SUPPLY CHAIN MANAGEMENT DEVELOPMENT AT CV INTI ROLL

Iqbal Syahid Safari[1], Angga Setiyadi[2]

[1,2] Informatic Engineering – Universitas Komputer Indonesia
Dipatiukur Street 112-114 Bandung
E-mail : iqbal.syahid.s@gmail.com[1], anggasetiyadi@gmail.com[2]

ABSTRACT

CV Inti Roll is private owned companies which main business are manufacturing and production process of *metal rubber roll type products.* The products manufactured include rubber roll, roll expander, roll pad, roll ebonite, and other type of rubble material products. CV Inti Roll only started its production according to customer request only. CV Inti Roll also provides raw materials to *suppliers* according to customer inquiries. From this research, it was revealed that the problem at CV Inti Roll is the short inquiries processing date which only 12 days since the inquiries accepted to the delivery time so customer often felt disappointed by the company performance as the lead delivery time is not on time as expected. The other problem faced by *purchasing* department is sourcing of *indent* raw material to *supplier* on which it will affect the leftover production causing the production itself to be delayed. Other problems faced are the unavailability of fixed schedule regarding the product delivery to customer and other information including the availability of transport vehicles.

Based on the condition above, the solution is to provide a *supply chain management* at CV Inti Roll. The purpose of *supply chain management* are to control and managing provision of raw materials, control and managing the availability of the raw materials, and even controlling the distribution of requested products to customer. *Supply Chain* strategy used is *pull supply chain* due to provision of raw materials and production only started after request from customer confirm to be accepted or usually called *make to order*. Planning of raw materials sourcing is using *EOQ* method and the delivery products are controlled by company terms and condition.

Based on research results, it was concluded that the system already helped the company to process the products to determine the product arrival to customers, helped to determine of how much raw materials needed from *supplier*, and helped the company in regards of products delivery scheduling and the availability of delivery vehicles.

Keyword: *supply chain management, pull supply chain, make-to-order, Economic order quantity (EOQ).*

1. INTRODUCTION

CV INTI ROLL is a company engaged in manufacturing and producing a wide range of components made of rubber *(Rubber Compounnds)* such forms of rubber roll, roll Padder, expander roll, roll ebonite and others. Types of rubber are provided CV.Inti Roll ie NBR *(Nitrile Rubber Butadine),* SBR *(Strine Butadine Rubber),* Ebonite and Hypalon. Company is located at Jl. Hasan Arief 1 Banyuresmi Garut has a series of work based on orders that are make to order, where the company will make the process of production and purchasing process of raw materials to the supplier if there are orders from consumers.

Based on interviews with parts marketing manager, Mr Rudiansyah that handle orders from customers, CV Inti Roll has provisions or rules in accepting orders. The first rule is the deadline for bookings made 12 days from starting the handling process in order to submit a product to the consumer, where the 12-day period is a time of grace given to work on every order while the activity that occurs at this time of the determination of the date of receipt to the consumer only determined by estimating the order completion time is 12 days from the date of receipt of the order so that consumers will feel disappointed on the performance of companies if the specified date is not in line with forecasts. CV Inti Roll provides the freedom for each consumer in determining the size and type of rubber, which is produced in a single order can vary. Provisions that both products will be processed, if consumers have already paid an advance of 50% of the overall price for the production process can be directly done. Old or not the product creation process depends on the difficulty level of the model desired by consumers.

Based on interviews with *purchasing* part, Mr Ahmad, the problems faced on the demand for the product of the number of consumers who are not sure. This can make it difficult parts *purchasing* an order to the *supplier* of raw materials when the raw materials are ordered status *indent*, it will have an impact on the production process to be blocked.

Based on interviews with Section Delivery, Mr Ade, explained related problems found in the product delivery process that is experiencing difficulty in managing product delivery schedules and determine the vehicles that will be used. CV. Roll core has 3 units of vehicles consisting of one truck and two pickup with a load capacity and size vary per unit. Delivery of products is done in time and a different amount so that the delivery had difficulty in determining when the product will be shipped and which car is available.

With the discovery of problems in the CV. Roll core, these problems can be overcome by using a system of *supply chain management. Supply Chain Management (SCM)* is a method or an integrative approach to manage the flow of products, information, and money in an integrated manner involving parties from upstream to downstream, consisting of suppliers, factories, distribution networks and logistics services. [7] The goal may regulate the management of procurement of raw materials, raw material inventory control as well as to carry out the distribution to consumers who have ordered products.

Based on the description of the problem that occurred in CV. Roll core, it takes a systems development *Supply Chain Management* at CV. Roll core.

The purpose of the thesis of this essay is to build *Supply Chain Management* at CV. Roll core.

While the goal to be achieved in building the *Supply Chain Management* at CV. Roll core is:

1. Marketing Section Manager makes it easy to determine the date of receipt to the consumer.
2. Facilitate *Purchasing* Section in determining the number of reservations to the *supplier* of raw materials, so the production process can proceed smoothly.
3. Facilitate the Delivery section to schedule delivery of products along with the vehicle being used.

2. CONTENTS RESEARCH

2.1 Theoretical Basic

The theoretical foundation aims to provide an overview and assessment resources of theories - theories related to the development of supply chain management in the CV. Inti Roll.

2.1.1. Information Systems

According to Jacob, "The system is a network of procedures interconnected, gathered together to perform an activity or a particular purpose." [4]

Meanwhile, according to HM Jogiyanto "The system is a set of elements that interact to achieve a certain goal. "[5]

Meanwhile, according to Kusrini and Andri Koniyo "Information is data that has been processed into a form meaningful to the user, which is useful in the current decision-making or supporting resources." [6]

By definition Jacob, Jogiyanto, Kusrini and Andri Koniyo authors conclude information system is a set of activities to collect, process, store, analyze, and disseminate information to the user for a particular purpose.

2.1.2. *Supply Chain* dan *Supply Chain Management*

According to I Nyoman Pujawan and Mahendrawati *"Supply Chain* is a network of companies - companies that collectively - working together to create and deliver a product into the hands of end users. Company - the company usually including suppliers, manufacturers, distributors, stores or retail, as well as companies - companies support such as logistics services company. "[7]

Meanwhile, according to Turban *"Supply Chain* is the flow of material, information, money and services from *suppliers of* raw materials, to the factory, to warehouse, to the end *customer.* "[8]

By definition I Nyoman & Mahendra, Turban authors conclude *supply chain* is a network that can be a network of companies and network of independent organizations working together and interconnected to create a partnership that is mutually beneficial to control, regulate and improve material flow and information of a product from the supplier to the end user.

According Simchi-Levi, David, Philip Kaminsky, and Edith, "S *upply Chain Management* is defined as a series of approaches used to integrate suppliers, manufacturers, warehouses, and stores effectively so that supplies can be manufactured and distributed in the appropriate amounts, to the location right and at the right time so that overall system costs can be minimized while trying to satisfy the needs and services. "[9]

Meanwhile, according to I Nyoman Pujawan and Mahendrawati *"Supply Chain Management (SCM)* is a method or an integrative approach to manage 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. "[7]

Based on the definition of "Simchi-Levi, David, Philip Kaminsky, and Edith", "I Nyoman Pujawan and Mahendrawati" the authors concluded that the *Supply Chain Management* is a set of activities that are involved in the process of transformation and distribution of goods ranging from upstream to downstream.

According to I 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 pad supply chain is as follows: [7]

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

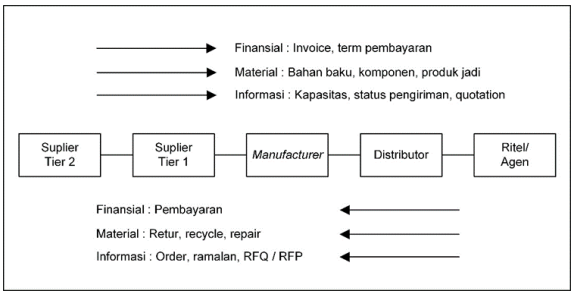


Figure 1. Simplification *supply chain* model and 3 kinds of stream

2.1.3. Element *Supply Chain Management*

According to Amin Widjaja Tunggal, *Supply Chain Management* is composed of three elements are interrelated to one another: [10]

1. *Supply Chain* Network Structure

Network members' work and relationships with other members of *the supply chain.*

1) Member Identification *Supply Chain*
Members *of Supply Chain* covers all companies and organizations associated with the company either directly or indirectly through a *supplier* or *customer* of the *point of origin* to *point of consumpion.*
2) Structural Dimensions Network
   a. Horizontal structure Covers all existing *tiers* in the *supply chain*, the network may be too short length.
   b. Vertical Structure Covering a number of *supplier* / *customer* representing each *tier* level.
   c. Horizontal Position Company A company may be positioned located or close to sources of *supply* or the final *customer* or on Somewhere between the end points of the *supply chain.*
3) Types of Business Process Network

Unify and manage all business processes through the *supply chain* will not be as effective with the results to be achieved. Therefore, there should be a separation between the network which is the tissue that is really important. There are 4 types of network business processes, namely:

a. *Managed Process Links*
Network in which the company felt it was important to unite and collaborate with other members of the *supply chain.*
b. *Monitored Process Links.*
In this process the company is not very actively involved. Companies only periodically reviewing and auditing how each process is incorporated or organized.
c. *Not-Managed Process Links*
The Company is not actively involved and also do not review as critical relationships. Companies entrust another member menggaturnya.
d. *Non-Member Process Links*
The process between the members of the company with non-members of the *supply chain.* Non-members are not included in the *company's supply chain* network structure but they can and often do make an impact on the company and other members.

2. Business Process *Supply Chain*

1) *Customer Relationship Management (CRM)*
The first step is to identify the *supply chain* major customers or customer critical to the company's trade mission. The business plan is the first step of identification. The team of customer service *(Customer Service)* establish and implement joint programs, approval of products and services are set at the level of certain work to meet *customer* needs.
2) *Customer Service Management (CSM)*
Customer Service informing *the customer* information about delivery dates and product availability through its relationship with production and distribution.
3) *Demand Management*
This process balances the needs of *the customer* with the ability to *supply* companies to determine what the *customer* will be purchased and when.
4) *Customer* Order *Fulfillment*
The order fulfillment process effectively requires the integration of work plans between production, distribution, and transportation. Relationships with colleagues that members of *the supply chain* primary and secondary members required to meet *customer* needs and reduce the total cost of shipping to the *customer.*
5) *Manufacturing Flow Management*
Products produced to meet production schedules. Often the wrong product mengakibatkanpersediaan unnecessary, increase the cost of storage handling and shipping of products is hampered. With the *Supply Chain Management,* the products generated based on *customer* needs.
6) *Procurement*

Involving *suppliers* since the design phase of the product will reduce the product development cycle and also coordination between *engineering, purchasing, and suppliers* at the final stage of design.

7) Product Development and Commercialization
   To reduce the time of entry of the product into the market share, *customers*, and *suppliers* should be included in the product development process.
8) Returns
   Effective returns management process allows us to identify an opportunity to improve productivity and cut through the projects in order to compete.

3. The components of *SCM* Management

Management components are critical and fundamental to the success of *SCM* as needed to demonstrate and determine how each network is put together and structured process. The level of integrity and a network of business process management is a function of the number and level arranged from low to high on the components added to the network.

Its main components are as follows:

1) Planning methods and pengedalian
   Planning and control of the operations is the key to guide the organization or *supply chain* to the desired direction. Planning includes many aspects have a significant effect on the success of the *supply chain.*
2) Structural work flow / work activities
   The structure of the flow of work or work activities show how companies deliver tasks and activities. This level of integration processes through the *supply chain* is a measurement of the organizational structure.
3) Organizational structure
   The organizational structure can be based on individual enterprise and *supply chain.* Usefulness of a *cross-functional* team suggested a process approach.
4) The structure of the flow of communication and information facilities
   Information flow facility structure has a strong influence on keifisienan *supply chain* and is a major component together most or all of the *supply chain.*
5) The structure of the product flow facility
   The structure of the facility related to the product flow network structure *sourcing,* production, and distribution *supply chain.* with the reduction inventory it will be less space required for storage of inventory. Supplies needed in the system, but the storage of supplies on a specific part can sometimes be be disproportionate.
6) management methods
   Management methods include the corporate philosophy and management techniques. Between the organizational structure of *a top-down* with *bottom-up* organizational structures will be difficult to put together.
7) The structure of authority and leadership
   The structure of the authority and leadership through the *supply chain* will affect the format. One strong leader will control the direction of *the supply chain.*
8) The structure of risk and *reward*
   The anticipation of sharing risk and *reward* through the *supply chain* will affect the long-term commitment of its members.
9) Culture and attitude
   Linking culture and individual attitudes takes time, but it takes some degree of supply chains as a coordinated network.

2.1.4. EOQ (*Economic Order Quantity*)

EOQ (Economic Order Quantity) is a simple model that could is used to determine the size of the economic order. this model consider two inventory costs ie costs and expenses messages save. The cost of the message in question are fixed costs that come out each time the reservation is made and is not dependent on the size or volume pesanan.Sedangkan save costs are costs that result from the company storing the goods for a specific period.

Economic Order Quantity is a method used to optimize the purchase of raw materials can reduce inventory costs so that the efficiency in the supply of materials Companies can run well. The use EOQ method can help a company in determining the number of units ordered in order to achieve cost ordering and inventory costs to a minimum. Some Keuntunagan the may be granted by the EOQ is to eliminate the risk if the material were booked not good so it must be restored, eliminating risks to rise seasonal goods prices or inflation, store raw materials produced seasonally so the company will have no trouble if the material was not available on the market, and others.

The purpose of the EOQ model is to minimize the total cost of inventory. Important cost is the cost of ordering, order placement fees, and fees carrying or holding units of inventory in stock. Formulation EOQ that can be used are:

$$EOQ = \frac{\sqrt{2DS}}{H} \qquad (2.1)$$

Information :
D: The use or demand estimated per time period
S: Booking Fee (preparation of orders) per order.
H: The cost of storage per unit per year.

2.2. Model *Supply Chain Management* di CV.Inti Roll

The following is a mapping that includes components - components that exist in the CV. Inti Roll can be seen in Figure 2.

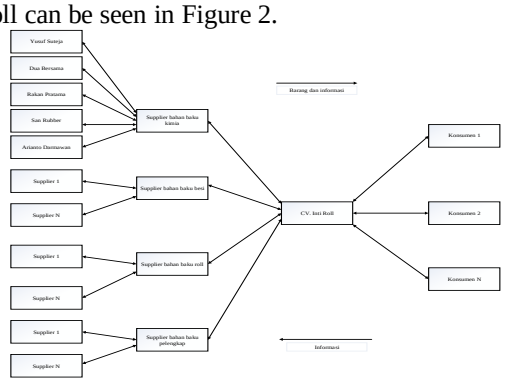


Figure 2. Model of Supply Chain Management in CV.Inti Roll

CV.Inti Roll has four categories of *suppliers of* raw materials for its production activities. The four categories of *suppliers* include:

a. Raw Materials *Supplier* Roll
   Suppliers who supply raw materials roll consists of *suppliers* and Arianto darmawan pratama movement.
b. Iron Raw Material *Supplier*
   Suppliers who supply the raw material *suppliers* of iron consists of iron pipe and steel axles.
c. Chemical Raw Materials *Supplier*
   Supplier is supplying chemical raw materials consist of *supplier* Yusuf Suteja, the two together, movement pratama, rubber and Arianto darmawan sun.
d. Complementary Raw Materials *Supplier*
   Supplier of raw materials complement consists of several *suppliers* include *suppliers* of plastic, paper and *impluse sealer.*

2.3. Stages Supply Chain Management di CV.Inti Roll

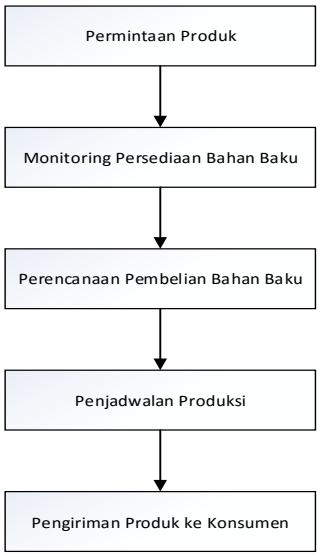


Figure 3. Stages of Supply Chain Management in CV.Inti Roll

Based on the explanation in figure 3, then do analysis on every stages of SCM in the company's CV. Roll core of which is as follows:

1. Stages of Product Demand
   Based on Figure 3 users are involved at the stage of product demand is part of marketing. Marketing division will manage the reservation data products purchased by consumers.
2. Stages Raw Material Inventory Monitoring
   Based on Figure 3 *users* are involved in the supply of raw materials is monitoring *the company's internal* parts are parts warehouse. After knowing the demand of consumers, the company will carry out monitoring of raw material inventory in the warehouse and determine the raw materials to be used for the production process if the remaining stock of raw materials is less than required, then the company will contact the *supplier* to order the raw materials needed.
3. Stages Raw Material Procurement
   Based on Figure 3 *users* involved in the stage of procurement of raw materials is part of *purchasing.* Parts *purchasing* will calculate the procurement of raw materials from the demand data obtained using *the EOQ method.*
4. Stages of Production Scheduling
   Based on Figure 3 *users* involved in this phase is part of the production.
5. Stages Shipping Products to Consumers
   Based on Figure 3 *users* involved in the stage of product delivery to the consumer that is part of the delivery. Part deliveries will make the scheduled delivery of products to submit the finished product to the consumer.

2.4. Analysis Database

Database analysis is the analysis phase to describe the desired system in the form of relationships between the entities involved in *supply chain management* information system in CV.Inti Roll. Relations are illustrated in a diagram called *entity relationship diagram.* ERD *supply chain management* information system in CV Inti Roll can be seen in Figure 4.

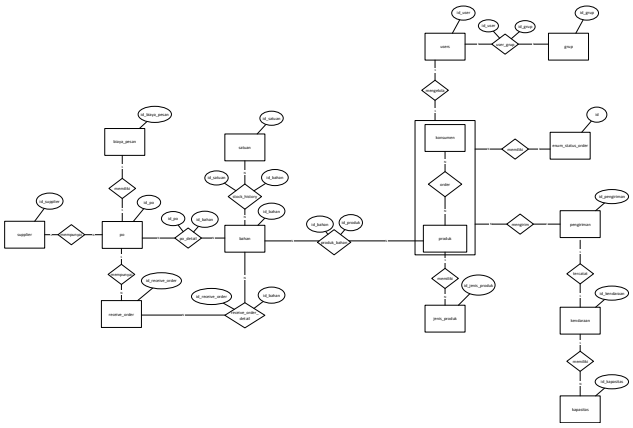


Figure 4. *Entity Relationship Diagram* Development of Supply Chain Management at CV. Roll core

2.5. Diagram Context

Diagram context is a global model to explain how the data is used and transformed to the process or describe the flow of data into and out of the system. Here is a picture in the system context diagram can be seen in Figure 5.

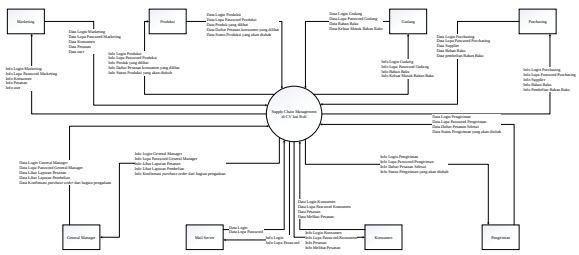


Figure 5. The diagrams Context of Development *Supply Chain Management* at CV Inti Roll

2.6. Data Flow Diagram

Data Flow Diagram shows how the flow of data outlining the processes that occur within the system processes more detail. In the context diagram sepereti figure 6 can be broken down into several DFD.

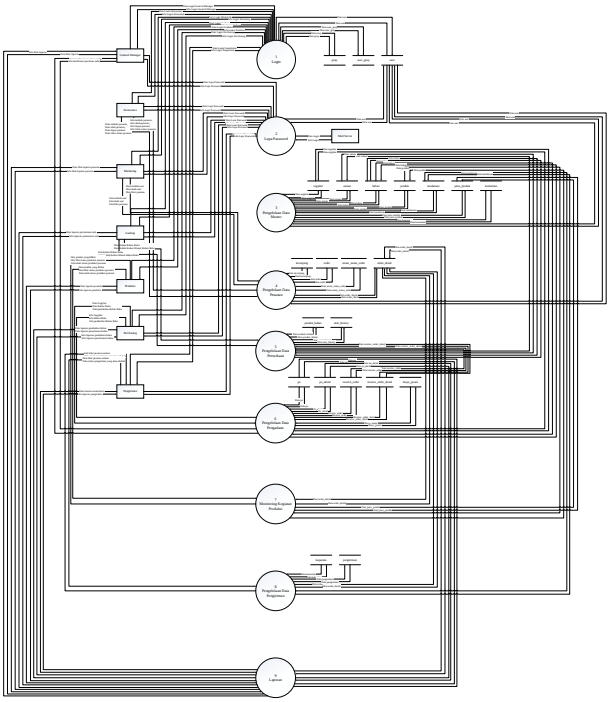


Figure 6. DFD Level 1

2.7. Relation Scheme

Relation scheme illustrates 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 that is connected by the key *fields.* Relation scheme will be explained in Figure 7.

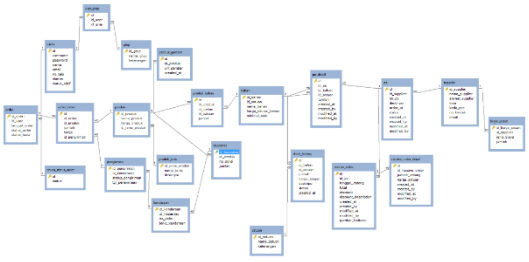


Figure 7. Relation Scheme

2.8. Interface Design

Interface design created 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 interface display both *input* and *output* that will be generated when the application is implemented. Here is a sample *login* interface design that can be seen in Figure 8.

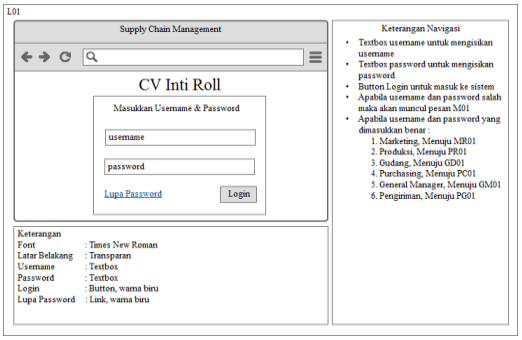


Figure 8. Designing Interfaces *Login*

2.9. Network Design Semantics

The design of the semantic network representation of the design interface that shows where each interface is connected. The design of semantic networks in *Supply Chain Management* at CV. Roll core are as follows :

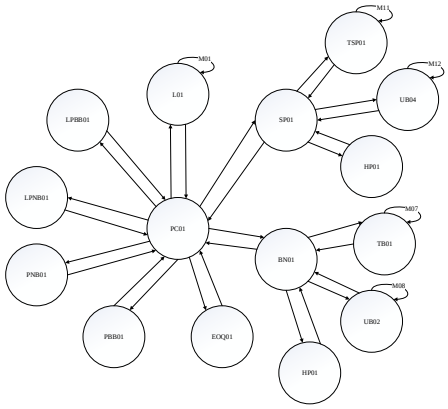


Figure 9. Design Semantics *Purchasing* Network

2.10. Prosedural Design

Designing procedural transform the structural elements of the architecture program into a procedural description of the components of the software. The design of procedural applications to be built are as follows:

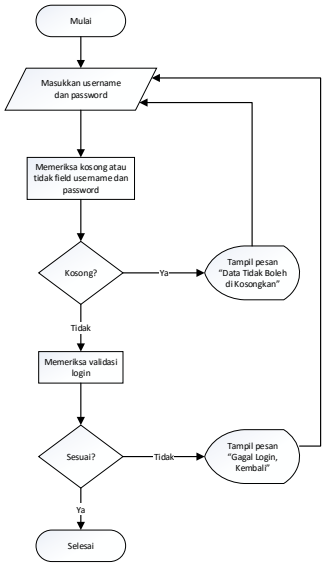


Figure 10. *Login* Procedure

2.11. Black Box Testing Conclutions

Based on the test results in the test case has been done it can be concluded that the overall *supply chain management* information system in CV Inti Roll can run as expected.

2.12. Beta Testing Conclutions

Based on the beta testing has been done, it can be drawn a conclusion that the *supply chain management* information system that has been built to meet user needs, among others:

1. Implementation of supply chain Management is built can be a helpful part in determining the date of receipt of marketing products to consumers.
2. Implementation of supply chain management are built to facilitate the purchasing part in the purchase of raw materials to the supplier.
3. Implementation of supply chain management are built to facilitate the delivery part in determining the schedule for delivery of finished products as well as used vehicles.

3. CLOSING

In this chapter we will discuss about the conclusions which contains the results obtained after the analysis, design, and implementation of software design that was built and has been developed as well as suggestions that will provide important records and possible improvements that need to be done for software development next.

3.1. Conclusions

Based on the analysis and testing has been done it can be concluded as follows:

1. Implementation of supply chain Management is built can be a helpful part in determining the date of receipt of marketing products to consumers.
2. Implementation of supply chain management are built to facilitate the purchasing part in the purchase of raw materials to the supplier.
3. Implementation of supply chain management are built to facilitate the delivery part in determining the schedule for delivery of finished products as well as used vehicles.

3.2. Suggestion

The advice given for thesis research in the development of this system are as follows:

1. The need for the development and maintenance of better the system that has been built, so that the system can be used according to the needs in the future.
2. Require training to the user (user) who will use the system, to be put to good use.

BIBLIOGRAPHY

[1] Rustan, Surianto. (2009). *Mendesain Logo*. Jakarta: PT Gramedia Pustaka Utama.

[2] Dominikus Juju. 2007. *Desain Promosi*. Jakarta: PT Alex Media Komputindo.

[3] M. Steers, Richard, 1984. *Efektivitas Organisasi: kaidah perilaku*. Jakarta: Lembaga Pendidikan dan Pembinaan Manajemen dan Penerbit Erlangga.

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

[5] Jogiyanto. (1989). Analisis dan Desain Sistem Informasi. Yogyakarta: Andi.

[6] Kusrini, Andri Kriyono. *Membangun Sistem Informasi Akutansi*. Yogyakarta: CV Andi Offset.

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

[8] Turban, E., Lee, J., & King, D. (2010). Electronic Commerce 2010 A Managerial Perspective Global Edition (6 edition). New Jersey: Pearson.

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

[10] Amin Widjaja Tunggal. (2010). *Pokok-Pokok Analisis Laporan Keuangan*, Harvarindo.

[11] Indrajit R. E dan Pranoto, R.D. (2002). Konsep Manajemen Supply Chain. Jakarta: Grasindo.

[12] Weele, A. V. (2010). *Purchasing and Supply Chain Management*. London: Cengage Learning EMEA.

[13] Hardjowijono and Muhammad. (2008). Daftar Simak Monitoring Proses. Jakarta: Indonesia Procurement Watch.

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

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

[16] Mahardika,dkk. (2012) . *Analisis Pengendalian Persediaan Bahan Baku dengan Pendekatan Metode Economic Order Quantity (EOQ) dan Metode Kanban*.Jurusan Teknik Industri, Universitas Brawijaya ,Malang.

[17] Kadir, Abdul. (2008). Dasar Pemrograman Web Dinamis Menggunakan PHP. Yogyakarta: Andi.

[18] Frans. 2006. *Web Dinamis Dan Interaktif Dengan CGI.* Yogyakarta: Andi.

[19] Achmad Solihin. 2008. *Pemograman Web Dengan Php Dan Mysql.*

[20] Stendy B Syakur.. 2005. *Aplikasi Web Database dengan Dreamweaver*. Yogtakarta: Andi.

[21] Andi Sunyoto. 2007. *Ajax Membangun Web Dengan Teknologi Asynchronouse Javascript Dan Xml.* Yogyakarta: CV Andi Offset.

[22] Antony Pranata. 2001. *Panduan Pemograman Javascript.* Yogyakarta: Andi.

[23] Toni Kun. 2010. *Membuat Website Canggih Dengan Jquery.* Jakarta: Media Kita.

[24] Aloysius Sigit W. 2011. *Website Super Canggih Dengan Plugin Jquery Terbaik.* Jakarta: Media Kita.

[25] Miftkahul Huda. 2005. *Membuat Aplikasi Database.* Jakarta: PT Alex Media Komputindo.

[26] White, Stephen A,. & Miers, Derek (2008). BPMN Modeling and Reference Guide. Future Strategies Inc: Book Division.

[27] Fathansyah, Ir. 1999. *Basis Data.* Bandung: Penerbit Informatika.