SUPPLY CHAIN SYSTEM BY APPROACHING SUPPLY CHAIN MANAGEMENT METHOD IN PT. TANABE INDONESIA

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ABSTRACK

PT. Tanabe Indonesia is one of the manufacturing company engaged in the pharmaceutical field. Products produced by PT. Tanabe Indonesia in the form of drugs in tablet form. Products produced drugs are then distributed to the pharmaceutical wholesaler which has been working with PT. Tanabe Indonesia before medicinal products are circulated in the community. PT. Tanabe Indonesia often have constraints determines the supply of drugs to be provided in order to meet the distribution needs. It affects the distribution of a drug that has been delayed.

Based on the above problems to overcome this problem is to build a supply chain system approach to supply chain management method in PT. Tanabe Indonesia. The goal is to keep the supply of medicinal products available to meet the needs of distribution that does not cause delays in distribution and to facilitate the PT. Tanabe Indonesia in determining the amount of supply of medicinal products for distribution. Forecasting method used is single exponential smoothing. Forecasting reservations drug use data ordering drugs from pharmaceutical wholesaler. Calculation in determining the amount of drug supply using Safety Stock.

Based on the test results it can be concluded that the system has not been able to meet all the objectives in this study. Thus the system built can not help PT. Tanabe Indonesia in keeping the supply of medicinal products available to meet the needs of distribution and to facilitate the PT. Tanabe Indonesia in determining the amount of supply of medicinal products for distribution.

Keywords: Supply Chain Management, Single Exponential Smoothing, Safety Stock .

1. INTRODUCTION

PT. Tanabe Indonesia is one of the manufacturing company engaged in the pharmaceutical field. Products produced by PT. Tanabe Indonesia in the form of drugs in tablet form. Products produced drugs are then distributed to the pharmaceutical wholesaler which has been working with PT. Tanabe Indonesia before medicinal products are circulated in the community. According to the Regulation of the Minister of Health of the Republic of Indonesia No. 1148 / Menkes / Per / VI / 2011 on the pharmaceutical wholesaler, is a pharmaceutical wholesaler is a company is a legal entity which has the license for the procurement, storage, distribution of drugs and / or drug ingredients in large quantities in accordance with legislation.

Based on observations and interviews with the PT. Tanabe Indonesia, in producing the drug PT. Tanabe Indonesia using the system make to stock and PT. Tanabe Indonesia often have constraints determines the supply of drugs to be provided in order to meet the distribution needs. If the drug supply is too little, can lead to a lack of supply that can not meet the needs of the distribution. In addition the company is also difficult to determine supply medicinal products because of customer demand for drugs is uncertain. Those problems can be overcome by using a system of Supply Chain Management, where PT. Tanabe Indonesia can cooperate with business partners for Supply Chain Management function itself is to integrate business processes ranging from raw material suppliers are suppliers to the end users ie subscribers in the form of products. The aim is that the drug product flow management and flow of information in companies ranging from booking receipts from customers through the delivery of medicinal products to customers will create the synchronization and consistency. Approach to supply chain management method used in this study because of supply chain management to manage the flow of data, information and products so that if the inventory as needed, then the flow in the supply chain will be able to run in accordance with the wishes.

The objectives to be achieved from this research are:

1. Keep inventory of drug products available to meet the needs of distribution that does not cause delays in the distribution process.
2. Make it easy for the PT. Tanabe Indonesia in determining the amount of supply of medicinal products for distribution.

1.1 Basis Theory

The information system is a system that is a combination of components in an organization that is intended to provide an information base for decision making astute. Based on the existing problems, the system will use a method of Supply Chain Management in assisting the process of product distribution.

1.1.1 Supply Chain Management

Supply chain is a network of companies involved in supplying raw materials, produce goods, and deliver it to end users. While supply chain management is a method to manage the flow of products, information and money in an integrated manner involving parties from upstream to downstream. Supply chain management is based on the cooperation between the elements contained in the supply chain to achieve its goals. In addition, the transparency of information both within internal company or with parties outside the company along the supply chain is an important principle in the supply chain management. Good SCM can enhance the ability to compete for the overall supply chain, but does not cause the party to sacrifice the long term.

At a supply chain there are usually three kinds of streams that must be managed. The first is the flow of goods flowing from upstream (upstream) to downstream (downstream). Examples are raw materials delivered from the supplier to the factory. After the finished products are produced, they are shipped to a distributor, then to a retailer or retailer, then to the end user. The second is the flow of money or the like which flows from downstream to upstream. The third is the flow of information that may occur from upstream to downstream or vice versa.

1.1.2 Components in SCM

There are three kinds of components in the supply chain, namely:

1. Upstream Supply Chain (Upstream Supply Chain)
   The upstream part of the supply chain covers the activities of a manufacturing company with the distribution (either manufacturing, assembler, and or both) and connect them to their dealers (dealer second-tier). Relationship suppliers can be extended to multiple strata, all the way from the original material. In the upstream supply chain, whose main activity is procurement.
2. Internal Supply Chain Management (Internal Supply Chain Management)
   The internal parts of the supply chain includes all the work of putting the goods into the warehouse which is used to transform input from downstream to upstream. In the internal supply chain management, his main concern, among others, production, manufacturing, and inventory control.
3. Downstream Supply Chain (Downstream Supply Chain)
   Downstream of the supply chain includes all activities involving the delivery of products to end customers. In the downstream supply chain, the main attention is directed to the distribution, warehousing, transportation and services

1.1.3 SCM Strategy

In the supply chain there are three types of strategies that push strategy, a strategy pull and push-pull strategy.

1. Push-based supply chain
   In the push-based strategy supply chain, production and delivery decisions are based on long-term forecasting. Forecasting a request is received from the retail warehouse. Therefore, the use of push-based strategy supply chain, to respond to changes of market demand depends on the information retail or warehouse. In this condition uncertain demand between the warehouse request to the plant with real demand by consumers will cause the bullwhip effect. Increased demand changes due to:
   a. Excessive amount of inventory that should require sizeable storage costs
   b. Changes in production capacity greater
   c. The level of service is less accepted by consumers
   d. Product becomes obsolete or old-fashioned in the sense that miss
   In particular, the bullwhip effect will lead to inefficiencies in the utilities, because it is more difficult in planning and management. For more rapid process so it can not be solved only through the distribution capacity of the product. In the push-based strategy this supply chain, often obtained an increase in transportation costs, inventory of goods in large quantities, so the production becomes expensive, in such circumstances the company recommended to immediately change the strategy used.
2. Pull-based supply chain
   In the pull-based supply chain, production and goods delivered occurs coordination of forecasting the demand for goods by the customer. This is possible because of the flow of information from customer demand. Customers can directly contact the company in terms of demand for goods does not necessarily have to pass through a retail or warehouse first. Pull system is run since manufacturers realized a few things:

a. Anticipating a drop in demand from customers
b. Diretailer inventories decline since increased storage levels
c. Changes in the system in production
d. A decrease in inventories due to the reduction in production volume

The pull-based system supply chain, we can see a significant reduction in inventory levels, adds the ability to manage resources and reduce the payment system when compared with push-based systems strategy. However, the pull-based system is also a risk that if the fulfillment of goods in tempo that is too long, then the consumer will shift demand to other manufacturers.

3. Push-pull supply chain

In the push-pull strategy supply chain there are several stages in its application and among these stages are push-based, and subsequently with a pull strategy-based system. Merging the two strategies is known as the push-pull strategy condition. Deeper understanding starting from the procurement of materials which starts from planning and delivery to customers in a long time span. Push-pull strategy is applied if the condition of delivery to several places in different locations with long distances.

1.1.4 Forecasting Theory

Forecasting is the process of estimating some of the needs in the future include the need to measure the quantity, quality, time and location are needed in order to meet the demand for goods and services. The main purpose of forecasting is to predict future demand in order to obtain a close approximation the actual situation. The purpose of forecasting is based on a time dimension can be divided into three parts:

1. Long-Term Forecasting

   Older long-term forecasting is generally 5 to 20 years. Planning is used for production planning and resource planning.

2. Medium-Term Forecasting

   Medium-long term forecasting is usually monthly or quarterly. Commonly used to determine the cash flow calculations and budgeting.

3. Short-Term Forecasting

   Long short-term forecasting is usually daily or weekly. Forecasting is used to take decisions in relation to the scheduling of labor, raw materials, machinery and resources.

Forecasting methods can be distinguished based on user characteristics and properties of the forecast. When viewed by its nature, forecasting methods can be divided into two, namely:

a. Forecasting is subjective, that forecasting is based on intuition or feelings of the user. Point of view, the nature and characteristics of users forecasting greatly affect whether or not the forecasting results obtained.
b. Forecasting is objective, namely forecasting based on past data that can be collected. The use of this method is done by using the techniques specific calculations, followed by analysis of forecasting results.

Meanwhile, if viewed by the nature of his predictions, the forecasting method is divided into two forecasting methods qualitative and quantitative forecasting methods. Qualitative forecasting method is a method of forecasting that the calculation does not use mathematical calculations but is based on considerations of common sense and experience are generally subjective. Some methods are included in the qualitative forecasting methods include the Delphi method, the alleged management, market research, structured group methods, and historical analogies.

Quantitative forecasting method is a method of forecasting that in its calculations using mathematical calculations. Quantitative forecasting can only be used when there is information about the past and the information can be quantified in the form of data where the data can be assumed to be a pattern that will continue in the future. Quantitative forecasting method is divided into two parts, namely:

1. The forecasting method based on the use pattern analysis of the relationship between the variables to be estimated with a variable time, which is a time series.
2. forecasting method based on the use pattern analysis of the relationship between the variables to be estimated with other variables that influence, which is not a method called correlation or causal (causal method).

1.1.5 Single Exponential Smoothing Method

The exponential smoothing method (Exponential Smoothing) is one part of a periodic time series method. Single Exponential Smoothing techniques can be interpreted brdasarkan stage of the calculation, where the value of the data forecast in period t + 1 is the actual value in period t plus the adjustment derived from the value of forecasting errors that occur in period t. Forecasting calculations done using equation (2.1).

$$F_{t+1} = \alpha . X_t + (1 - \alpha) . F_t \quad \text{.....(2.1)}$$

Description :

X_t = Data request period t

α = Factor / smoothing constant

F_{t+1} = Forecasting for the period t

Smoothing constant value selected between 0 and 1 as applicable 0 <α <1. If the historical pattern of actual data demand is very volatile or unstable over time, the value of α is selected approaches 1. historical pattern of actual data does not demand fluctuating or relatively stable over time, α is selected whose value is close to zero.

1.1.6 Mean Square Error

Forecast error in the calculation used to test the forecasting results is Mean Absolute Error (MSE). MSE is the average of the squared forecasting errors. MSE values can be found using equation (2.2).

$$MSE = \frac{\sum(X_t - F_t)^2}{n} \quad \text{.....(2.2)}$$

Description :

X_t = The actual data in period t

F_t = Data calculated prediction of the model used in period t

n = A lot of the data results forecast

1.1.7 Mean Absolute Deviation

Mean Absolute Deviation (MAD) is the average - average absolute value of forecast error, regardless of the positive and negative signs. MAD can be seen in equation 2.3 below:

$$MAD = \frac{\sum |X_t - F_t|}{n} \quad \text{.....(2.3)}$$

Where: MAD = mean absolute deviation value
Σ=total number of periods
Xt=Data observation period t
Ft=forecast period t
n = number of data

1.1.8 Safety Stock

Safety stock serves as a protection against the uncertainty of demand or supply. Companies typically save more are thought to be required for a certain period so that more needs can be met without having to wait. Calculation of safety stock can be seen in equation (2.4).

Safety Stock = (amount of expenditure / number of days in the month xL) ..... . (2.4)

Description:
L = The waiting time delivery (Lead Time).

2. CONTENTS OF RESEARCH

2.1 Analysis of SCM Stages

PT. Tanabe Indonesia deal with suppliers as suppliers of raw materials and Market Pharmacy (PBF) as a distributor of medicinal products. In this research known that. Tanabe Indonesia uses a strategy make to stock so that the company produces the drug before the orders of Market Pharmacy (PBF). Within the scope of this study PT. Tanabe Indonesia to monitor the drug product inventory in the warehouse PT. Tanabe Indonesia. This is done to control the availability of medicinal products to be distributed. Stages monitoring inventory to warehouse PT. Tanabe Indonesia is using the Safety stock method to determine the safe limit drug products should be available in warehouse PT. Tanabe Indonesia.

Steps being taken next is a drug product demand forecasting the next period. This was done in anticipation of orders to be carried out by the Pharmaceutical Market as a customer so that orders can be fulfilled drugs. In addition, there is also the monitoring of the distribution of the drug. Stages in monitoring the distribution process, namely the monitoring of the status of the distribution of medicinal products. Status of this distribution is performed to determine whether the drug product has been delivered or in the delivery process. So from the above explanation can be concluded that the SCM stages are as follows:

1. Stages medicinal product inventory monitoring.

   This stage is the stage drug monitoring product inventory available if it meets the safe limit supply or not. This is done so that it can be known if the supply of medicinal products to meet the needs of the distribution of the drug to the Pharmaceutical Market. Monitoring inventory of finished products using safety stock.

2. Stages forecasting medicinal products

   This stage is the stage to forecast orders from Market Pharmacy will happen in the next period. This is done so that the order can anticipate what will happen. Forecasting stages of drug products using the Single Exponential Smoothing.

3. Stages of distribution of medicinal products

   Distribution stage is the stage of delivery of medicinal products from PT. Tanabe Indonesia to Market Pharmacy (PBF). In this phase there is a process of monitoring of the distribution of the drug. Stages in monitoring the distribution process, namely the monitoring of the status of the distribution of finished products. Status of this distribution is performed to determine whether the finished product has been delivered or in the delivery process, delivery time, the officer who made the delivery, and vehicles used in making deliveries.

2.2 Discussion

2.2.1 *Entity Relationship Diagram* (ERD)

ERD supply chain systems with methods of supply chain management approach to the PT. Tanabe Indonesia can be seen in Figure 1.

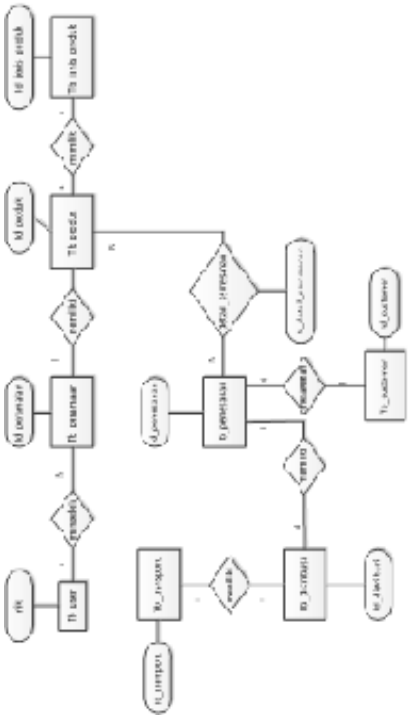


Figure 1 Entity Relationship Diagram

2.2.2 Context Diagram

Essentially the system is linked to sejumalh entity, be it a relationship with entities outside the system as well as linkages with entities in the system. The relationship between entitias with the system described by the diagram Context. As Diagram Context on Supply Chain Systems PT. Tanabe Indonesia can be seen in Figure 2.

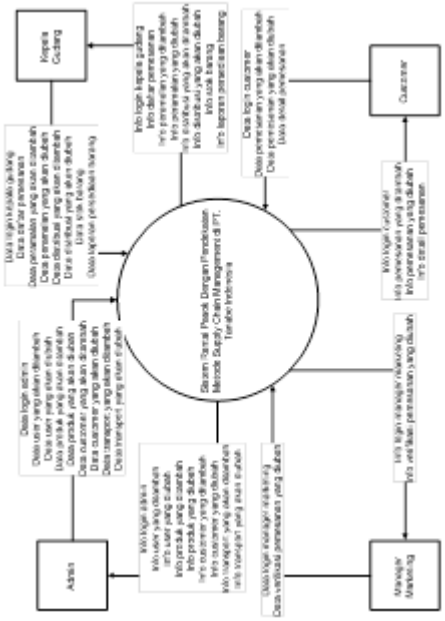


Figure 2 Context Diagram

2.2.3 Data Flow Diagram (DFD)

DFD Level 1 supply chain system can be seen in Figure 3. The process contained in the DFD Level 1 is a supply chain system login process, processing of master data, booking data processing, processing of forecasting, monitoring inventory, processing inventory reports, and processing Data verification.

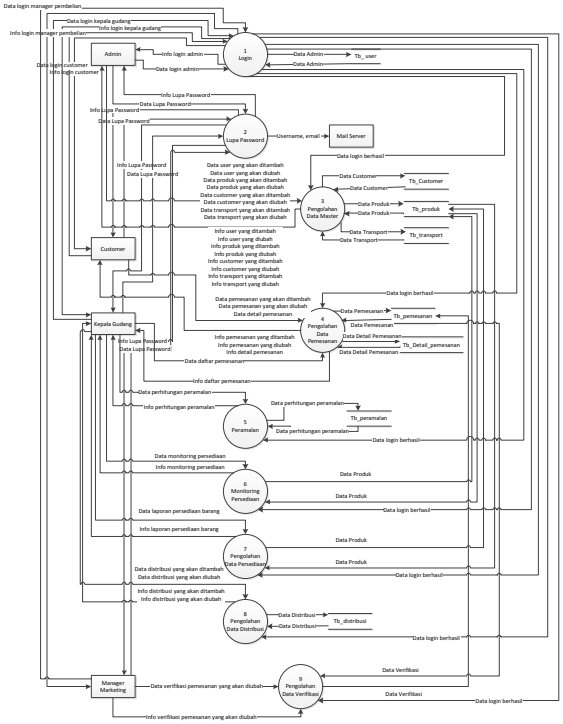


Figure 3 DFD Level 1

2.2.4 Diagram Relation

In designing a database, data model that will be used is the Entity Relationship Diagram (ERD) can be seen in Figure 4.

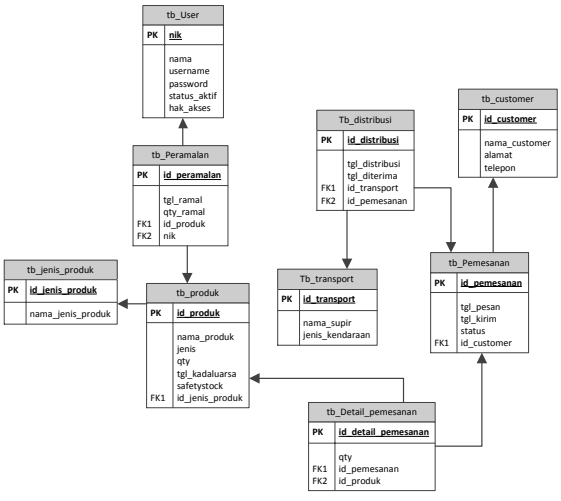


Figure 4 Diagram Relation

2.2.5 Designing Interfaces

Interface design created to describe the look of the program that will be used by the user to interact with the system are made. The design is based on the user interface inputs and outputs to be generated when the application is implemented.

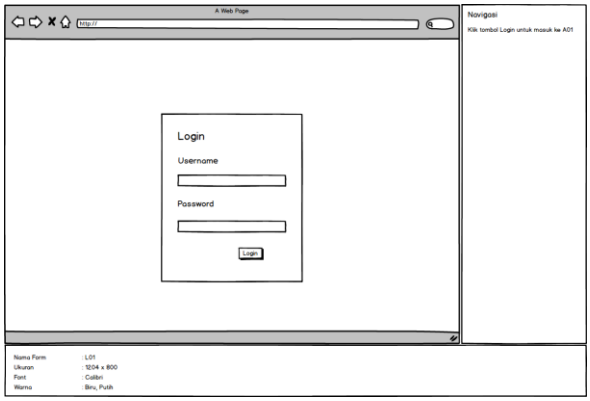


Figure 5 Design Interface Login

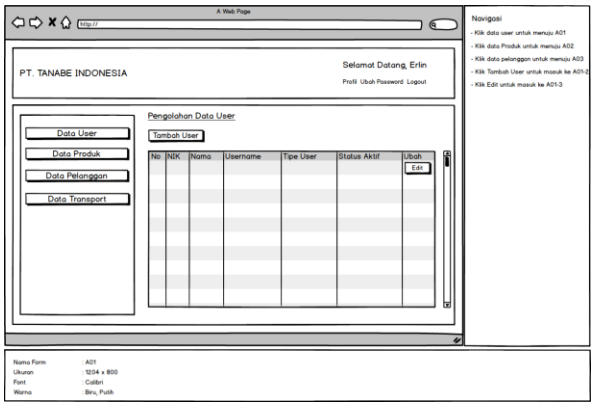


Figure 6 Admin Interface Design

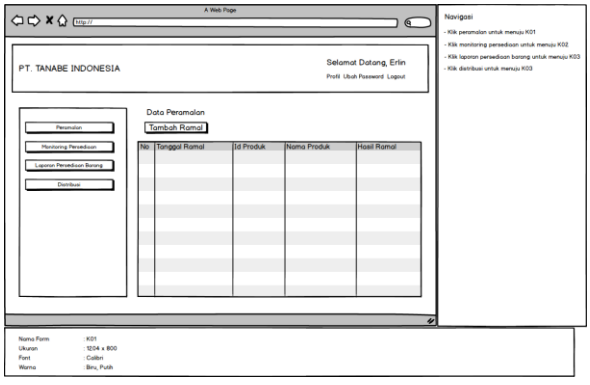


Figure 7 Interface Design Forecasting

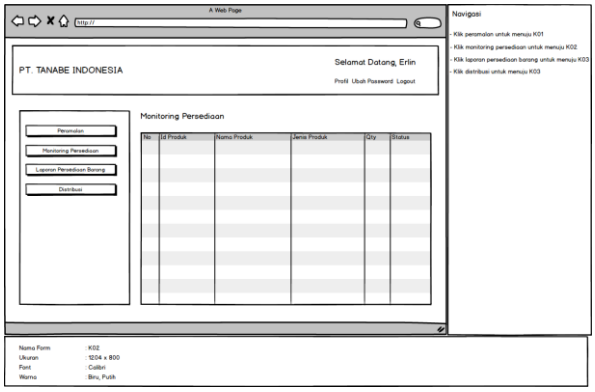


Figure 8 Design Interface Monitoring Forecasting

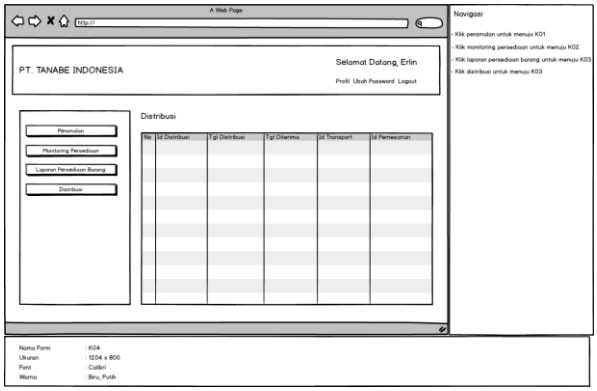


Figure 9 Distribution Interface Design

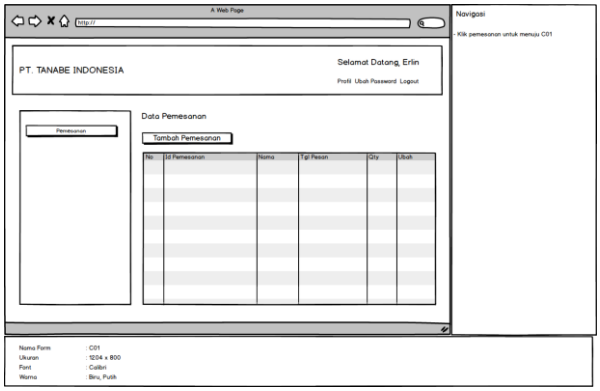


Figure 10 Designing Interfaces Booking

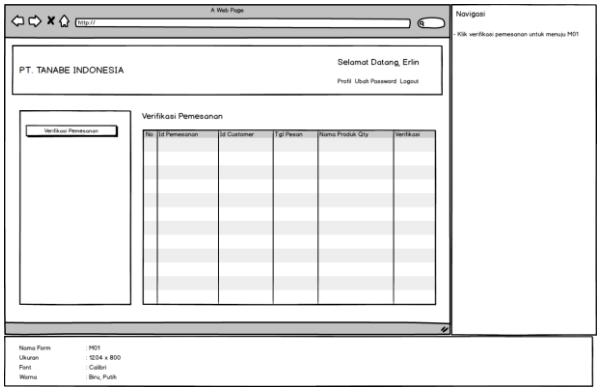


Figure 11 Design Verification Interface

2.3 Implementation Interface

Implementation of a system built interface is shown in Figure 12 and Figure 15.

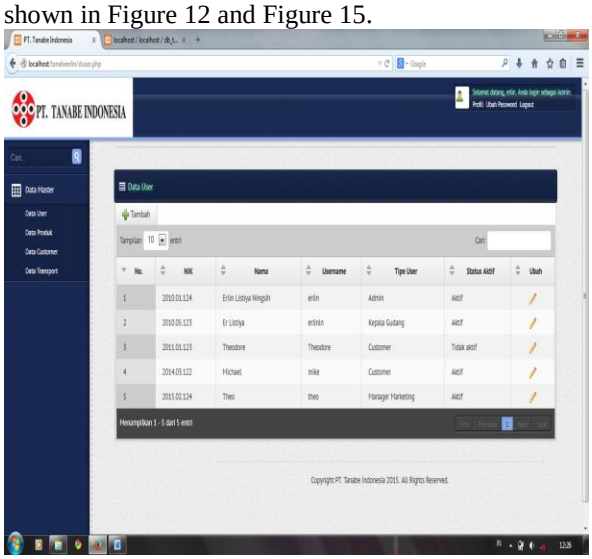


Figure 12 Admin Interface Implementation

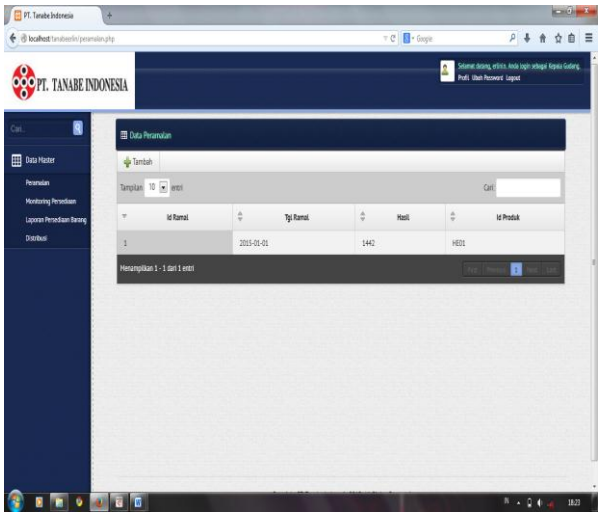


Figure 13 Implementation Interface cellarer

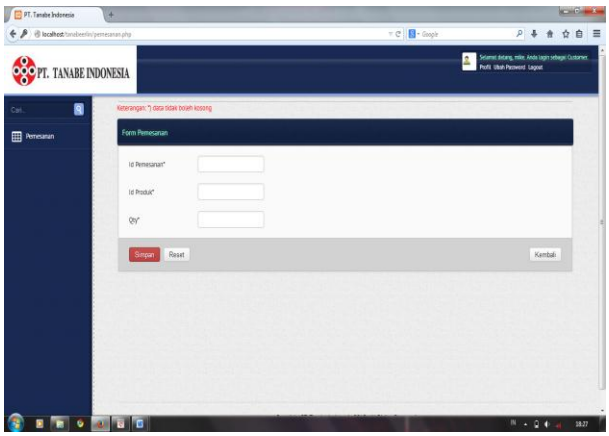


Figure 14 Implementation of Customer Interface

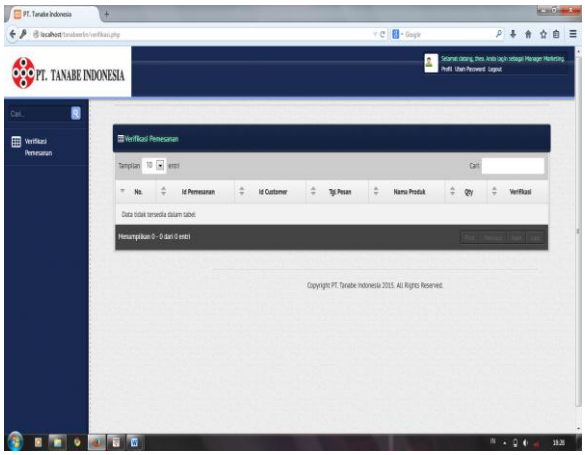


Figure 15 Implementation of Interface Manager Marketing

3. CLOSING

3.1 Conclusion

The conclusion that can be drawn from all the processes that have been made in building a supply chain system are as follows:

1. The supply chain system that is built not facilitate the PT. Tanabe Indonesia in maintaining the supply of medicinal products must be available in the warehouse of drugs in order to meet the distribution because there are processes in the system that are not successful.
2. The supply chain system that is built not facilitate PT. Tanabe Indonesia in determining the amount of supply of medicinal products to meet the distribution because there are processes in the system that are not successful.

3.2 Suggestions

Based on the conclusions that have been described, the expected supply chain system in PT. Tanabe Indonesia can be developed further, so that the system can enhance the system built. Development of the system is expected to perform processes that can not be done in this research so as to facilitate the PT. Tanabe Indonesia in maintaining and determine supply medicinal products to be available in the warehouse of drugs in order to meet distribution.

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