DEVELOPMENT SUPPLY CHAIN SYSTEM OF THE MUSLIM FASHION IN CV MUTIF CORP. USING SUPPLY CHAIN MANAGEMENT APPROACH

Ingeu Lizzi Novianna[1], Tati Harihayati [2]

[1.2]Teknik Informatika – Universitas Komputer Indonesia
Jl. Dipatiukur 112-114 Bandung
Email : Ingeulizzinovianna@gmail.com[1], tatiharihayati@email.unikom.ac.id.com[2]

ABSTRACT

CV Mutif Corp is a manufacturing company that produces moslem fashion. Raw material fabric is the main raw material in the production of Muslim fashion. Problems that occur in CV Mutif Corp. is part *Supervisior Purchasing* difficulties in determining the amount of raw materials because the amount of raw materials is less when the demand for increased products so that raw materials are insufficient. And the Expedition Team part is difficult in determining product delivery scheduling. Based on current problems at CV Mutif Corp, it needs a development of supply chain by using *supply chain management* approach. It will make the supply chain system to perform the Planning of the number of raw material needs based on the plan of the number of products in order to avoid the emptiness of raw materials and determine the scheduling to avoid the delay of delivery of the product.

Supply Chain strategy used is *push supply chain*, Because based on the suitability of the supply chain that occurs, the *make-to-stock* strategy. The supply chain system is built from upstream to downstream. Method of forecasting the number of products using *Single Moving Average*. Calculation of predicted availability of raw materials in the warehouse using *safety stock* method.

Application of test results against systems built using UAT black boxes And Beta Testing then it can be concluded that this system can help *Supervisior Purchasing* do the planning of raw materials, and assisting the Expedition Team to determine the delivery of products to consumers.

Keyword : *supply chain management , push supply chain, make-to-stock, single moving average , safety stock*

1. PRELIMINARY

CV. Mutif Corp. is a manufacturing company that produces Moslem fashion for various size, children until adult. CV Mutif products have four categories, among others, "Mutif" is Muslim fashion for women, "Mutif Man" is a Muslim dress for men, "Little Mutif Boy" is a Muslim dress for boys and "Little Mutif Girl" is a muslim dress for girls. CV Mutif Corp. make the Make To Stock system that is the production before ordering. CV Mutif Corp has terms in naming each of its divisions such as the Warehouse Division is the term for the Warehouse division, CV Mutif Corp has 3 Warehouse, that is Warehouse Material, Warehouse Accsesories and Warehouse Finish Good, Factory Division is the term for Production division. At this time CV. Mutif Corp has three categories of Supplier of raw materials ie 3 fabric Supplier, 6 Supplier accessories, and 3 Supplier packaging. Fabrics are the main raw material in the production of products.

Based on the results of interview with Mr. Lucky as Supervisior Purchasing stated that the procurement of raw materials is done by plotting the amount of raw materials according to the planning number of products made by the *Product Planning Inventory Control* (PPIC) by looking at previous sales data, When the demand for the product exceeds the expected number so that the demand is not fulfilled, such as the january-july period of 80% product demand is only fulfilled by 40%, this is because the number of products is not sufficient, when it will reproduce the amount of raw material is not available, as in April, the remaining raw material inventory of only 400 kg, While that will be produced again as much as 716 pcs requiring fabric raw material as much as 439 kg. The production process did not go well because the raw materials are not enough and have to wait to order the raw materials back in the next month. Because of this Purchasing supervisor is still difficulty in determining the amount of raw materials, and will result in stock of product inventory experiencing shortage of material when demand rises.

Based on the interview with Mr. Dedi as head of the Expedition Team, stated that at this time CV

Mutif Corp has 50 distributors spread in Indonesia. Distributor is a sole buyer of CV Mutif Corp. These distributors make a purchase by ordering to the sales first and make payment after the Sales give certainty of the product has been available. The buyer who will be the distributor must have a minimum deposit of 100 pcs Muslim fashion product. Shipment scheduling is sometimes not appropriate, because the number of products in the warehouse is less resulting in insufficient demand. Consequently delivery to distributors is delayed. The delivery of the product is made by a third party as the distributor wishes to use the sending service. Therefore, due to delayed delivery of the disadvantaged party is the delivery service and distributors, and will have a negative impact on corporate profits.

Based on the problems that exist at this time in the CV. Mutif Corp, it needs a development of product supply chain system that can manage raw material procurement management, production planning management and finished product inventory using Supply Chain Management approach.

1.1 Rumusan Masalah

Based on the background of the issues raised, then the problems that occur in the CV. Mutif Corp is how to build a supply chain system of Muslim fashion products in CV Mutif Corp. using Supply Chain Management approach.

1.2 Tujuan Penelitian

The purpose of this research is to obtain or collect data as supporting material to find the right way in designing a supply chain system of Muslim fashion products in CV Mutif Corp. using Supply Chain Management approach.

The objectives to be achieved in this research are:

a Facilitate Purchasing Supervisor in determining the quantity of raw materials based on product quantity planning.

b Facilitate the Head of Expedition Team to arrange shipping scheduling to buyer/distributor.

1.4 Batasan Masalah

The problem restrictions in the development of supply chain system are as follows:

1. Data entered to be processed is, raw material ordering data, raw material inventory data, finished product data, supplier data. The product data managed is product data category "Mutif". This is because this product is the highest selling product.
2. The raw material used has a gradation of old color at least 200gr / m2 while for a minimum color of 195 gr / m2.
3. Calculation of the prediction of availability of raw materials in the warehouse using the method of securing the inventory (Safety stock).
4. Forecasting method to predict the amount of product used is Single Moving Average method.
5. The analysis model used in the development of this system is structured analysis which includes ERD (Entity Relationship Diagram) and DFD (Data Flow Diagram).
6. Data Base Management System (DBMS) is MySQL.
7. The supply chain system to be built is web-based.

1.5 Sistem

According Jogiyanto "System is a collection of elements that interact to achieve a certain goal." (Jogiyanto, 2005)

According to Jacob "The system is a network of related procedures, collected together to perform a certain activity or purpose." (Jacob, 2012).

1.6 Rantai Pasok (*Supply Chain*)

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

Meanwhile, 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, managing and improving the flow of materials and information from suppliers to users. (Simchi-levi, Kaminsky, Simchi-levi, & Bishop, 2003).

1.7 Sistem Rantai Pasok

Based on experts' opinions on supply chain systems and supply chains the authors conclude the supply chain system is a system in the supply chain that aims to create mutually beneficial cooperation in controlling, managing and improving the flow of materials and information of a product from supplier to end user. Development of supply chain system at CV Mutif Corp in development author using supply chain management approach.

1.8 *Supply Chain Management* (*SCM)*

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).

Meanwhile, according to I Nyoman Pujawan and Mahendrawati "Supply Chain Management (SCM) is a method or integrative approach to manage the flow of integrated products, information and money involving parties from upstream to downstream consisting of suppliers, factories, distribution and service networks - logistics services. "(Pujawan & ER, 2010).

According to I Nyoman and Mahendrawati on supply chain there are usually 3 kinds of flow that must be managed. Three kinds of flow that must be managed in the supply chain is as follows (Pujawan & ER, 2010):

1. 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.

The following is a simplification of supply chain model and 3 kinds of managed flow can be seen in Image 1.

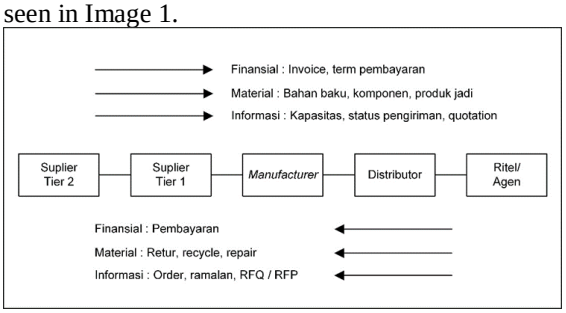


Image 1 Simplification of supply chain model and 3 kinds of flow

1.9 *Push* dan *Pull Supply Chain*

According to Chopra and Meindl "The pull process is based on customer orders, while the push process is initiated and done in anticipation of customer orders." (Chopra & Meindel, 2007).

Pull supply chain is a "make-to-order" production strategy whose main benefit is to avoid inventory waste or a company strategy, especially a manufacturing company where new production is done always after market demand and is actually done on customer demand.

Push Supply Chain is a Make-to-Stock production strategy. This strategy is the opposite of the Pull strategy in which the pull appeals, the push strategy is more popular because the production system is based on forecasting and generates a large amount of output that will then go into inventory before being channeled to the customer.

This strategy focuses on activity efficiency and standardization. Push strategy can be connoted with lean supply. The more companies have a little variety of products then this strategy is right. However, for products with a fluctuating market situation, the use of push systems will cause some losses, such as:

1. Inability to meet changing market demands.
2. The buildup of inventory that will bring in a lot of waste and requires a lot of storage space.
3. Large production *batch*.
4. The risk of large obsolete product.

1.10 Persediaan (*inventory)*

Supply along Chain supply has major implications for a company's financial performance.

According Riyanto "Inventory or inventory of goods as the main element of working capital is an asset that is always in a state of rotation and constantly changing." (Riyanto, 2001).

1.11 Teknik Safety Stock

Security inventory or Safety stock serves to protect errors in predicting demand during Lead Time. Lead Time is the time required between raw materials ordered to arrive at the company. The amount of Safety stock value depends on supply and demand uncertainty. Here is the formula in determining Safety stock can be seen (formula 1):

Safety Stock = Z x S_{dl} (1)

Where :

Z = *Service Level* (The ability of companies to serve the demand or translated from management decisions)

S_{dl} = Determined from the uncertainty of demand with the provisions can be seen in Image 2

variabel		
Permintaan	Sdl = Sd x $\sqrt{(l)}$ *Safety Stock* ditentukan oleh ketidakpastian permintaan.	Sdl = $\sqrt{(d^2 \times Si^2 + l \times sd^2}$ *Safety Stock* ditentukan oleh interaksi dua ketidakpastian.
konstan	Tidak diperlukan *safety stock*, situasi deterministik (S_{dl} = 0).	Sdl = d x sd *Safety Stock* ditentukan oleh ketidakpastian *lead time*.
	konstan	variabel
	Lead Time	

Image 2 The interaction of demand and lead time on the determination of safety stock

1.12 Metode Peramalan *Single Moving Average*

Single moving average method uses a number of actual data of new requests to generate predictive value for future demand. This method will be effectively applied if we can assume that the market demand for the product will remain stable over time. This method has two special properties that is to make forecasts require data.

Historically over a period of time, the longer moving averages will result in a smoother moving average, a systematic moving average can be calculated by (formula 2)

$$S_{t+1} = \frac{x_t + x_t - 1 + \cdots + x_t - n + 1}{n} \quad (2)$$

Where :

S_{t+1} = *Forecast for period t + 1.*

Xt = Data in period t.

n = *Duration Moving Averages.*

1.13 *Mean Absolute Deviation* (MAD)

Mean Absolute Deviation (MAD) measures the accuracy of the prediction by averaging the alleged error (the absolute value of each error). MAD is useful when measuring prediction errors in the same unit as the original series. The value of MAD can be seen in (formula 3)

$$MAD = \frac{\sum |A_t - F_t|}{n} \qquad (3)$$

where,

MAD = Mean absolute deviation.

A_t = Observational data in period t.

F_t = Forecast data of the model used in period t.

n = Many data forecasting results.

2. ISI PENELITIAN

2.1 Analisis Masalah

The problem analysis is an assumption of the problem that will be in the data processing process in development program of Mosli Clothing Supply Chain System at CV Mutif Corp using Supply Chain Management approach. What is happening right now is:

1. The absence of efficient raw material requirements planning to meet the number of products, so often the vacancy when product demand increases.
2. Frequent shipping delays due to lack of stock of products in the warehouse.

2.2 Analisis *Supply Chain Management* (SCM)

Supply chain management analysis is used to apply supply chain management approach to supply chain system to be built. Supply chain management has a framework that is a development component for the system.

2.3 Model *Supply Chain Management* (SCM) di CV Mutif Corp

The following model of Supply Chain Management contained in Cv Mutif Corp can be seen in Image 3

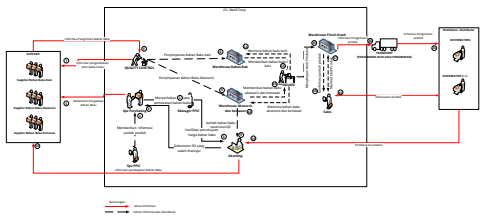


Image 3 Supply Chain Management Model at CV Mutif Corp

2.4 Analisis Supply Chain di CV Mutif Corp

Supply chain analysis is conducted to illustrate the supply chain management process to be built in CV Mutif Corp. following the Supply Chain stages in CV Mutif Corp in Image 4

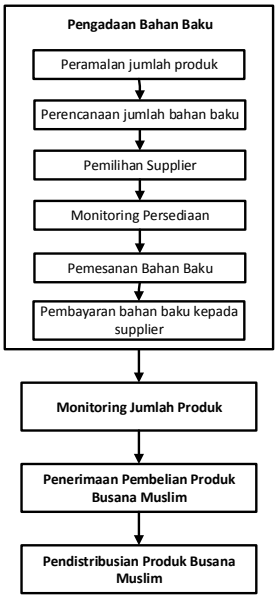


Image 4 Stages of SCM

1. Pengadaan Bahan Baku

At this stage there are several processes from the procurement of raw materials as follows:

a Product forecasting
Forecasting is done by predicting the number of products based on the actual data of previous sales.

b Planning the amount of raw materials
Forecasting results obtained to determine the number of products to be in production, will be the basis for consideration to do the planning of raw materials.

c Supplier selection
CV Mutif Corp has several suppliers who are partners of the company and become the main supplier to meet the needs of raw materials. Supplier selection is done by choosing based on the lowest price with the proposed mutif criteria. Supplier in CV Mutif Corp consists of suppliers of raw materials of fabric, raw materials accessories, and packaging raw materials.

d Inventory monitoring
Inventory monitoring is carried out to make raw material ordering plans to suppliers, by looking at the amount of stock safety and raw material inventory, and estimating raw material requirements in accordance with the order plan.

e Raw material ordering
At this stage after the selection of suppliers then made ordering of raw material requirements to selected suppliers

f Payment of raw materials

At this stage the payment is made to the supplier in accordance with the amount of raw materials received by the company.

2. Monitoring Jumlah Produk

At this stage is done monitoring the number of safety stock products to overcome the lack of products when demand increased.

3. Penerimaan Pemesanan Produk Busana Muslim

At this stage, the consumer can order the product and will be verified by the sales that the stock is available, the consumer will make payment to the venture, and the accounting department will verify that the distributor has made the payment.

4. Pendistribusian Produk Busana Muslim

At this stage the expedition team will make deliveries to consumers according to available stock and payment. The expedition team will then prepare the goods for delivery by the shipping service.

2.5 Analisis Basis Data

Database analysis on the supply chain system of Muslim fashion products in CV Mutif Corp. will be built using Entity Relationship Diagram (ERD). Here's the ERD in CV Mutif Corp in Image 5

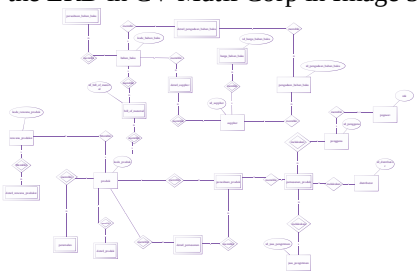


Image 5 *Entity Relationship Diagram of Muslim clothing supply chain system at CV Muttif Corp*

2.6 Analisis Kebutuhan Fungsional

Functional Needs Analysis is an analysis that describes the flow of data or information that includes the drawing, planning, and sketching or arrangement of several separate elements into a unified whole and functioning in the process of making software to be built.

2.6.1 Diagram Konteks

Diagraam context is a model for explaining globally how data is used and transformed to process or describe the flow of data into and out of the system. The following context diagram on the system can be seen in Image 6

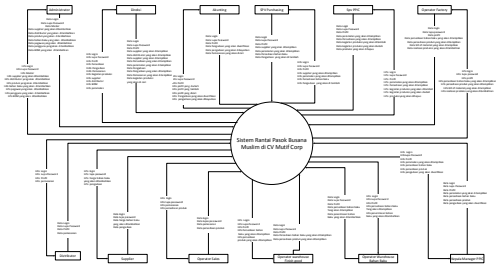


Image 6 Context Diagram of Muslim clothing supply chain system at CV Mutif Corp

2.6.2 *Data Flow Diagram* (DFD)

Here DFD Level 1 Muslim Supply Chain System in CV Mutif Corp can be seen in Image 7

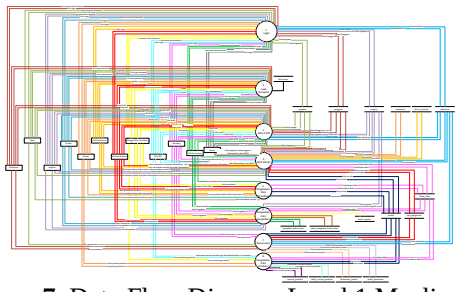


Image 7. Data Flow Diagram Level 1 Muslim Supply Chain System at CV Mutif Corp

2.6 Diagram Relasi

Relationship diagram illustrates the relationship of a table with other tables. The process of relation between attributes is a combination of attributes that have the same primary key, so that these attributes into a unity that is connected by the key field. Table relation can be seen in Image 8 as follows:

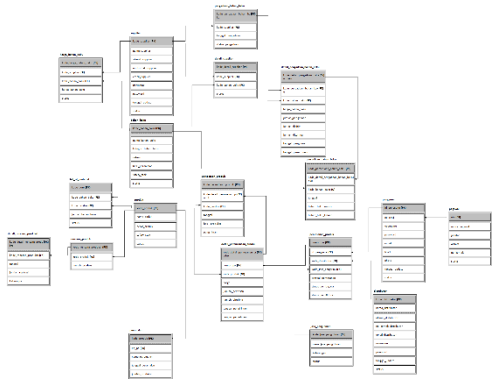


Image 8. Relationship diagram

3. PENUTUP

In this section, explains the conclusions that contain the results obtained after the analysis, design, and implementation of the constructed design and suggestions that will provide important records and possible improvements.

3.1 Kesimpulan

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

1. S upply chain system that is built can facilitate the Spv Purchasing to determine the plan needs the amount of raw materials, so there is no shortage of raw materials for the production process
2. This Supply Chain System can help the Expedition team to determine the delivery schedule of products to the distributor, resulting in a regular delivery schedule and no delays in delivery.

3.2 Saran

Based on the conclusions that have been described, the expected future is Suggestions for the development of supply chain system is that this system can be integrated with Muslim fashion product catalog system, to facilitate distributors to order.

DAFTAR PUSTAKA

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.

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.

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

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