DEVELOPMENT OF INFORMATION SYSTEMS WITH APPROACH SUPPLY CHAIN MANAGEMENT IN CV.BIKERS LEATHER

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ABSTRACT

CV.Bikers Leather is a company located on the street of General A.yani Suci village. District Karangpawitan, Garut district. The company is in the field of leather tanning. The problems that often occur in CV.Bikers Leather is the inventory manager difficulties in determining the amount of raw materials for the procurement process due to fluctuations in the sale of goods that are not sure to make the raw materials for the production process often experience fraud and excess stock of raw materials. When the shortage of raw materials will hamper the production process and if the excess of raw materials it will make the company will incur additional costs for raw materials maintenance. Based on the problems that exist in CV.Bikers Leather, then it needs an development of information systems using supply chain management approach. The purpose of this system is to facilitate the procurement of raw materials to avoid void stock of raw materials or stockpiling of raw materials.Supply chain strategy used is push supply chain, because it is based on suitability of supply chain that happened in company at this time that is using make-to-stock strategy. This supply chain system is built from the upstream to the downstream. Forecasting method of raw material requirement used is single moving average. Calculation of the prediction of availability of raw materials in the warehouse using the method of securing the inventory (Safety stock). Based on the test results can be concluded that this system has helped in procurement of raw materials and avoid void stock of raw materials.

Keywords : Supply chain management, push supply chain, make-to-stock, single moving average, safety stock

1. INTRODUCTION

CV.Bikers Leather is a company engaged in the tanning of leather. Leather CV.Bikers are on the Sukaregang 304 General Ahmad Yani, Garut. The initial objective of Mr. Dedi Supriadi as owner CV.Bikers Leather is skin unused processing into a product that can be used (useful). As it grows now CV.Bikers Leather has produced several leather-based products including lamb leather jacket, leather jacket cow, goat leather jackets and others.

Based on the interview with Mr. General as inventory manager, stated that the current activities of the company which are upstream of that procure raw materials to suppliers, Based on data from the raw material stock in appendix F, there are raw materials that have excess stock and raw material shortages, it happens when the needs of the production increases or decreases caused by the uncertainty of the amount of purchases of goods in stores. If the purchase of goods increases will lead to less raw material warehouse, it inhibits the production part in producing goods that also these issues will have an impact on downstream activities. Likewise, when the purchase of consumer goods by decreasing the excess raw materials will take place resulting in the buildup of the amount of raw materials in the warehouse and will require additional costs for treatment of raw materials resulting in losses.

While the activities are in the downstream CV.Bikers Leather goods, namely market, sell and distribute goods. Based on the interview with Mr. Rijal were also as a marketing manager said there are three types of consumers in CV.Bikers Leather that is, consumers who come directly to the store to buy stuff, and then there are consumers in the city who order goods to be delivered using a company vehicle and consumers outside the city who order goods to be delivered by courier and shipping costs are borne by the buyer. Forwarding services today are often used by companies that JNE expedition services. Orders of consumer goods will be accepted by the marketing, and the marketing to distribute goods to consumers who have ordered goods and pay the penalty. Delivery within the city conducted using company vehicles. Vehicle types of motorcycles used if delivery on that day only reached 5pcs goods, if more than 5 pcs will be sent using car type vehicles. Shipping service has been determined by the company that is using regular shipping with delivery time ranging from 1 to 3 days the goods will reach the

consumer. Distribution of goods to consumers frequent delays. The factors that cause delays in the distribution of goods, namely, shortages of goods in store, when the stock of goods in stores less, then the production will produce the goods after knowing the raw materials available, if the raw material is not available it will return to the process of upstream is to procure raw materials to suppliers that will affect the delay in downstream activities. It will require a lot of stalling and slowing down the process of distributing that would impact on the company if the shift of consumers due to a lack of consumer confidence in the company's performance.

Pursuant to the problems that exist today in the CV. Bikers Leather, Hence the need for a system that can manage the information supply chain**.** Therefore, Supply Chain Management (SCM) is the right choice to handle these problems as a function of the Supply Chain Management (SCM) itself is to integrate processes of business ranging from raw material suppliers to the end users. Thus it is necessary to build an information system Supply Chain Management (SCM) CV. Bikers Leather.

While the objectives to be achieved in this study are:

1. Facilitate the inventory manager in determining the amount of raw materials in order to assist suppliers.
2. Make it easy for marketing managers in scheduling the distribution of goods to consumers.

2. RESEARCH CONTENTS

2.1 Theoretical basis

The theoretical basis of this thesis will explain the theories relating to the Development of Information Systems Supply Chain Management Approach in CV.Bikers Leather.

2.1.1 System

According Jogiyanto "The system is a collection of elements that interact to achieve a particular goal." (Jogiyanto, 2005)

Meanwhile, according to Jacob, "The system is a network of procedures interconnected, gathered together to perform an activity or a particular purpose." (Jacob, 2012)

Based on the two opinions above authors conclude that the system is the system is a collection of elements or a network of procedures that interact and relate to accomplish an activity or a particular purpose.

2.1.2 *Supply Chain*

According to I Nyoman Pujawan "Supply Chain is a network of companies that jointly work to create and deliver a product to the end user's hand." (Pujawan & ER 2010)

Meanwhile, according to According to Simchi-Levi et. al "Supply Chain (SC) is a network of independent organizations and interconnected to work together in a cooperative and mutually beneficial in controlling, regulating and improving the flow of materials and information from supplier to consumer. (Simchi-Levi, Kaminsky, Simchi-Levi, & Bishop, 2003)

Of the two opinions cited above can be concluded supply chain is a network that can be a network of companies and network of independent organizations that work together to create cooperation of mutual benefit in controlling, regulating and improving the flow of material and information about a product from suppliers to end users.

2.1.3 Supply Chain Systems

Based on expert opinion about the system and supply chain authors conclude supply chain system is a system in the supply chain that has the objective of creating mutually beneficial cooperation in controlling, regulating and improving the flow of material and information about a product from the supplier to the end user. Development of Information Systems Approach Using Supply Chain Management in CV. Bikers Leather

2.1.4 Supply Chain Management (SCM)

According to James A. and Mona J. Fitzsimmons "Supply Chain Management is a total system approach to deliver the products to the end users by using information technology to coordinate all elements of the supply chain from the supplier to the retailer, then the next level which is a competitive advantage which is not available in traditional logistics system. "(Fitzsimmons & Fitzsimmons, 2004)

Meanwhile, according to Jacobs and Chase "Supply Chain Management is a system for implementing a total approach that is used to manage the entire flow of information, materials, and services from raw materials through factories and warehouses to the final consumer." (Jacobs & Chase, 2008)

Meanwhile, according to Simchi-Levi et. al "Supply chain management is defined as a series of approaches used to integrate suppliers, manufacturers, warehouses and stores to effectively so that supplies can be manufactured and distributed at the right amount, to the right location and at the right time so that the overall cost of the system can be minimized while trying to satisfy the needs and services. "(Simchi-levi, Kaminsky, Simchi-levi, & Bishop, 2003)

Meanwhile, according to Nyoman Pujawan and Mahendrawati "Supply Chain Management (SCM) is a method or an integrative approach to managing the flow of products, information, and money in an integrated manner involving parties from upstream to downstream consisting of suppliers, factories,

distribution networks and services logistics-services. "(Pujawan & ER 2010)

According to Nyoman and Mahendrawati on the supply chain there are usually three kinds of streams that must be managed. Three kinds of streams that must be managed in the supply chain is as follows. (Pujawan & ER, 2010):

1. The first is the flow of goods flowing from upstream (*upstream*) Downstream (downstream).
2. The second is the flow of money and similarHer flowing from upstream downstream.
3. The third is the flow of information that could occur downstream of the upstream or vice versa.

Here is a model of supply chain simplification and 3 kinds of managed flow can be seen in Figure 1.

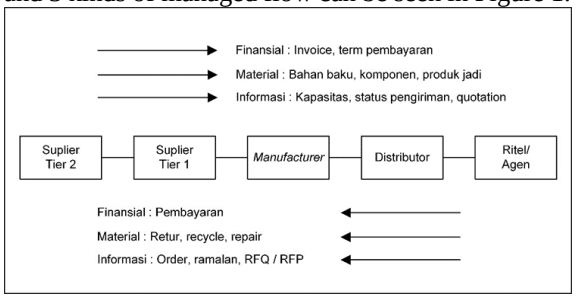


Figure 1. Simplification supply chain model and 3 kinds of stream

2.1.5 Coverage Of SCM (Supply Chain Management) Area

SCM has important principle that SCM is transparency of information and theircollaboration between existing internal functions of the company or that of the parties which is beyond the company which are in the scope of supply Chain. When referring to a manufacturing company, main activities included in the classification SCM is [3]:

1. The activities of designing new products (Product Development)
2. Activity obtain raw materials (proceurement, purchasing, control)
3. Production planning and inventory activity (planning and control)
4. Perform activities of production (production)
5. The activities do delivery / distribution (distribution)

Fifth classifications are usually reflected in the division of the department or division with activities that are usually performed.

2.1.6 Push and Pull Supply Chain

According to Chopra and Meindel "pull process by the customer orders, while the push process is initiated and conducted in a way to anticipate the customer's order." (Chopra & Meindel, 2007).

Pull supply chain is a production strategy of "make-to-order" the main benefit is to avoid waste inventory or a company mainly manufacturing strategy in which new production is done always after the market demand and actually performed at the request of customers.

Push Supply Chain is a production strategy Make-to-Stock. This strategy is the opposite of the Pull strategy where the appeal pull, push the strategy more popular due to the system of production based forecasting and produce large amounts of output that will be entered into inventory before it is piped to customers.

This strategy has a focus on efficiency and standardization activities. Push strategy can be connoted with lean supply. Increasingly, companies have little variation of the product is the right strategy. However, for products with market conditions change, the use of the push system will bring some disadvantages, such as:

1. Inability to meet the market demand changes.
2. Cumulation *inventory* which will bring in a lot of waste and need a lot of storage space.
3. *Batch* big production.
4. Risk *obsolete product* big.

2.1.7 Stock (*inventory*)

Inventories along the supply chain have major implications for the financial performance of a company.

According Riyanto "Inventory or inventory as the main element of the working capital assets are always in a state of rotating and constantly changing." (Riyanto, 2001)

Meanwhile, according to Zaki Baridwan "Definition of inventory in general term used to indicate the inventory of goods held for resale or used to produce goods for sale." (Baridwan, 2000)

2.1.8 Mechanical Safety Stock

Safety stock inventory or security functions to protect the error in predicting demand during Lead Time. Lead time is the time it takes between the raw material booked up until the company. The value of safety stock depends on the uncertainty of supply and demand. Here is the formula in determining Safety stock is shown in Equation 1

$$SS = average\ usage\ previous\ period \times LT \quad (1)$$

Where:

SS = *safety Stock*
LT = *Lead Time*

reorder point or reorder point is when the supplies reached the point that needs to be done reordering. Here is the formula to determine reoder point can be seen in Equation 2.

$$Reorder\ Point = (LD \times AU) + SS \quad (2)$$

Where:

LD = *Lead Time*
AU = Use of average
SS = Safety Stock

2.1.9 Forecasting methods *Single Moving Average*

Method moving average single-use amount of actual data to generate new demand forecast values for future demand. This method would be effectively implemented if we can assume that the market demand for the product will remain stable over time. This method has two special properties that require data to make a forecast.

Historically within a certain period, the longer moving averages will produce increasingly fine moving average, systematically moving average can be calculated with Equation 3.

$$S_{t+1} = \frac{x_t + x_t - 1 + \cdots + x_t - n + 1}{n} \quad (3)$$

Information:

St + 1 = Forecast for the period to t + 1.
xt = Data in period t.
n = Duration of Moving Averages

2.1.10 Mean Squares Error (MSE)

Mean Squared Error (MSE) which is the average of the squared forecasting error and can be seen in Equation 6.

$$MSE = \frac{\sum(X_t - F_t)}{n} \quad (6)$$

2.1.11. Mean Absolute Percentage Error

MAPE is a measure of the relative error. MAPE is usually more significant than MAD as stated percentage error MAPE forecasting results against the actual demand for a certain period that will provide information on the percentage of errors is too high or too low. Mathematically, MAPE can be seen in Equation 7

$$MAPE = \frac{100}{n} \sum |A_t \frac{F_t}{A}| \quad (7)$$

2.1.11 Black Box Testing

The concept of black box used to represent the system that way of working in it are not available for inspection. In the black box, the items tested are considered "dark" because logically unknown, known only what comes in and what comes out of the black box. [7]

2.2. Problem analysis

Problem analysis is an assumption of the problems that are described in the data processing procedures in a development program using the Information Systems Supply Chain Management approach in CV.Bikers Leather. Analysis of problems of the current system at this time is:

1. Inventory manager difficulty in determining the amount of raw material procurement to suppliers due to fluctuations in the purchase of a changing product. If the determination of the appropriate amount of raw material will cause some of the things that lead to losses. When purchasing goods there is a vacuum higher then stocks of raw materials, and if the purchase of inferior products cause a buildup of stocks of raw materials warehouse that affected the company's losses due to need for care stocks of raw materials.
2. Marketing manager of the distribution schedule due to difficulties in the empty inventory, stocks of raw materials were empty and the lack of production process due to empty raw material inventory in the warehouse (out of stock). Delivery delays should be minimized because it would be to trust the buyer to purchase goods.

2.3 Analysis of Supply Chain Management (SCM)

Analysis of supply chain management is used to apply the approach to supply chain management system to be built in CV.Bikers Leather.

2.3.1 Model Supply Chain Management (SCM) in CV.Bikers Leather

Based on SCM analysis presented in the previous section, while the supply chain model contained in CV.Bikers Leather can be seen in Figure 2.

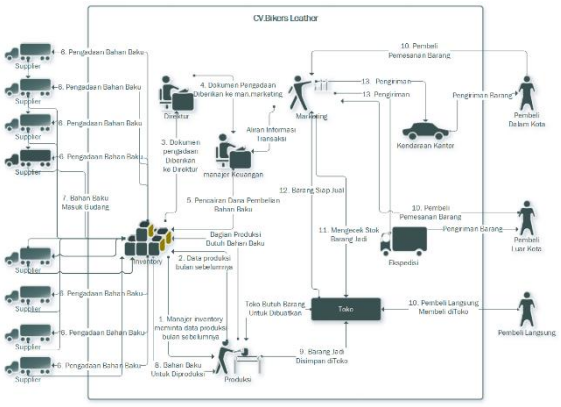


Figure 2. Model supply chain in CV.Bikers Leather

2.3.2 Analisis Supply Chain in CV.Bikers Lether

Supply chain analysis conducted to describe the process of supply chain management which will be built in CV.Bikers Leather based supply chain model in Figure 2. The analysis of supply chain management can be seen in Figure 3.

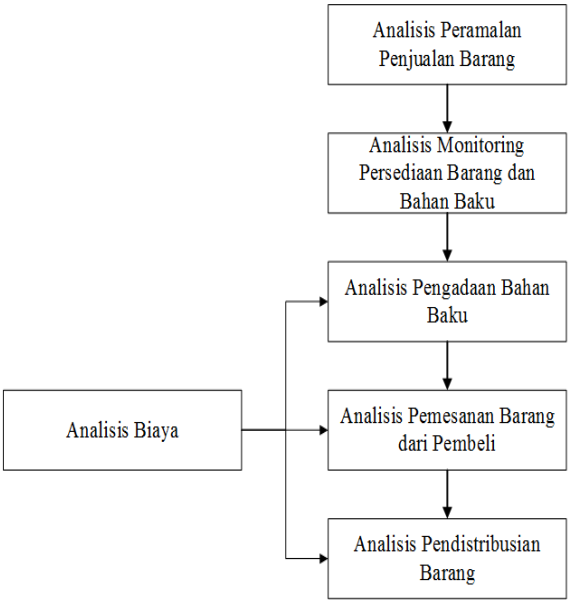


Figure 3. Supply Chain Management in CV.Bikers Leather

1. Product Sales Forecasting Analysis

Forecasting sales of products based on the actual data of previous sales data. Forecasting results obtained are used to determine the amount of raw material procurement to be carried out and as a basis for making purchases on suppliers of raw materials. Analysis will be done stage forecasting is predicting raw material requirements for the procurement process.

2. Monitoring Analysis and Raw Materials Inventory

After perform forecasting stage, the next stage is to monitor inventory and raw materials to define a safe limit the amount of goods and raw materials warehouse that should be aimed for, so no shortage of raw materials or void methods Safety Stock.

3. Raw Material Procurement Analysis

In the analysis of raw material procurement, inventory manager procure raw materials based forecasting results obtained from the previous month's sales data.

4. Booking Analysis of Raw Materials

In ordering goods analysis is a cost analysis of ordering goods committed buyers. The items to be shipped by the company that the buyer has paid the full order goods.

5. Analysis of Product Distribution

In the analysis of the distribution of goods is the determination of the amount of cargo transportation and delivery of goods carried out the monitoring process so that the company knows exactly the goods ordered have reached the hands of the buyer.

2.4 Analysis Database

Analysis of the data on the basis of information systems with supply chain management approach in CV.Bikers Leather will be built using Entity Relationship Diagram (ERD). The diagram is illustrated in Figure 4.

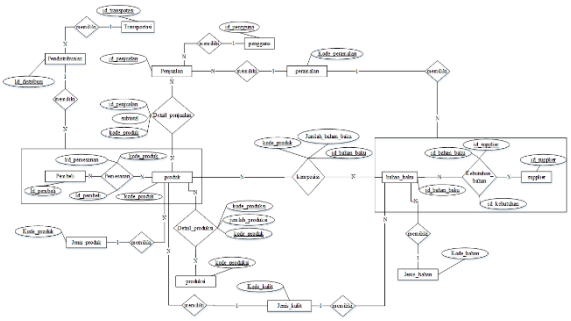


Figure 4. Entity relationship diagrams information systems with supply chain management approach in CV.Bikers Leather

2.5 Diagram Context

Context diagram explaining how data is used and transformed for the process in the form of data flow into and out of the system information with supply chain management approach in CV.Bikers Leather globally. Diagram context of the system can be seen in Figure 5.

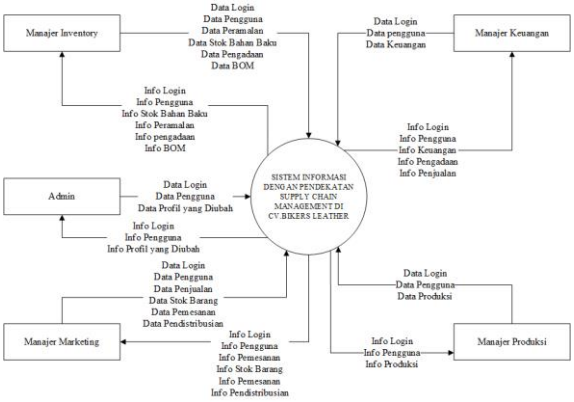


Figure 5. Diagram of the context of information systems with supply chain management approach in CV.Bikers Leather

2.6 *Data Flow Diagram (DFD)*

*Data flow diagrams*shows how data flows outlines the processes that occur in the system until the process in more detail. In such a context diagram of Figure 5 can be broken down into several DFD.

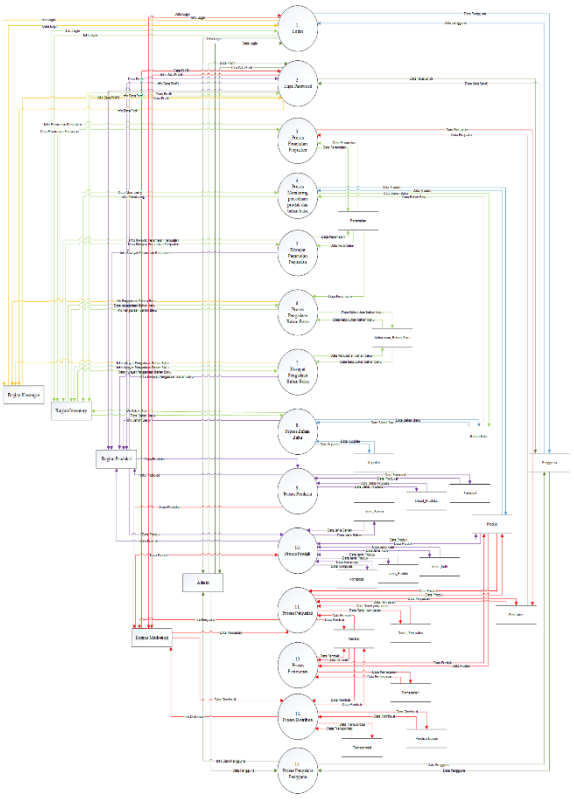


Figure 6. DFD Level 1 system information with supply chain management approach in CV.Bikers Leather

2.7 Relation scheme

The relation scheme is to describe the relationships among the data, meaning data and limits. The process of relations between attributes is a combination between the attributes that have the same primary key, so that these attributes into a single unit which is connected by the key fields. The following table relationships will be described in Figure 7.

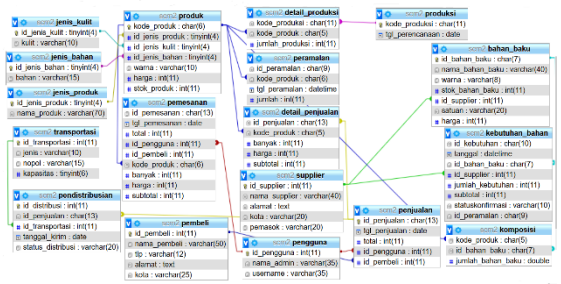


Figure 7. Schematic relation to the information system of supply chain management approach in CV.Bikers Leather

2.8 Designing Interfaces

The design of the interface is made to describe the look of the program that will be used by the user to interact with the system to be built. The design is based on the user interface, both input and output to be generated at the time of application is implemented. Here is a sample login interface design that can be seen in Figure 8.

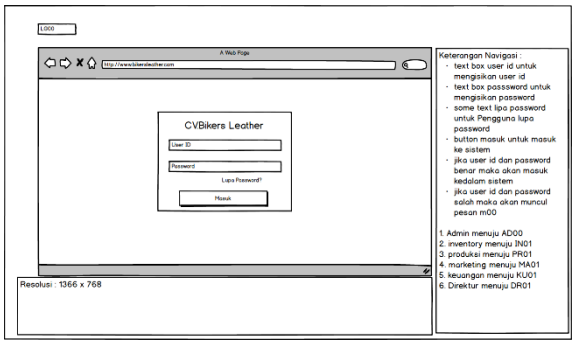


Figure 8. Designing Interfaces Login

2.9 Network Design Semantics

The design of the semantic network representation of the design interface that shows where each interface is connected. Here is an example design of a semantic network admin users in information systems with supply chain management approach in CV.Bikers Leather can be seen in Figure 9.

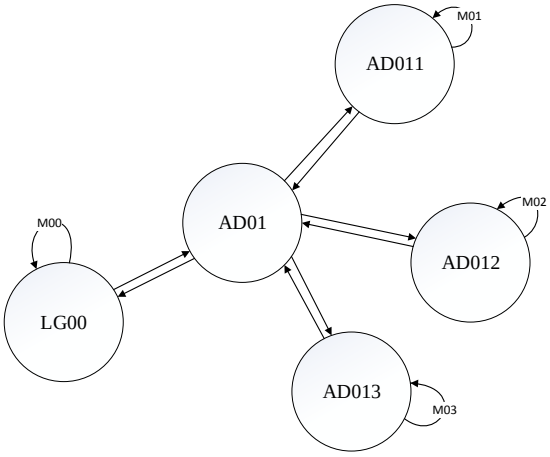


Figure 9. Designing User Semantic Network Admin

2:10 Designing Procedural

Designing procedural transform the structural elements of the architecture program into a procedural description of the components of the software. Here is the login procedural design that can be seen in Figure 10.

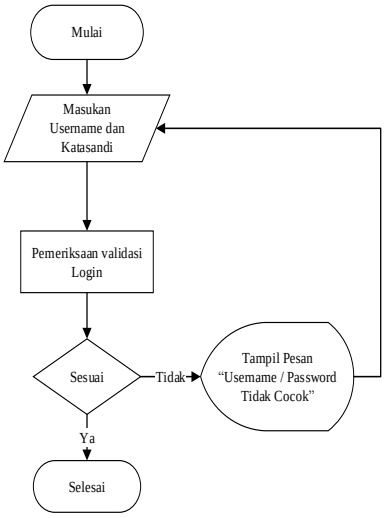


Figure 10. Procedural Design Login

2:11 Testing Systems

Testing of the system is the cornerstone that aims to find errors or deficiencies in the system tested. The test intends to determine information systems with supply chain management approach that is prepared to comply with the performance in accordance with the design objectives.

Tests are used to test the system is a black box testing methods. Black box testing focused on testing the functional requirements of information systems.

Test plan will do is to test the system built by Black Box and beta. Testing of information systems development approach to supply chain management in CV.Bikers Leather using test data based on data provided from some of the data that has been given.

1. Functional testing

Black box testing focuses on functional requirements of software built.

Testing is done by testing each process for possible mistakes.

Based on test results with sample test cases that do have to give the conclusion that the process is correct. Filtering process in the form of referrals error message page is enough to see the maximum. Functionally, the system is able to produce the expected output.

2. Beta testing

Beta test is a test that is directly the actual environment. Users make an assessment of the software using interviews. From the interviews, it can be deduced that if the software is built in accordance with the purpose or not.

Interviews conducted for the users of the system consisting of the admin, inventory managers, production managers, marketing managers, financial managers.

Based on the beta testing, it can be concluded that:

1. This system helps the admin, inventoy managers, marketing managers, financial managers and production managers in carrying out their respective jobs
2. The system is built fairly easy to use
3. The system built has the look simple and easy to understand.
4. The use of language in the system is quite easy and simple to understand.

3 CLOSING

In the concluding part of this, describes the conclusion that contains the results obtained after the analysis, design, and implementation of the software design was built and has been developed as well as suggestions that will provide important records and possible improvements that need to be made to develop devices previous software.

3.1 Conclusion

Based on the results obtained in this essay, it can be concluded as follows:

1. Information systems with supply chain management approach can facilitate inventory manager in determining the amount of raw materials in order to assist suppliers.
2. The information system uses this approach to supply chain management facilitate marketing managers in scheduling the distribution of goods to consumers.

3.2 Suggestion

Suggestions for developers of information systems with supply chain management approach are some suggestions that can be done, among others:

1. User additions buyers will be better, so the buyer can make a purchase of goods and confirm the payment by uploading a proof of payment online via the web, so that the flow of activities downstream will be more effective.

BIBLIOGRAPHY

Jogiyanto. (2005). Analisis dan Desain Sistem Informasi. Yogyakarta: Andi.

Yakub. (2012). Pengantar Sistem Informasi. Yogyakarta: Graha Ilmu.

Pujawan, I. N., & ER, M. (2010). Supply Chain Management Edisi Kedua. Surabaya: Guna Widya.

Simchi-levi, D., Kaminsky, P., Simchi-levi, E., & Bishop, W. (2003). Designing and Managing the Supply Chain. Boston: McGraw-Hill.

Chopra, S., & Meindel, P. (2007). Supply Chain Management: Strategy, Planning, and Operation. New Jersey: Pearson Prentice Hall.M. Gokhale and P.S. Graham, Reconfigurable Computing, Springer, 2005.

Fitzsimmons, J. A., & Fitzsimmons, M. J. (2004). Service Management: Operations, Strategy and Information Technology. Boston: McGraw-Hill.

Jacobs, F. R., & Chase, R. B. (2008). Dalam O. a. Core. Boston: McGraw-Hill.

Riyanto, B. (2001). Dasar-Dasar Pembelanjaan Perusahaan, Edisi Keempat, Cetakan Ketujuh. Yogyakarta: BPFE.

Baridwan, Z. (2000). Intermedite Accounting. Yogyakarta: BPFE.