themselves as the application provides the access. The overall performance of the process of restocking and ordering materials have been increased by the usage of this mobile app. Users are provided by the convenience and have tested the application, it showed that the application is easy to use, understand, and maintain. It also reduces time significantly in processing inventory time. As it supports the process for producing goods, and helps overcome the delayed production time regarding to the unavailability of raw materials. Mobile Development Life Cycle is applied in the making of this app, and it is a good method to use as it's specifically designed for developing a software in mobile platform. Results of integration testing shows that the software performs as expected and all the test cases work as designed. This Android-based application was created to make it easier to choose and order goods with the flexibility of time and place without the need for many additional devices. In this application there is a menu that can be used to manage warehouse data, purchase data, a menu to complain to suppliers, and order goods that can be managed by the general manager. So that the process of purchasing production materials is faster, more structured, manageable, and purchasing data is not easily lost. The staffs are also able to order and make order requests to make it faster and easier to manage.

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