SUPPLY CHAIN MANAGEMENT INFORMATION SYSTEM AT PT. KANVAS MULIA PADALARANG

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ABSTRACT

PT. Kanvas Mulia is a company engaged in the textile industry that produces tarpaulin and non tarpaulin products. The problems that often occur in PT. Kanvas Mulia is when taking into account the need for raw materials. When buying raw materials is not appropriate there will be products that are excess and stock shortages. Problems that occur in the downstream that is often the accumulation of orders because companies do delivery only on Wednesday and Saturday. When an order exceeds the capacity of the vehicle, the delivery is repeatedly delayed. Based on the problems contained in PT. Kanvas Mulia Padalarang, then needed a supply chain management information system. The purpose of this system is to facilitate production planning and raw material requirements needed for production to avoid void or stockpiling.

Supply chain strategy used is push supply chain, because based on suitability of supply chain that happened in company that is using make-to-stock strategy. Systems built from upstream to downstream. Forecasting methods for production planning use a single moving average. The calculation of raw material peresdiaan using inventory security method (safety stock).

Based on the test results can be concluded that this system has helped in the production planning and calculation of raw material requirements and scheduling distribution to avoid the buildup of orders.

Key Words : *supply chain management, push supply chain, make – to – stock, single moving average, safety stock.*

1. INTRODUCTION

PT. Kanvas Mulia was established in 1965 addressed on Jl. Orion No. 461 villages Kertajaya Padalarang. This company is engaged in textile production. Products produced by PT. Noble canvas in the form of cloth raw materials bags, canvas cloth, and almost all types of tarpaulin. The company's business strategy uses make-to-stock where the production process continues without waiting for orders from customers. PT. Kanvas Mulia markets its products through distributors and some directly market it to retail or retail stores that have ordered.

Based on the results of interviews with Mr. Hafidz as Production Manager describes the business processes that occur in the company, PT. Kanvas Mulia has 5 suppliers on each of the raw material supplies required during production such as 10s cotton yarns, 20s PE, cloth dyes, medicines. PT. Kanvas Mulia performs production according to available raw materials in the warehouse. Raw materials ordered every month to see the number of products produced, then calculated the amount of raw materials used. The resulting product has a composition of raw materials that vary, resulting in purchasing managers have difficulty when calculating the amount of raw materials to be purchased. If it does not fit the need will result in some products experiencing excess stock and some stock shortages. The product inventory data and the number of orders in 2016, the number of tarpaulins as much as 530318 meters while the number of orders 505633 meters, the number of non-sheeting production as much as 38240 meters while the order 50060 meters. The data shows the existence

of products that are excess stock and products that lack of stock, it happens because the raw material for tarpaulins too much and non tarpaulins too little.

Production managers have difficulty in production planning due to the uncertainty of the number of orders. When the amount of order is very high can not be fulfilled because the stock in the warehouse is not sufficient. To fulfill orders from customers, PT. Noble Canvas often provide more stock. However, if storing stocks of products with large quantities, resulting in stockpiling of products in the warehouse when the order is quiet.

In handling orders, the customer contacts the marketing department to order the product. The marketing department coordinates with the warehouse section of the product to check the availability of the product. If the number of warehoused products does not meet the number of orders then the warehouse of the product request to the production to meet the ordered products. If the order has been fulfilled, the marketing department sends to the customer ordering after the transaction, the transaction is done before the goods are sent to the customer.

PT. Kanvas Mulia has a medium-sized 1 colt diesel transport capable of loading 50 rolls of cloth and 1 box car capable of loading 30 rolls of fabric. 1 roller can roll 100 meters of fabric. However, if the number of orders exceeds the capacity of all transportation companies hire the services of outside shipping or freight forwarding services. The company waits for 2-3 days to come and then sends the delivery on Wednesday and Saturday. When orders are on the rise there is an accumulation of orders, because before the product's ordering deadline the order amount has exceeded the capacity of all vehicles. When the delivery schedule arrives can not send the entire order, and delivery of the product is delayed.

PT. Kanvas Mulia has a problem in the upstream sector that is difficult to take into account the needs of raw materials. The amount of raw materials affect the production process that will run. Downstream problems have difficulty scheduling delivery of products to customers. Based on the problems contained in PT. Canvas Mulia, it needs a supply chain management information system to be able to manage and manage the procurement of raw materials from suppliers and production processes until the delivery of products produced by PT. Kanvas Mulia.

Goals to be achieved are :

1. simplify the process of calculating needs in the procurement of raw materials.
2. facilitate the production manager in determining the number of products to be produced to meet orders in the next period.
3. facilitate marketing managers in scheduling and determining vehicles for delivery of products to customers

2. RESEARCH CONTENTS

The foundation of this thesis writing theory explains the theories related to Supply Chain Management information system in PT. Kanvas Mulia Padalarang to be built.

2.1.1 Information System

According to Hutahaen Jeperson "The system is a network of interconnected procedures, gathered to work on a thing or activity to achieve a certain goal or goal" (Hutahaen Jeperson, 2014)

The conclusion of the authors is that the information system can be defined as a network of interrelated work and work together to perform certain activities or activities in order to provide an information to the recipient useful information to support the decision-making process more quickly.

2.1.2 *Supply Chain*

According to Simchi-Levi et. Al "Supply Chain (SC) is a network of independent and interconnected organizations working together cooperatively and mutually beneficial in controlling and improving the flow of material and information from suppliers to users." (Simchi-Levi, Kaminsky, Simchi-levi , & Bishop, 2003)

According to I Nyoman Pujawan "Supply Chain is a network of companies that simultaneously work to create and deliver a product into the hands of the end user." (Pujawan & ER, 2010)

From the explanation according to the experts above can be concluded that Supply Chain is a network of organizations or companies that can work together to benefit each other and can

improve the flow of material and product information to the end user.

2.1.3 *Supply Chain Management*

According to Indrajit Richardus Eko Djokopranoto "Supply Chain Management is the organizer of information, goods and services from the earliest suppliers to the last consumers by using an integrated systems approach with the same objectives." (Indrajit Richardus Eko Djokopranoto, 2002)

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

According to I Nyoman Pujawan there are three entity streams that must be managed properly including material, information, and finance.

1. The first is the flow of goods flowing from upstream to downstream.
2. The second is the flow of money and the like that flows from downstream to upstream.
3. Third is the flow of information that can occur from upstream to downstream or vice versa.

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

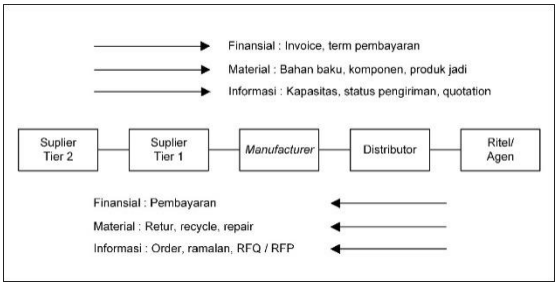


Figure 1. Three streams of Supply Chain Management

2.1.4 Safety Stock

Safety stock or Safety Stock has a function to secure or protect errors in predicting orders during Lead Time. Lead Time is the time required between raw materials ordered until received by the company. Here is the formula in determining Safety Stock.

Equation 1

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

Where :
SS = *Safety Stock*
LT =*Lead Time*

Reorder Point or reorder point when the goods inventory reaches the point where the order must be reordered. Here is the equation for determining the reorder point.

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

LD = *Lead Time*
AU = Average usage
SS = *Safety Stock*

2.1.5 Single Moving Forecasting Method

Forecasting with Single Moving Average method uses a number of new sales actual data in order to generate forecasting value for future demand. This method will be maximized if it can assume that market sales of the product will be stable. Single Moving Average method has special properties that require data to make forecasting.

The history within a certain period of time, the longer the time period will result in an increasingly subtle time period, systematically the timing can be calculated by the following equation.

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

Keterangan:
S_{t+1} = *Forecast* for period to *t+1*.
Xt = Data in period t.
n = Duration Moving Averages

2.1.6 *Mean Squares Error* (*MSE*)

Mean Squares Error (MSE) is the average of forecasting errors raised in two can and can be seen in the following equation.

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

2.2 Problem analysis

Problem analysis is the assumption of the problem that will be described in data processing

procedures on PT system. Kanvas Mulia Padalarang uses the Supply Chain Management approach.

1. The products produced by the company have different composition of raw materials - bedas. Resulting purchasing managers have difficulty in calculating the amount of raw materials to be purchased from suppliers to meet the needs of the next period of production.
2. Ordering products from customers every period is uncertain. Resulting in the production manager has difficulty in planning the number of products to be produced in the next period.
3. Shipping to customer waiting 2 - 3 day order entry. Delivery is done every Wednesday and Saturday. When an order exceeds the capacity of all vehicles before the delivery schedule arrives, there is an accumulation of orders. Engaging marketing managers has difficulty scheduling product shipments to customers.

2.3 Supply Chain Management (SCM) Analysis

Supply chain management analysis will be used to implement supply chain management approach on the system to be built.

2.3.1 Model Supply Chain Management (SCM) at PT. Kanvas Mulia Padalarang

Based on Supply Chain Management analysis found in the previous section, here is the supply chain management model contained in PT. Canvas Mulia Padalarang can be seen in Figure 2.

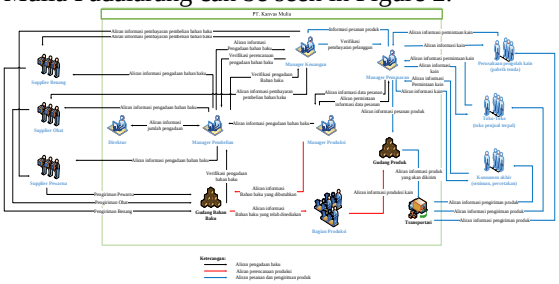


Figure *2*. Supply Chain Management Model PT. Kanvas Mulia Padalarang

2.3.2 Supply Chain Analysis at PT. Kanvas Mulia Padalarang

Supply chain analysis is done to know the description of supply chain management process to be built at PT. Kanvas Mulia Padalarang based on supply chain management model in Figure 2. Supply chain management analysis can be seen in Figure 3.

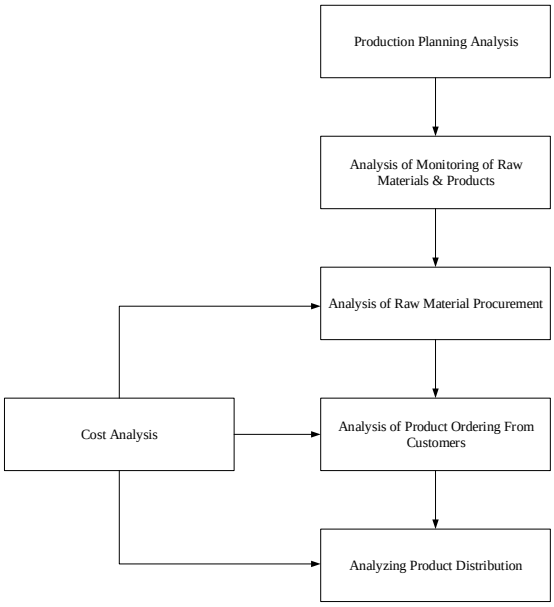


Figure 3. Supply Chain Management Analysis PT. Kanvas Mulia Padalarang

1. **Production Planning Analysis**

Analysis of production planning is done to determine the amount of production that will be done in the next period. Production planning is done using forecasting technique with Single Moving Average method.

2. **Analysis of Monitoring of Raw Materials & Products**

After doing the forecasting stage, the next step is to monitor raw material inventory and determine the safe limits of raw materials that must exist in the raw material warehouse that aims to avoid the occurrence of deficiencies or void raw materials using safety stock method.

3. **Analysis of Raw Material Procurement**

In the analysis of the procurement of these raw materials PT. Kanvas Mulia procures raw materials with the ordered quantities in accordance with product forecasting results plus safety stock minus existing stock in the warehouse.

4. **Analysis of Product Ordering From Customers**

In the ordering analysis of products from these customers is to calculate the number of peanan ordered by the customer to determine the transportation to be used during delivery. Delivery will be made when the order quantity reaches the maximum capacity of all vehicles.

5. **Anayzing Product Distribution**

Based on the ordering data, the company determines the schedule of distribution of products to customers who have made payment transactions. Determination of the vehicle to be used viewed from the number of orders to be sent.

2.4 Database Analysis

Database analysis on supply chain management information system at PT. Kanvas Mulia Padalarang will be built using Entity Relationship Diagram (ERD). Here is a picture for database analysis can be seen in Figure 4.

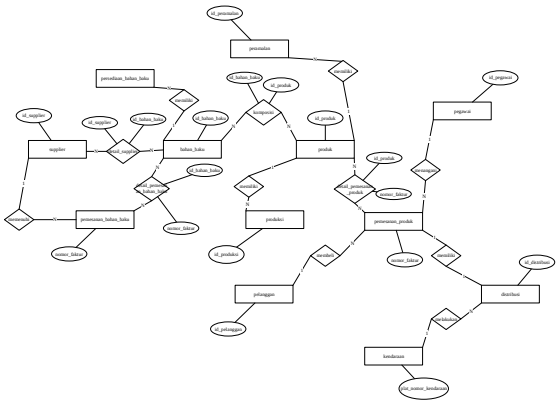


Figure 4. Entity Relationship Diagram supply chain management information system at PT. Kanvas Mulia Padalarang

2.5 Context Diagram

Context diagram illustrates how data is used and transformed to process in the form of data flow into or out supply chain management information system at PT. Kanvas Mulia Padalarang as a whole. Context diagram can be seen in Figure 5.

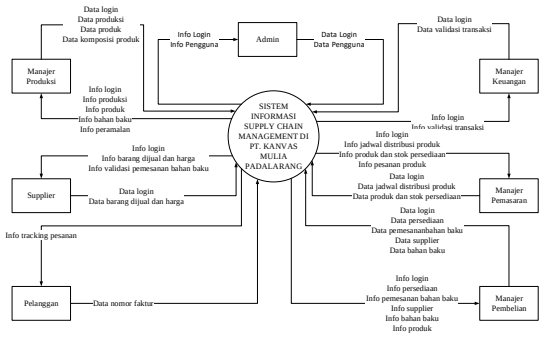


Figure 5. Context Diagram of supply chain management information system at PT. Kanvas Mulia Padalarang

2.6 *Data Flow Diagram* (DFD)

Data Flow Diagram describes the flow of data dmengalamanikan processes - processes that occur in the system until a more detailed process. Diagarm context contained in Figure 5. can be described again into a form of DFD.

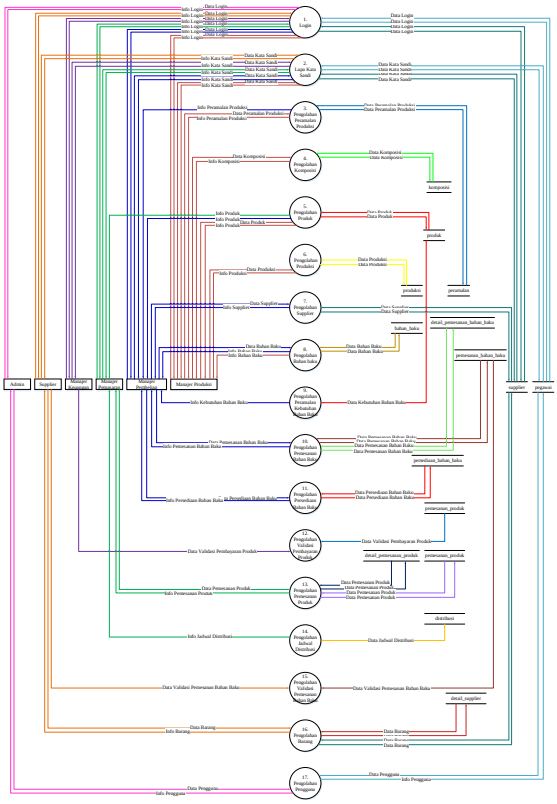


Figure 6. DFD Level 1 Supply Chain Management information system at PT. Kanvas Mulia Padalarang

2.7 Relation Scheme

The relation scheme describes the relationship of data, the meaning of the data and its limits. The process of relation between the attributes that have the same primary key, so that the attribute becomes one entity, the attribute is connected by the key file. Table relation can be seen in figure 7.

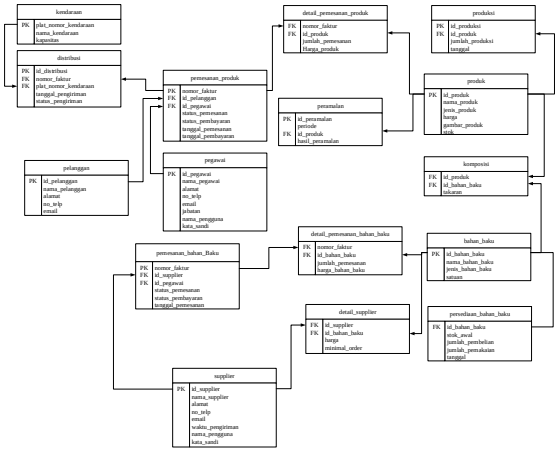


Figure 7. Relation scheme of supply chain management information system at PT. Kanvas Mulia Padalarang

2.8 Interface Design

Interface design is done to create a picture of the system that will be used by the user to be able to interact with the system to be built. Interface design can be seen for example in figure 8.

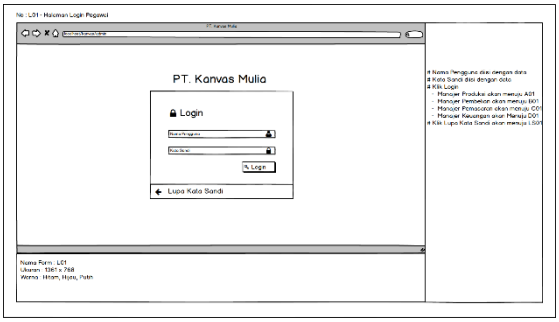


Figure 8. The design of the admin login interface

2.9 Semantic Network Design

Semantic network design is a representation of interface design that has been done to show where each interface is interconnected. Example of semantic network design of information systems Supply Chain Management at PT. Kanvas Mulia Padalarang can be seen on picture 9.

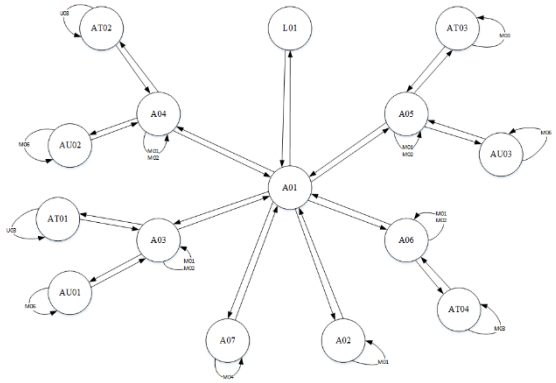
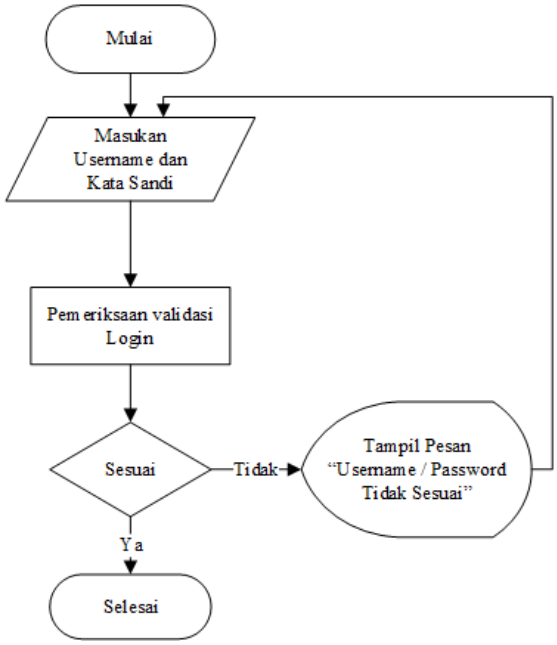


Figure 9. Network Design Semantics user production manager

2.10 Procedural Design

The procedural design describes the structural elements of the program architecture in a procedural description of the software components. Examples of procedural login design can be seen in Figure 10.



2.11 System Testing

Testing the system is the most important thing because it aims to determine the faults or deficiencies contained in the system being tested. The purpose of this test to know the supply chain management information system at PT. Kanvas Mulia Padalarang that has been made has met the needs in accordance with the design objectives.

The tests used to test this system are black box testing methods, User Accpetance Test (UAT), and beta.

1. Black Box Testing

Black box penguijan prioritize the system functional requirements that have been built.

Conduct every process to find out what errors are likely to occur.

Based on the results of tests that have been done can be concluded that the system built is correct. Functionally, the built system already produces the expected information.

2. UAT Testing

The UAT test aims to confirm that the system under test can meet the business requirements to provide confidence that the system being tested works correctly and can be used before it is officially assigned to the end user. End user testing is performed by one or more user representatives with the help of the testing team.

After performing UAT testing to each user it is concluded that all processes are functioning properly. Functionally the system is able to produce the expected output.

3. Beta Testing

This beta test is done by doing the test directly in place of research by using interview technique to each - each user.

Based on beta testing that has been done, it can be concluded that :

1. The built system can assist purchasing managers in determining the amount of raw materials to be purchased.
2. The built system can recommend the amount of production to assist the production manager in determining the amount of production to be performed.
3. The built system can help the marketing manager in scheduling and determining the vehicle to deliver the product to the customer.

3. CLOSING

This concluding section describes the conclusions of the resulting results after analyzing, designing and implementing the design of the built and developed system.

3.1 Conclusion

Based on the results obtained in the writing of this thesis, it can be concluded as follows:

1. Supply chain management information system can help the calculation process to determine the amount of raw materials required.
2. Supply chain management information system can facilitate the production manager to determine the amount of production to be done to be able to fulfill orders for the next period.
3. This supply chain management information system can assist marketing managers in scheduling and determining vehicles to deliver products to customers.

3.2 Suggestions

Supply chain management information system at PT. Kanvas Mulia Padalarang can still be developed further with better system specifications and maximum performance. Suggestions for the development of supply chain management information system is there are some suggestions that can be done, among others :

1. The addition of new users such as subscribers will make it easier in the process of ordering products to be done.
2. Need a better development of information systems that have been built, so that the system can be used as needed.

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