



Artikel

## ANALYSIS AND DESIGN OF A WEB-BASED SALES AND INVENTORY INFORMATION SYSTEM AT PT. AGRO PRIMA SEJAHTERA USING THE EOQ METHOD

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### A B S T R A C T

The advancement of information technology, especially web applications, is currently very rapid. Web applications have been utilized in various aspects of life today. PT. Agro Prima Sejahtera is a company that sells fresh fruits. Problems faced by PT. Agro Prima Sejahtera is a data processing system in the company that is still carried out in a semi-manual way, namely using Microsoft Office Excel, so there are still often errors in carrying out the data processing process and inaccuracies in carrying out data processing. Therefore, a website-based information system will be designed with the Economic Order Quantity (EOQ) method, which will help PT. Agro Prima Sejahtera in delivering product information, monitoring inventory, and making transaction reports and inventory reports. So designing a web-based information system using the EOQ method, will help PT. Agro Prima Sejahtera in selling and inventorying goods becomes more effective and efficient. And the necessary information PT. Agro Prima Sejahtera becomes more qualified.

### INTRODUCTION

The advancement of information technology, specifically the internet or the web, is currently developing so rapidly. In today's life, internet technology is needed in the world of work. A person will become faster and more precise to get information without knowing the time and place. The technology

that exists today is very influential in the global world and can have an impact on all fields, one of which is the field of sales. There are already many companies that have used e-commerce website media in selling their products.

In today's business world, the development of increasingly sophisticated web programming

has had an impact on the emergence of many competitors who develop new ideas. A company competes with each other to survive in the world of business competition in this era. A company competes in the world to survive at this time. That way, in the changes that occur today, a company must be ready and can quickly adapt so that the company can compete in today's business.

PT. Agro Prima Sejahtera is a company in the field of selling fruits. This company serves the sale of various types of fruits that are fresh and also guaranteed quality, PT. Agro Prima Sejahtera is located in Curug Kulon, Curug District, Tangerang Regency, Banten 15810.

The focus of the existing problems is on carrying out a data management system that is still inefficient and time-consuming, and inventory data management also still uses a semi-manual method, using Microsoft Office Excel. The amount of stock on goods is only handled by a few employees who already have the responsibility of collecting stock data on goods so that there are several problems and weaknesses in its use.

So with these problems, there is a need for an information system for processing sales and regulating inventory. Because the ongoing data is still done semi-manually there will be inaccuracies in making sales and inventory reports, with these inaccuracies will cause problems such as errors in the provision of goods, making reports that run for a long time, and the reports produced are often inaccurate.

After making observations at PT Agro Prima Sejahtera, and based on the background description above, an information system will be built that can help reduce inaccuracies and various types of data errors.

## **SYSTEM**

The system is a collection of components that form a unit. which is outside the system.

## **INFORMATION**

Information is data in a processed form that is far more useful and more meaningful. Data is a source of information. Real-world data that can describe real-world events or incidents and entities. [1]

## **INFORMATION SYSTEM**

The information system is an amalgamation of human activities and technology users in carrying out various needs and operational activities, these are things that refer to a relationship that exists based on human interaction or attachment, data, technology, information, and also algorithms.

The information system is defined as a combination of humans, in structuring a communication network that is very important for users, existing media, technology, and procedures are needed. [2]

## **ANALYSIS**

Analysis is an activity to look for a pattern besides analysis is a way of thinking related to systematic testing of something to determine parts, relationships between parts, and their relationship to the whole. [3]

Analysis that focuses on studying several parts that serve to reduce existing problems, so that it will form a clear structure because the contents are clearer and the meaning is easier to understand. [4]

## **I. METHODS**

The process of collecting data and analyzing for data system needs is carried out by conducting interviews and making observations and directing down to the company, to collect transaction data, ordering fees, warehouse costs, storage costs, and others.

## 1. E-Commerce

E-commerce is selling electronically. Easily, one of the simplest features of e-commerce is an online catalog of trade products. [5]

## 2. PHP Programming

PHP is one of the web-based programming languages written for web development. Rasmus Lerdof is a software developer and a member of the Apache team, Rasmus Lerdof who first developed PHP at the end of 1994. Rasmus Lerdof developed PHP aiming only to record the number of visitors to his website. Then in his second release, Rasmus Lerdof added a Form Interpreter, which is for translating an SQL command, and in his second release, his name is called PHP/FI. Since then, PHP began to be accepted and officially became a new programming language in mid-1997. Around the world, 50,000 sites in the world have been using PHP. [6]

## 3. UML (*Unified Modelling Language*)

In carrying out this design, UML (Unified Modelling Language) will be used which functions as a tool that can explain the flow of the analysis that will be designed in the research, building UML, Activity Diagrams, Class Diagrams, and Sequence Diagrams. [7] UML is a standard modeling language common in the field of software engineering. UML includes graphic notation techniques for creating abstract models of specific systems. [8]

In UML several graphic elements are often combined into a diagram. Diagrams serve as an overview or to document aspects of a system. The following are some of the classifications on the diagrams in UML:

### a. Activity Diagram

Activity diagram is to describe the business process and the sequence of activities in a process. Shows the

sequence of process activities on the system. The main purpose of the Activity Diagram is to describe the business process and the sequence of activities to other activities. [9]

### b. Use Case Diagram

Use case diagram is a model for the behavior of the information system to be created. Use cases are used to find out what functions are in the information system and who has the right to use these functions. [10]

### c. Class Diagram

A class diagram in UML is a type of static structure diagram that describes the structure of a system by showing system classes, their attributes, operations (or methods), and relationships between objects. Class diagrams are a central modeling technique that runs through almost all object-oriented methods. [11]

### d. Sequence Diagram

A sequence diagram is an interaction diagram that is arranged based on a time sequence. Each sequential diagram represents one flow of several flows in a use case. [12]

## 4. HTML

HTML or Hyper Text Markup Language is an ordinary programming language that functions as a tool in building web pages and can be opened to show various types of information on the web. [13]

Because there are many tags in HTML and it is also dynamic, the code in HTML cannot be used as an executable program file. This happens because HyperText Markup Language is just a script that can only be run on, Netscape Navigator, Explorer, Mozilla, Opera, browsers, and others.

## 5. Inventory

Inventory is the result of a product from a company that is available for purchase by consumers, then these available products will be offered to consumers to make a profit.

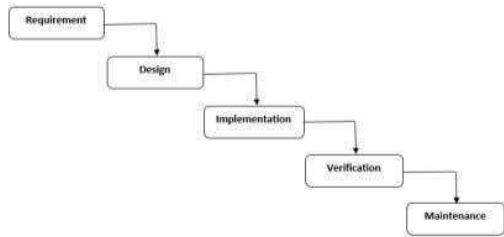
Inventory is also included as one of the assets that play a very important role in providing profit to the company.

Inventory is one of the most active elements in a company's operations and is constantly acquired, converted, and resold. [14]

### 6. Waterfall Method

The waterfall method is a method to develop software and the oldest method because the process occurs naturally. And this waterfall method is also the first SDLC method used in the process of developing software.

The waterfall method is one of the SDLC models commonly used in the development of information systems or software. The waterfall model uses a systematic and sequential approach. The stages of the waterfall model include needs, design, implementation, verification, and maintenance. The following are the phases of the method. [15] :



Picture 1. Phases in the waterfall method

The following are the stages of the waterfall method carried out in software development, namely as follows.:

- a. Needs
- b. Implementation Design
- c. Verification
- d. Maintenance

### 7. Economic Order Quantity (EOQ) Method

"Economic order quantity (EOQ) is the minimum cost of obtaining a quantity, or

commonly referred to as the optimal purchase of quantity To meet these needs, it can be calculated that the most economical satisfaction of purchasing needs is the quantity of an item that can be obtained by purchasing at minimum cost.".[14]

The formula in the method is as follows [16] :

- a. Calculating EOQ Q\* (Order Quantity)

$$EOQ = \sqrt{\frac{2 \times R \times S}{P \times I}}$$

- b. Calculate the estimated number of orders

$$N = \frac{R}{EOQ}$$

Table 1. Symbol captions on EOQ

Symbol	Information
Q	Optimal number of items per order (EOQ)
D	Demand per units for supplies
S	In-depth booking fee every time you book
H	Storage costs
P	Per units price of goods

Source : Juwari, *et all.*, 2018

## II. RESULT

1. Analysis of the EOQ (Economic Order Quantity) Method

Agro Prima Sejahtera needed 250 boxes of green melons in the previous year, the purchase price of products per box @ 8 kg was IDR 680,000 and a shipping cost of IDR 15,000 per box @ 8 kg. While the storage value of 5% has been set by the distributor and the delivery process is for 2-3 days.

**Table 2. Analysis of EOQ (Economic Order Quantity) Method**

Information	Value
<b>R = Quantity of goods needed in the previous year</b>	250 box
<b>S= Ordering/shipping costs</b>	Rp 15.000 / box @8 kg
<b>P = Product Purchase Price</b>	Rp 680.000 box @8 kg
<b>I = The cost of storage on each type</b>	5 %

**Note:**

**Value I is obtained based on several factors including the size and type of product.**

$$\text{Formula EOQ} = \sqrt{\frac{2 \times R \times S}{P \times I}}$$

$$\text{EOQ} = \sqrt{\frac{2 \times 250 \times 15.000}{680.000 \times 0,05}}$$

$$\text{EOQ} = \sqrt{\frac{7.500.000}{34000}}$$

$$\text{EOQ} = \sqrt{220,59}$$

EOQ = 14,85 or 15 box

Bookings in a year =  $N : \frac{R}{\text{EOQ}}$

$$N : \frac{250}{14,85}$$

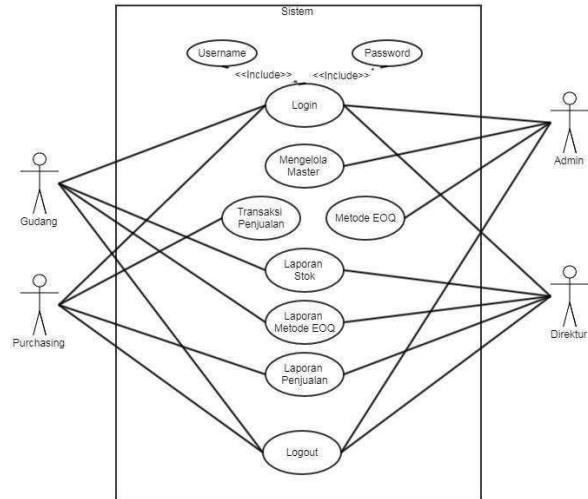
N : 16,8 atau 17 kali

EOQ = 14.85 or 15 boxes for purchasing green melon stocks and in a year orders are made as many as 16.8 or 17 times

### III. DISCUSSION

#### 1. Draft Proposed System

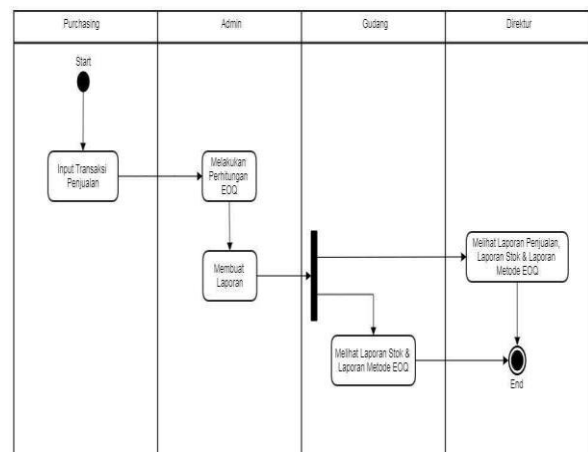
##### a. Use Case Diagram



**Picture 2. Use Case Diagram Proposal**

The following is an explanation of the Use Case Diagram above :

- Warehouse, admin, purchasing and director are actors.
  - Actor warehouse connects association logins, stock reports, EOQ calculation reports, and logouts.
  - Actor admin connect association login, manage master, eoq calculation, and logout.
  - Actor purchasing connects association logins, sales transactions, sales reports and logouts.
  - Actor director connect association login, stock report, EOQ calculation report sales and logging out.
- b. Activity Diagram



**Picture 3. Activity Diagram**

## 2. Program View

### a. Form Login

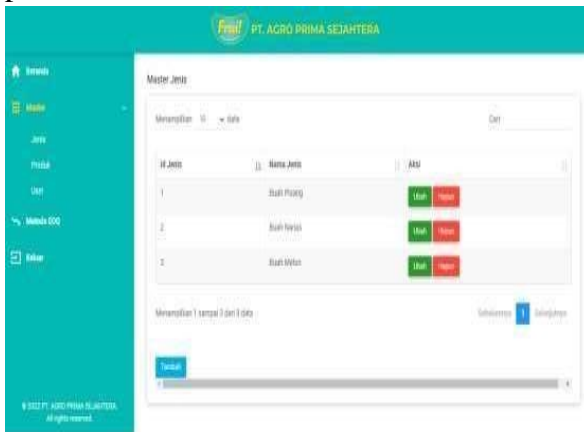
Login menu display.



Picture 4. Tampilan Form Login

### b. Master Type

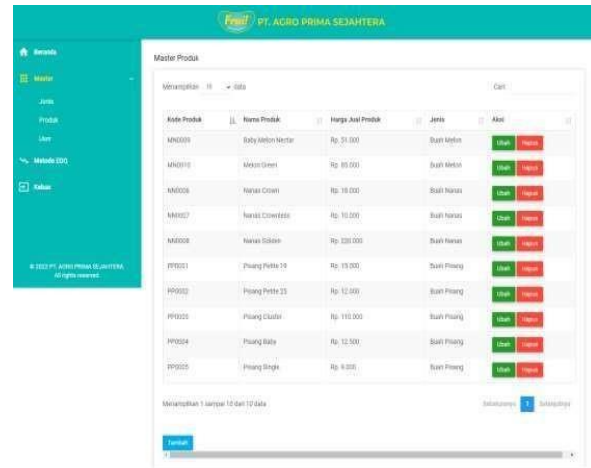
In the master view the type has functions: type id, type name, action consisting of change and delete buttons, and has search, display data, previous, next as well as add buttons



Picture 5. Tampilan Master Jenis

### c. Product Master

In the master view the product has functions: product id, product name, product selling price, type, action consisting of change and delete buttons, and has a search, display data, previous, next as well as an add button.



Picture 6. Product Master View

### d. User Master

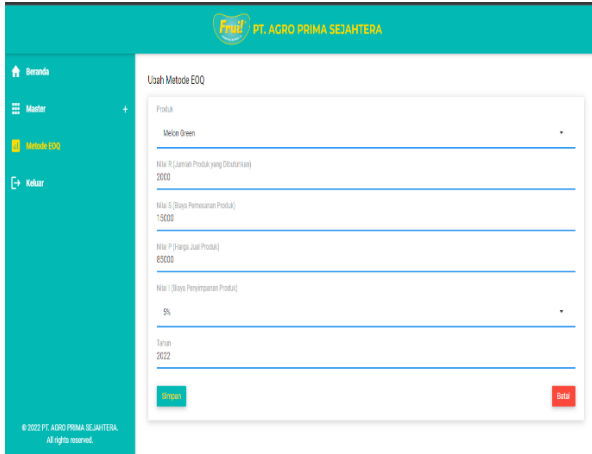
The master user view has functions: user id, username, access, action consisting of change and delete buttons, and has search, display data, previous, next, and add buttons.



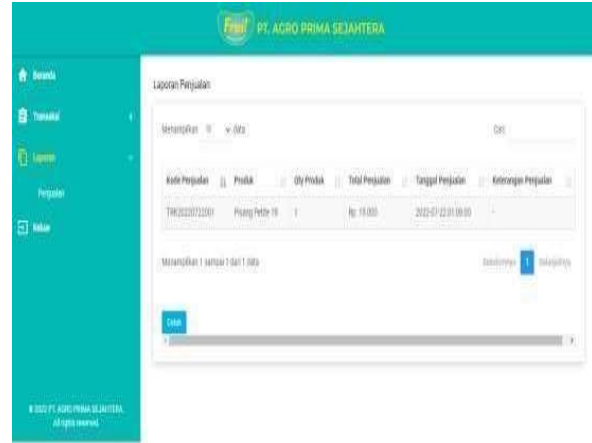
Picture 7. Master User View

### e. EOQ Method

The display of the EOQ method has functions: R value, S value, P value, I value, year, status, action consisting of change, delete, and inactive buttons and has search, display data, previous, next well as plus buttons.



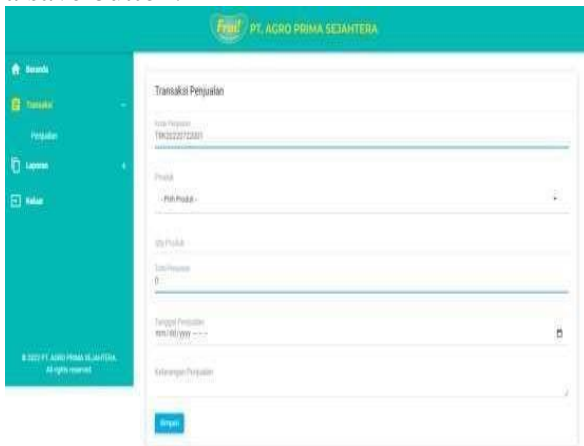
Picture 8. Metode EOQ View



Picture 10. Sales Report View

f. Sales Transaction

In the change view, the Sales Transaction View has functions: sales code form, product, product qty, date of sale, sales description and a save button.



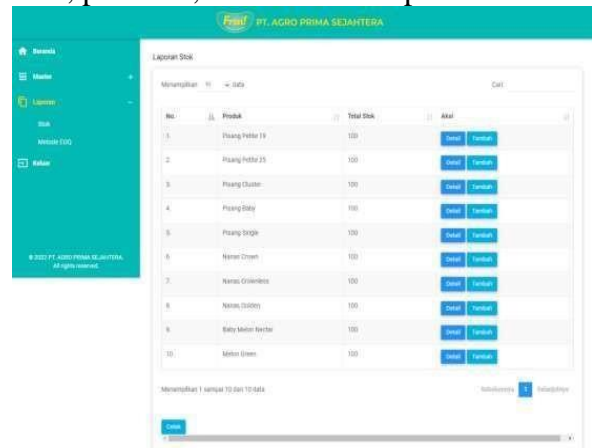
Picture 9. Sales Transaction View

g. Sales Report

The sales report display has functions: sales code, product, product qty, total sales, date of sale, sales description and has a search, displays data, previous, next, and print buttons.

h. Stock Report

The stock report view has the functions: No, product, total stock, action consisting of detail, and add buttons and has search, display data, previous, next as well as print buttons.



Picture 11. Stock Report View

i. EOQ Report

In the report display, the EOQ method has functions: no, product, total stock, EOQ, recommendation of total order/year, and has search, display data, previous, next, and print buttons.

No.	Produk	Total Stok	EOQ	Rekomendasi Total Pemesanan/Tahun
1.	Pisang Petite 19	100	195.95917942265	0.61237243569579
2.	Pisang Cluster	100	83.29574910031	1.9088609168821
3.	Melon Green	100	118.8177051572	16.832508230603

Picture 12. EOQ Report View

j. Print EOQ Report

In printed view the EOQ report has information: no, product, total stock, EOQ, recommendation total order/year.

No.	Produk	Total Stok	EOQ	Rekomendasi Total Pemesanan/Tahun
1.	Pisang Petite 19	100	195.95917942265	0.61237243569579
2.	Pisang Cluster	100	83.29574910031	1.9088609168821
3.	Melon Green	100	118.8177051572	16.832508230603

Picture 13. Print EOQ Report View

k. Print Stock Report

In print view the stock report has information: no, product, total stock

No.	Produk	Total Stok
1.	Pisang Petite 19	100
2.	Pisang Petite 25	100
3.	Pisang Cluster	100
4.	Pisang Baby	100
5.	Pisang Single	100

Picture 14. Print Stock Report View

IV. CONCLUSION

Designing sales applications at PT. Agro Prima Sejahtera aims to help companies to improve the quality of work and petrify in carrying out their sales to be easier and more practical, of course. In designing a sales information system for PT. Agro Prima Sejahtera gets several results, namely as follows.

1. Build a web-based Information System for sales and inventory using the Economic Order Quantity (EOQ) method.
2. With the design of this web-based information system, it can make reports of sales results more accurate and faster.
3. Make it easier to check inventory stocks.



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## **BIOGRAPHY**

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