INFORMATION SYSTEM AT PT CIPTA NIAGA SEMESTA USING SUPPLY CHAIN MANAGEMENT (SCM) APPROACH

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ABSTRACT

PT Cipta Niaga Semesta is a company engaged in the distribution of food products and soft drinks. Distributed products namely, coffee and health food as well as cup. Product information delivery is done by the supplier so erratic delay in procurement of stock of products in storage, so the shortage of stock of products in the warehouse. The uncertainty of product order agents resulted in the head of the warehouse of the difficulty in estimating the amount of product that will be distributed to agents.

Based on problems that have been described, then the proposed solution is to build information systems at PT Cipta Niaga Semesta use Suplly Chain Management Approach. The goal is the warehouse Chief eases in planning for the procurement of a product to the supplier to avoid a shortage of stock of products and make it easier for the head of the warehouse in determining the amount of a product that is distributed to agents based on forecasting products required by the store. Forecasting methods used in the study is Single Exponential Smoothing with the Mean Square Error (MSE), while in determines the amount of finished product inventory using the Safety Stock.

Based on the test results, it can be concluded that this system has helped the head shed in planning for the procurement of a product to the supplier and ease the head of warehouse in determining the amount of a product that is distributed to agents based on forecasting products required by the store.

Keywords: berisi maksimal 5 kata penting dalam penelitian.

1. PENDAHULUAN

PT Cipta Niaga Semesta is a company engaged in the distribution of food products and soft drinks that are located in the West Bandung in Surabaya. Distributed products namely, coffee and health food as well as cup. These products in supply by PT Eka Torabika universe, PT Nutrindo Bogarasa, CV gift of Jaya, and Go Paper Cup. Distribution of the products is carried out after the booking from the booking agent, the product can be done by contacting Supervisors Talking Order (TO) via phone or in person to the company when the pemsaran or sales came to each agent. The process of payments made by the customer to the company with COD (Cash On Delivery) or by way of mortgage payment by a specified time.

Based on the results of the interview with Mr. Dian Gunawan as head of warehouse at PT Cipta Niaga Semesta, stating that the current activities of the supply chain there are upstream activities namely procurement of product to the supplier, then the supplier performs the delivery of product to order from PT Cipta Niaga Semesta in procurement of supplies of the products in warehouses of PT Cipta Niaga Semesta, information product delivery done by suppliers uncertain there happened the delay in procurement of stock in the warehouse which resulted in a shortage of stock of products in the warehouse. The shortage of stock of existing products in the warehouse to impact the process of reordering, namely the difficulty of determining the amount to be ordered not to shortage of the product.
In addition, based on the results of the interviews of Mr. Dian Gunawan as head of warehouse at PT Cipta Niaga Semesta, the booking agent of products done in a sometimes erratic order 3 – 4 times bahakan sometimes only 1 time in booking each week, so the uncertainty of product order agents resulted in the head of the warehouse of the difficulty in estimating the amount of product that will be distributed to agents.

Based on problems that have been described, then it needs to be made of an information system which allows PT Cipta Niaga Semesta in the procurement and distribution of the product the product, so that in meeting customer demand will be more optimal. System requirements i.e. the system which applies the concepts of Supply Chain Management (SCM), namely "information systems at PT Cipta Niaga Semesta use approach to Supply Chain Management (SCM)".

Based on problem which researched, then the point of writing this final task is to build a system Infromasi of PT Cipta Niaga Semesta use approach to Supply Chain Management (SCM).

The goal will be reached in this study is:

1. Facilitate the head of warehouse in planning for the procurement of a product to the supplier to avoid a shortage of stock the product.
2. Facilitate the head of warehouse in determining the amount of a product that is distributed to agents based on forecasting products needed by the stores.

2. RESEARCH

2.1 Understanding The System Infromasi

Information systems must not involve a computer. Information systems that use computer-based information system can be called a computer (Cumputer-Based Information System or CBIS). In practice, the term information system is more often used by no-frills computer-based although in fact the computer is an important part.

There are various definitions of system information, as listed at. From these various definitions, it can be concluded that the information system includes a number of components (human, computer, information technology, and procedures work), there's something processed (data becomes information), and is intended to achieve a goal or objective.

2.2 *Supply Chain Management*

Supply Chain Management is the method or integrative approach to managing the flow of products, information, and integrated money involving parties ranging from upstream to downstream consisting of suppliers, factories, distribution network or services logstik.

Supply chain usually there are 3 kinds of flow that must be managed. First was the flow of goods that flow from upstream (upstream) to downstream (downstream). Examples are raw materials sent from the supplier to the factory. After the finished products manufactured, they are sent to the distributor, then to the retailer or retail, then to the end. The second is the flow of money and the like which flows from downstream to upstream. And the third is the flow of information that may occur from the upper to the lower or vice versa. Information about the preparation of the products still exist in each supermarket often needed by the distributor or the factory. Information about production capacities ktersediaan owned by supplier is also often required by manufacturer.

2.2.1 Coverage Area Supply Chain Management

When referring to a manufacturing company, activities
the main entrance in the classification of SCM are:

1. The activity of designing new products (product development)
2. The activities of getting raw materials (procurement, purchasing or control)
3. The activities of production and supply plan (planning & control) activity of doing production (production)
4. The activity of doing production (production)
5. Delivery/distribution (distribution)
6.The activities of the management of the product/goods refund (return)

2.2.2 Komponen Supply Chain Management

In Supply Chain Management there are three main components that support the operation of a business process as follows:

1. Upstream Supply Chain
   Upstream Supply Chain is the overall activities of the manufacturing company with pendistribusiannya or distributor can be expanded to multiple levels. The main activities in the Upstream Supply Chain this is the procurement of goods.
2. The Internal Supply Chain
   This internal Supply Chain is the process of distributing the goods to the warehouse. The main activities in the Internal Supply Chain Management is the production, fabrication, and inventory control.
3. The Downstream Supply Chain
   Activities in the Downstream Supply Chain involves the process of distribution to the end komsumen. The main activities in the Downstream Supply Chain this is the distribution of goods, warehousing, transportation.

2.3 Forecasting

To resolve the issue in the future is uncertain, people are always working to get it done with the model approaches that correspond to actual behavior data, so too do the forecasting. Forecasting (forecasting) demand for products and services at the upcoming and units is very important in planning and monitoring of production. A lot of forecasting has the meaning, then the forecasting needs to be planned and scheduled so that it will take a period of time at least in a period of time it takes to make a kebijaksanan and set a few things affect the discretion. Forecasting is required in addition to forecast what will happen in the future also the decision makers need to make planning. Forecasting is very diverse in the time horizon of forecasting, the factors that determine the actual result, type pattern and a variety of other aspects. The extensive use of the face like that, some techniques have been developed.

A noteworthy forecasting stages that must exist within the process of forecasting. There are six phases in the forecasting process, namely:

1. Determine the purpose of divination.
How to forecast will be used and when the forecast will be needed? This step will give an indication of the level of detail required in the forecast, the number of resources (employees, time, computer, and cost) which can be justified, as well as the degree of accuracy required.
2. Setting a time span.
Forecast must indicate the span of time considering that lack decreases when a span is increased.
3. Select the forecasting technique
4. Acquire, memberishkan, and analyze the appropriate data
Obtain the data can include businesses that sigiifikan. After obtaining the data, the data may need to be "cleaned up" in order to remove foreign objects and data that are clearly not true before analysts.
5. Create a self-fulfilling prophecy.
6. Monitor the forecast.
The forecast should be monitored to determine whether the prediction is done in a way that is satisfactory. If not, check back method of forecasting, assumptions, data validity, and others. Then, change it according to your needs and prepare a revised forecast.

This type of forecasting can be distinguished based on the timeframe, the scope and the methods used.
1. Based on the time period, forecasting differentiated into short term and long term.
2. Based on the spaces in scope forecasting forecasting differentiated into micro and macro.
3. Based on the method of forecasting, forecasting used differentiated into qualitative and quantitative methods.

Kaulitatif method is based more on intuition and judgement people doing forecasting than pemanipulasian (processing and penganalisisan) historical data is available. Techniques in qualitative methods consists of the Delphi technique, growth curve, Screenwriting, market research, focus groups, etc..

2.3.1 *Single Exponential Smoothing*

In pemulusan this historical values, random errors in Align-Align to produce a forecast of "smooth" that seem to work well in certain circumstances. The simplest case of a Single Exponential Smoothing can be developed from equation (2.1) or more specifically from a variation on the equation as follows:

$$F_{t-1} = F_t + \left(\frac{X_t}{N} - \frac{X_{t-N}}{N}\right) \quad (2.1)$$

Suppose a long observation is not available so it should be replaced with a value approach (approximations). One of the possible replacements are forecast previous period ft. by doing the substitution the equation (2.1) into equation (2.2) so that it can be written as (2.3).

$$F_{t-1} = F_t + \left(\frac{X_t}{N} + \frac{F_t}{N}\right)$$
(2.2)

$$F_{t-1} = \left(\frac{1}{N}\right) X_t + \left(1 - \frac{1}{N}\right) F_t$$
(2.3)

Of the equation it can be seen that the forecasted value at time t + 1 depending on the weighting value of observation time t, i.e. on the weighting value of forecast time t is 1-1/N value between 0 and 1. By replacing the 1/N = a. Equation (2.3) into equation (2.4).

$$F_{t-1} = aX_t + (1 - a)F_t \quad (2.5)$$

Description:
F _ (t – 1) = Results forecast for period t + 1
a = Constant pemulusan
X_t = deman actual Data for the period t
X_t = Forecast period t F _ (t = n)

Exponential smoothing method in the value of α can be determined freely, meaning that there is not a way that's sure to get the optimal value α.
Then α value selection done by trial and error. The magnitude of α is located
between 0 to 1.

2.3.2 *Mean Square Error (MSE)*

The mean Squared Error (MSE), namely the average of the squared forecasting errors and can be seen in the equation (2.5).

$$\text{MSE} = \frac{\sum(|X_t - F_t|)^2}{n} \quad (2.5)$$

Description:
MSE = mean value of squeres errors
X_t = the actual Data in the period t
F_t = Data Forecast from models used in period t
n = a lot of data results forecast

2.4 Safety Stock

Based on the classification of the preparation which is already explained earlier the author uses techniques of Safety stock to accommodate the uncertainty of demand affects inventory.
Security or Safety stock inventory serves to protect the errors in predicting demand during Lead Time. Lead Time is the time it takes between the raw materials were ordered up to the company. The magnitude of the value of the Safety stock depends on the uncertainty of supply or demand. Here's the formula in determining the Safety stock can be seen in the equation (2.6).

$$SS = Pemakaian\ rata - rata\ periode\ sebelumnya\ x\ LT \quad (2.6)$$

Keterangan:
SS = Safety Stock
LT = Lead Time

2.5 Monitoring

Monitoring is can be described as awareness of what is like to note, containing high-level monitoring carried out in order to make the measurement through time that shows movement towards or away from it. Monitoring will provide information on the status and trends of that measurement and evaluation is completed repeating from time to time.

So the monitoring activity is an activity monitor or supervise the whole activity is performed by a person. The activities of this monitoring can be done in two ways, namely directly or indirectly. Monitoring directly by way of the review directly against the ongoing activities such as the review of incoming goods, goods that come out and others. While the indirect monitoring is done through activities see the written reports, oral reports or observe the interviewing one of the few people involved in an activity.

Traditionally, the distribution network is often considered Bantenkaian physical facilities such as warehouses and transhipment facilities and operations of each facility is likely to separate between one and the other. However, essentially the distribution activities not only focuses on physical activity such as distribution, but also think about how to do the design of the distribution network, segmentation or clusterisasi point distribution, scheduling-determination of routes and determine the consolidation of distribution. In general the function of distribution and transportation is essentially delivering products from the location where the product is produced to where they will be used.

Management of distribution and transportation in General made a number of basic functions which consists of:

1. Do segmentation and determine the target service level
   Segmentation agent needs to be done because by understanding the difference in characteristics and contributions of each agency or area of distribution, the company can optimize inventory allocation nor the speed of service.
2. Determine the mode of transportation that will be used
   Transportation management should be able to determine what mode to be used in distributing their products to the dealer for each mode of transport has advantages and weaknesses of the different funds impact on shipping of the goods.
3. Consolidate information and distribution
   Consolidation is a keyword which is very important nowadays. The pressure to perform the distribution of fast but cheap being the main drivers of the need to consolidate information and distribution. One example of the consolidation of information is consolidated data requests from various regional distribution center by the central warehouse for the purpose of making the distribution schedule. While the consolidation of distribution is performed for example by bringing together demand some stores or different agents in a truck.

2.6 Data Flow Dagram (DFD)

Data Flow Diagram (DFD) is a diagram using the notation-notation or symbols to describe job network system between the functions that relate to each other with the flow and storage of data.

DFD is often used to describe a system in which there has been a new system or would be developed logically without considering the physical environment where the data flows or where the data will be stored. One of the advantages of using data flow diagrams are facilitating user (user) the less controlled the computer field to understand the system to be worked on.

2.7 Entity Relationship Diagram (ERD)

ERD is a model to explain the relationships between the data in the database based on the basic data objects that have relationships between relationships. ERD to model the data structures and the relationships between data, to describe it used some notation and symbols.

Entity Relationship Diagram (ERD) has two main components, namely the entities and Relationships. Both of these components, each equipped with a number of attributes that are present all over the fact that exists in the real world. ERD can be described systematically using the symbol.

2.5 Analysis Of The Problem

Based on research conducted at PT Cipta Niaga Semesta there are some internal problems of the company and associated problems among distributor PT Cipta Niaga Semesta with customers. Some problem that arise in a system that is running at the moment is as follows:

1. Uncertainty information delivery products from reliable mengakbitkan shortage of finished products inwarehouses of PT Cipta Niaga Semesta so as head of warehouse of difficulties in the process of procuring the product to the supplier.
2. Order the product from an authorized Uncertainty resulted in the head of warehouse sesulitan in estimating the amount of product to be distributed.

2.6 Analysis of *Single Exponential Smoothing*

The first thing that was done to calculate the Single Exponential Smoothing forecasting method that is determining the value of the constant alpha 0.1 and predicted the previous period to the next. Calculation of Forecast Products Torabika Duo.
Example of calculation for forecasting α = 0.1:
Based on sales data, compute forecasting bookings for February 2016.
It is known that:

Product sales in February (Xt) = 14012 and forecasting results in February (Ft) = 14012, obtained a sample calculation as below:

$F_{Februari}$ = (0.1 * 14012) + (1 – 0.1) * 14012
= (1401.2) + (12610.8)
= 14012 karton

For the calculation of the month of March, note that:

Product sales in March (Xt) = 12069 and forecasting results in February (Ft) = 14012, So the obtained sample calculation as below:

F_{Maret} = (0.1 * 12069) + (1 – 0.1) * 14012
= (1206.9) + (12610.8)
= 13817.7 carton

The calculation for the month of April and next month is done in the same manner in accordance with the calculation of sales in February and March.

Example of calculation for forecasting α = 0.2:

Product sales in February (Xt) = 14012 and forecasting results in February (Ft) = 14012, So the obtained sample calculation as below:

$F_{Februari}$ = (0.2 * 14012) + (1 – 0.2) * 14012
= (2802.4) + (11209.6)
= 14012 carton

For the calculation of the month of March, note that:
Product sales in March (Xt) = 12069 and forecasting results in February (Ft) = 14012, So the obtained sample calculation as below:

F_{Maret} = (0.2 * 12069+ (1 – 0.2) * 14012
= (2413.8) + (11209.6)
= 13623.4 carton

Calculations for alpha = 0,2 from April and next month is done the same way with the calculation of booking in February and March. Do sales in the same way as above up to alpha = 0,9.
After the whole calculation of sales from February to July, obtained the results of the calculations for alpha = 0,1 up to alpha = 0,9

2.7 Analysis of Mean Square Error (MSE)

After the whole calculation of sales from February to July, obtained the results of the calculations for alpha = 0,1 up to alpha = 0,9

$$MSE = (X_{Maret} - F_{Maret})^2$$
$$= (12069 - 14012)^2$$
$$= (-1943)^2$$
$$= 3775249 \text{ carton}$$

Doing the same calculation as an example up to 6th period. After counting up to the MSE-6, total the next step the MSE from 2nd to 6th period divided the number of periods.

Based on results of α in the calculation of Forecast Error using the Mean Square Error (MSE), it can be inferred that the α-value 0.1 generate the smallest error i.e. 7816558.58. The smallest error result indicates that the accuracy of forecasting results. The results of product sales forecasting torabika duo for the next period which is contained in the table 3.3 with a value ofα = 0.9, so PT Cipta Niaga Semesta recommended product for product torabika duo to supplier in the next period is the month of August, with the number of ≈ 10720 carton.

2.8 Analysis of Safety Stock

Application of the method of Safety Stock calculation process, namely the preparation of safe limits that must be available in the barn PT Cipta Niaga Semesta for the next period and point of booking again. Calculation of safety stock can be seen in the Parallels (2.22). Calculation example with data product sales torabika duo, energen vanilla, and paper cup 8 oz, in February until July 2016.

The following example calculation with methods of Safety Stock:
It is known that:

The number of sales in July = 10131
The number of days in July = 31 day
Lead Time on procurement to supplier = 6 day

The completion of the:
Safety Stock = $\frac{(10131)}{31} x6 = 1960.83$ = 1961 carton

Safety stock calculation based on the above, then PT Cipta Niaga Semesta must provide a Safety stock torabika duo as much as 1961 carton, so that by the time the stock is less than the amount of safety stock then the system will tell you that there are unsafe products have stock. Monitoring the inventory products will be presented in the form of a table.

When the remaining stock of products have the status is not secure, then the company's procurement with the amount of procurement as follows:
Example: 900 product inventory.

The number of procurement = (sales forecasting + *Safety Stok)* – remaining stock

= (5665 + 933) – 900

= 5698 carton

After knowing the amount of product that must be reserved, so companies need to conduct product procurement to suppliers who had done previous cooperation.

2.9 Analysis of Distribution

In the supply chain there is ditribusi or shipping activities. The scope of activities include monitoring the status of delivery, delivery scheduling and capacity of the vehicle to be used in distribution. Monitoring the distribution of the product until it is done so at the user end on time and the right place and know the status of your delivery. Schedule for distributing products to agents is done on a schedule that has been agreed between the PT Cipta Niaga Semesta with agent.

Act or the evaluation of the monitoring of the status of the distribution that is using the system to be built. In the system that will be built there is a menu that includes shipping information shipping date, shipping destination (Agent), the number and types of products shipped, who the sender is, and the vehicle will be used. Monitoring the status of the delivery is done in order to PT Cipta Niaga Semesta knowing agents make changes the status of the receipt of the products distributed from PT Cipta Niaga Semesta, There are two delivery status for a product that is still in shipping or already received. After the dealer changed the delivery status then PT Cipta Niaga Semesta can get to know the product already received.

2.10 *Entity Relationship Diagram* (ERD)

Database analysis is the analysis of a collection of interconnected data and stored in a particular storage media without repetition. There is data that will be used in the manufacturing process of software information systems with supply chain management approach. The data obtained will be used to design the database accompanied by attributes-the attributes of each of the entities and the relationships between the entities, data base, in designing a data model that will be used is an Entity Relationship Diagram. The relationships between these entities can be seen in Figure 2.1 and specifications of each entity (data dictionary).

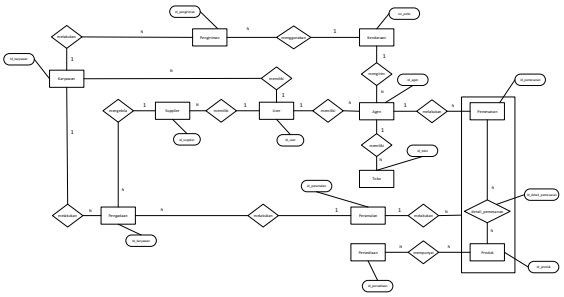


Figure 2.1 Entity Relationship Diagram Sistem Informasi di PT Cipta Niaga Semesta Menggunakan Pendekatan Supply Chain Management (SCM)

2.11 Context Diagram

Context diagram is a model to explain how data is used globally and is transformed to the process or describe the flow of data into or out of the system. This system context diagrams can be seen in Figure 2.2.

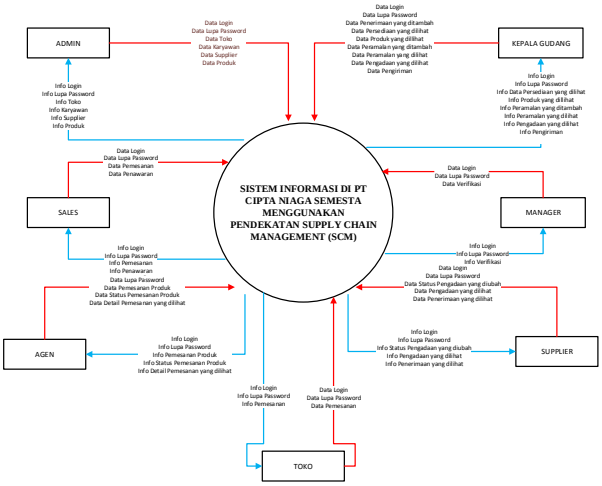


Figure 2.2 Diagram Konteks Sistem Informasi di PT Cipta Niaga Semesta Menggunakan Pendekatan Supply Chain Management (SCM)

2.12 Table Relation

Table relation describing relationships between data, meaning data and their boundaries. The process of relationship between attributes is a combination between an attribute that has the same primary key, so that these attributes into a single entity linked by the key field. Table relationships are described in Figure 2.3.

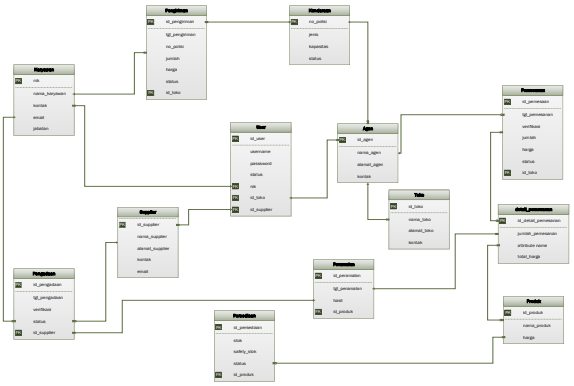


Figure 1.3 Tabel Relasi

2.13 Testing System

System testing is the most important thing that aims to find errors or deficiencies in the information system tested. Testing intends to find out the information system created has met the performance according to the purpose of design.

Testing is used to test the new system is a black box testing methods. Black box testing is focused on testing the functional requirements for information systems.

2.13.1 Testing *Alpha*

Alpha testing is functional testing that is used to test the system that has been created with a black box testing methods. Black box testing focused on the functional requirements of the software.

2.14.2 Testing *Beta*

Beta testing is testing that is directly in the actual environment. Researchers conducting assessment of the software by using the method of interview. From the results of the interview then the conclusion can be drawn if the software has been built according to the purpose or not.

The interview was done against the beta testing page for each user. Beta testing is done by way of doing testing on-site research. This research was conducted in PT Cipta Niaga Semesta, in order to find out the extent to which the system is built can be a solution of the problems of settlement have been described previously.

3. CONCLUSION

The conclusion that can be drawn from all of the processes that has been made in establishing this information system are as follows:

1. *Supplier*. supply chain management information systems this can ease the head of warehouse in the case of procurement planning product to the supplier.
2. Supply chain management information systems this can ease the head of warehouse in determining the amount of a product that is distributed to agents based on forecasting products needed by the stores.
3. Supply chain management information systems this can ease the head of warehouse in determining the amount of a product that is distributed to agents based on forecasting products needed by the stores.

The informmasi system is built with the supply chain management approach at PT Cipta Niaga Semesta this can still be developed further with higher system specs and better performance again.

Here are a few suggestions that can be used for the development of this research:

1. Display interface on the research of the next expected more attractive again to system users.
2. On the system is not processing data related to finance. Expected in the next research can manage data related to financial supply chain management application in order to be more complete.

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