SUPPLY CHAIN MANAGEMENT AT PT. SANSYU PRECISION INDONESIA

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ABSTRACT

PT. Sansyu Precision Indonesia manufactures and marketscomponent products automotive and electronic that can be categorized with industrial companies. The order process from the customer will do production, the customer can submit a supplier to the Head of Procurement. The problems found in the company are the process of ordering the Head of PPIC (Production Planning Inventory Control), the difficulty in calculating the time the product is finished produced until the delivery of the product. The next process is the Material Control Head having difficulty in calculating how many times thepurchase material to the supplier is done because it can cause delays in the production process of the product. In the process of sending products, the Head of Sales & Delivery has difficulty determining the delivery of the product along with the capacity of the vehicle to deliver the finished product to the customer. Supply chain for companies that is usingstrategy make to order because after the order process will be produced. Calculation of the finished time of production until the delivery of the product using gann chart, to purchase materials to suppliers using themethod Economic Order Quality (EOQ)and scheduling the delivery of products to the customer according to the delivery time and capacity of the vehicle. PT. Sansyu Precision Indonesia needs ainformation system Supply Chain Management based on several issues. Functional testing results, UAT (User Accepted Test) and end user testing are concluded. The system can help the Head of PPIC, the Head of Material Control and the Head of Sales & Delivery.
Keywords: supply chain management, make to order, economic order quality

1. INTRODUCTION

PT. Sansyu Precision Indonesia is located in the Ejip Industrial Park Area Plot 8C / A4-5 Cikarang Selatan, Bekasi. PT. Sansyu Precision Indonesia manufactures and markets automotive and electronic component products, PT. Sansyu Precision Indonesia uses thestrategy, make to order namely the production process is carried out if there is an order from the customer.activities Supply chain management which are upstream of that customer place an order and the customer do the filing the ofsuppliers to the Head of Procurement,whereas the downstream activities that there is to do the procurement of materials to the supplier. Theinformation system supply chain management that is created will help provide information and support the development of the company. Users of this information system are the heads of the relevant companies and also the creation of information systems based on the business rules of the company.

The customer orders the product from Mr. Agus Wiyono as the Head of Sales & Exim who receives the product order and submits one supplier to the Head of Procurement. The minimum product order limit is 100 pcs, the company added 10% of each product ordered in order to anticipate product defects, then make order data submitted to the Head of Production Planning & Inventory Control (PPIC). Based on the results of an interview with Mr. Puji Setiadjid as the Head of PPIC, he had difficulty in determining the calculation of the time when the product was produced until the product was delivered to the customer. Because all this time the Head of PPIC only estimates or guesses the completion time of the product until the delivery of the product to the customer is calculated from the start date of the order, the information is obtained before the procurement of material and before the production, consequently the time of product completion is not in accordance with the initial agreement, this will have an impact to the product delivery scheduling process.

Based on the results with Mr. Hari S. as the Head of Material Control at PT. Sansyu Precision Indonesia, he explained that it was difficult to determine the amount ofpurchaseordered material every time the product wasbecause he did not take into account the number of times material procurement was due to the late production process and product delivery. The regulation of material purchases within the company adds 10% of the number ofproduct orders customer to anticipate product defects. In this case it will cause the delivery of products to customers late.

Based on the results of an interview with Ms. Karyani as the Head of Sales & Delivery, she

explained that it was difficult to determine the delivery of the product along with the capacity of the vehicle because all this time it was only able to estimate product deliveries as a result of the buildup and delay in product delivery to customers.

Based on observations that have been made according to the above problems it can be seen that PT. Sansyu Precision Indonesia requires adevelopment Supply Chain Management that can find out the estimation of product scheduling to deliver products to provide information to customers, manage the management ofprocurement material using themethod Economic Order Quantity (EOQ). Based on the description of the problems contained in PT. Sansyu Precision Indonesia, we need a facility that can manage itsinformation supply chain. Therefore, Supply Chain Management (SCM) is the right choice to handle these problems because the function of Supply Chain Management (SCM) itself is to integrate business processes fromprocurement material to end users.

The purpose and objective of this research is based on the problems that occur, then to build a Supply Chain Management Information System at PT. Sansyu Precision Indonesia. The Purpose of Supply Chain Management at PT. Sansyu Precision Indonesia is as follows:

1. Assisting the Head of Planning Production & Inventory Control (PPIC) in determining the product completion time until the product is delivered to the customer , the right solution is the estimated product schedule until the product is delivered to the customer.
2. Assist theHead Material Control in determining the amount ofprocurement material that must be ordered to the supplier.
3. Helping the Head of Sales & Delivery in determining the scheduling of product delivery to each customer who has made an order to be on time.
4. Helping customers to order products and submit suppliers.

2. RESEARCH CONTENTS

2.1 Theoretical

Basis The theoretical basis is the collection of definitions and concepts from various sources. The foundation of this theory is a strong foundation in a study, so some of the theoretical basis described is a supportive theoretical basis for Supply Chain Management at PT. Sansyu Precision Indonesia.

2.1.1 Information Systems

According to Jacob "The system is a collection of elements that interact to achieve a particular goal. Information is data that is processed into a form that is more useful and more meaningful for those who receive it. "(Jacob, 2012)

Whereas according to Fathansyah" The system is a network of related procedures, collected together to carry out certain activities or objectives. Information is data that has been processed into a form that is more meaningful and useful for recipients who will later be used to make decisions today and in the future. "(Fathansyah, 2007) The

author can conclude from two opinions that information systems are a collection of elements or even a network of procedures that interact and relate to achieve a specific activity or purpose that is useful for the recipient for the present and the future.

2.1.2 Supply Chain Management (SCM)

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

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

Whereas according to I Nyoman Pujawan and Mahendrawati"Supply Chain Management (SCM) is an integrative method or approach to managing product flow, information and integrated money involving parties ranging from upstream to downstream consisting of suppliers, factories, distribution networks and logistics services. "(Pujawan & ER, 2010)

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

1. The first is the flow of goods flowing from upstream(upstream)to downstream(downstream).
2. 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 themodel supply chain and 3 types of managed flows can be seen in Figure 1.

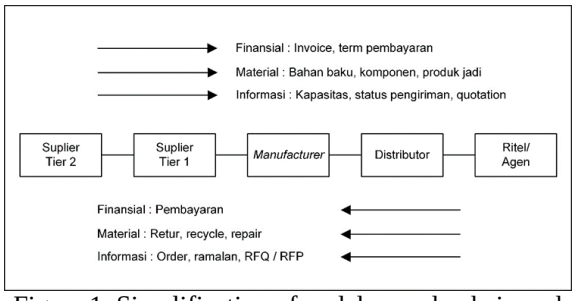


Figure 1. Simplification ofmodels supply chain and 3 kinds of flow

2.1.3 Coverage Area of Supply Chain Management

According to Pujawan the main activities included in the classification of Supply Chain Management is as follows (Pujawan & ER 2010):

1. Activity of designing new products(productdevelopment)
2. activities to obtain raw materials(procurement,purchasing or control)
3. activities planned production and supply(planningandcontrol)
4. Activity doing production(production)
5. activity is sending / distribution(distribution)
6. of product returns management activities / goods(return)

2.1.4 component supply Chain management

According to James A. and Mona J. Fitzsimmons there are some basic components that are interconnected in the application of supply chain management including planning(planning),resources(source), production process (make), delivery (deliver), and pe ngembangan(return).(Fitzsimmons & Fitzsimmons, 2004)

1. Planning(planning),is one portion of a company's strategy need a strategy to manage all the resources needed to produce a product that is desired by the customer. The regulatory strategy includes the arrangement and supervision of supply ormaterials supply, so that they can be used efficiently, cheaply and can produce high-quality and high-value products.
2. Source (source), in this case the company needs to choose a supplier who can send goods or services needed to produce a product. It is also necessary to review the price of supply materials offered, supervision in terms of shipping and payment to suppliers so that the working relationship can be fostered properly.
3. The production process (make), is a step in the process of producing goods or services that will be provided to customers. Must be scheduled on the important activities during the production, testing and packing(packing),and preparation for delivery. Observations that need to be made during this production are measurements of product quality that will be produced, output of finished goods, and worker productivity.
4. Delivery(deliver),this shipment could also be known as logistics. This needs to be done is coordinating the receipt of orders from customers, developing warehouse networks, returning products to then be sent to customers, and establishing a billing system for customers.
5. Return(return),this return is one of the problems in the supply chain. Things that need to be considered are anticipatory steps if there are product returns from customers.

2.1.5 Push and Pull Supply Chain

According to Chopra and Meindel "Theprocess is pull based on customer orders, while theprocess push begins and is done by anticipating customer orders." (Chopra & Meindel, 2007)

Pull supply chain is a "production strategymake-to-order"whose main benefits are avoid waste inventory or is a company strategy, especially a manufacturing company where new production is carried out always after market demand and actually done at the request of the customer.

Push Supply Chain is aproduction strategy Make-to-Stock. This strategy is the opposite of the Pull strategy where in pull appeal, the push strategy is more popular because the production system is based on forecasting and produces large amounts of output that will be entered into inventory before being distributed to customers.

This strategy has a focus on activity efficiency and standardization. Push strategy can be connoted to lean supply. The more companies have fewer product variations, then this strategy is right. However, for products with changing market situations, the use of a push system will bring some losses, such as:

1. Inability to meet changing market demands.
2. accumulation Inventory that will bring a lot of waste and requires a lot of storage space.
3. batch Large production.
4. Risk of obsolete products large.

2.1.6 Economic Order Quantity (EOQ)

According to Alan Nur Aditya EOQ (Economic Order Quantity) is a simple model that can be used to determine an economical order size. This model considers two costs of inventory, namely the cost of messages and the cost of storage. The cost of the message in question is the fixed costs that come out every time the order is made and does not depend on the size or volume of the order. While the cost of storing is the cost that occurs due to the company storing the item for a certain period. The EOQ method is made with a number of assumptions. That is, this model can only be used well enough if a number of assumptions are met or at least approaching. The first assumption is that the demand

for an item is continuous with a uniform level. That is, the item is needed in the same amount from time to time. In reality, this assumption was never fulfilled, but this model is still good enough to be used as long as the variation in demand over time is not too large. In the field there are many cases where the demand or need for an item is relatively fixed over time. (Alan Nur Aditya, 2011)

According to Agus Ristono in the EOQ formula, carrying costs are represented as an average annual cost per unit of inventory in hand. The following are the main components of recorded costs. (Agus Ristono, 2008)

1. Interest, If you have to borrow money to pay for your inventory, the interest rate will be part of the carrying amount.
2. Insurance, Because insurance costs are directly related to the total value of inventory, you will enter this as part of the recorded costs.
3. Taxes, If you are asked to pay taxes on the value of your inventory they will also be included.

In general, storage costs for the company take all costs associated with the warehouse and are divided by the average inventory to determine the percentage of storage costs of EOQ calculations. This tends to include costs that are not directly affected by inventory levels and do not offset storage characteristics. Registered costs for the purpose of EOQ calculation should only be costs that are based on inventory level variables.

According to I Nyoman Pujawan the EOQ model can be used to determine the quantity of inventory orders that minimizes the direct costs of storing inventory and the inverse cost of ordering supplies. (I Nyoman Pujawan & Mahendrawathi ER, 2010)

The formulation of EOQ that can be used is:

$$EOQ = \sqrt{\frac{2SD}{H}} \qquad (1)$$

S = H / D

(2) The following is how to determine the number of orders estimated during the year (N) and the time between the estimated order (Q), which can be seen, among others:

Estimated number of orders = N

$$Jumlah\ pesanan\ yang\ diperkirakan = N = \frac{permintaan}{kuantitas\ pesanan} =$$

= request / order quantity = D / Q

(3)

Time between estimated orders:

T = number of working hours / N (4)

Description:

D = number of goods (unit / year)
S = order cost (rupiah / order)
h = storage cost (% of item value)
C = item price (rupiah / unit)
H = hx C = storage cost (rupiah / unit / year)
Q = number of orders (unit / order)
F = frequency of order (times / year)
T = time interval between orders (year, day)
TC = total inventory cost (rupiah / year)

2.2. Problem Analysis Problem

analysis is an assumption of the problem that will be described in the data processing procedures. Based on interviews with the respective heads of departments at PT. Sansyu Precision Indonesia. Analysis of the problems of the current system are:

1. Head of Planning Production & Inventory Control (PPIC) difficulties in determining the product completion time until product delivery.
2. Head has Material Control difficulty in determining the amount ofprocurement material that must be ordered to the supplier.
3. Head of Sales & Delivery has difficulty in delivering products along with vehicle capacity to each customer who has made an order to be on time.

2.3 Analysis Supply Chain Management(SCM)

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

2.3.1 Model Supply Chain Management (SCM) at PT. Sansyu Precision Indonesia

Based on the SCM analysis described in the previous section, themodel supply chain contained in the PT Downstream Industry. Perkebunan Nusantara VIII Figure 2.

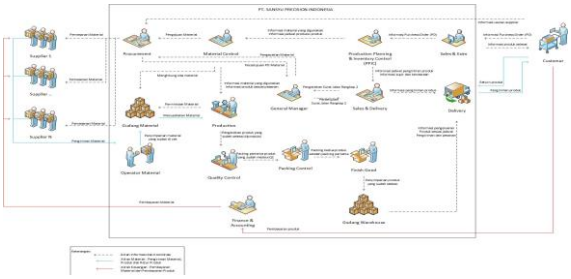


Figure 2.model Supply chain at PT. Sansyu Precision Indonesia

2.3.2Analysis Supply Chain at PT. Sansyu Precision Indonesia

analysis is Supply chain done to describe theprocess supply chain management that will be built at PT. Sansyu Precision Indonesia based on themodel supply chain in Figure 2. Theanalysis supply chain can be seen in Figure 3.

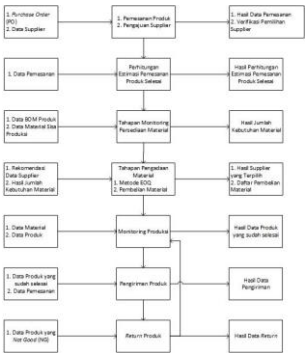


Figure 3. Supply Chain Management Stages at PT. Sansyu Precision Indonesia

1. Product

Orderingorders Customer are the beginning of aactivity supply chain at PT. Sansyu Precision Indonesia. Customers will order automotive and electronic component products to the Head of Sales & Exim for at least 100 pcs of products and submit one supplier to the Head of Procurement, each product ordered by the customer is not the same as customers other. In this ordering stagedata customer,, product, supplier, product calculation and product calculation are needed.

2. Estimated Calculation of Finished Product Ordering

After the customer orders the product, the Head of PPIC estimates the finished product until the product is shipped based on the order data. Estimated product orders are calculated from after ordering products made by the customer. Take into account the estimated order of finished products until product delivery is based on the business rules of the company.

3. Material Monitoring Stages Material

monitoring is carried out to find out if there are residual production materials in the warehouse or not. Material monitoring also aims to find out material requirements for production needs. In the monitoring phase the material requires data from the Bill of Material (BOM) product and residual production material data that will produce a number of material requirements.

Before knowing the amount of material needed will determine the Bill of Material first. The calculation is in accordance with the business rules of the company and the company adds every 10% of material from the material order the purpose is to anticipate defects in the product when it is produced.

The form of material that will be used as a product is in the form of plastic seeds, each material will be different types of material. One material with other material will also differ in content in the material that is with the sack unit, 1 sack there is 50 kg.

4. Material Procurement Stages

At the stage of material procurement, after knowing the amount of material needed and lack of material atwarehouse Warehouse. There are 2 stages in the procurement of materials, namely:

a. **Method EOQ**

Before buying material to the supplier, it will be calculated first by the EOQ method. First determine the method of calculating inventory from telephone costs and transportation costs after getting the results. Calculate the storage costs obtained from the electricity costs in the warehouse and the cost of reserves if there is damage the results are added up.

After knowing the results of the two methods can calculate the EOQ method, the amount of material purchases becomes economical by using the EOQ method. In the EOQ method there are the number of orders, the amount of material purchase, the time between orders and the order frequency. The purpose of the EOQ method is to be able to repay material purchases to suppliers found in the order frequency.

b. **Material Purchase Material**

purchases are made after the amount of material purchase to the supplier. Material purchases are obtained from the calculated EOQ method.

5. Monitoring Production

Supplier will send materials that are in accordance with company orders. Waiting time for material delivery from suppliers is around 1 to 3 days.

After the material is available according to the order. The material will immediately go through the production process, after which it is checked in the Quality Control, sections Finish Good, and Packing.

6. Product Delivery Product

delivery is carried out after the product is finished through theprocess Packing. The Head of Sales & Delivery will determine the delivery schedule and the capacity of the vehicle that will be given to thesection Delivery to be sent to the customer.

7. Product Returns Products

have gone through QC does not rule out the possibility of disability or Not Good (NG). Thetime limit is return productnot limited so the customer canreturnreturn the NG productto the company.

2.4 Database

Analysis Analysis of the database on Supply Chain Management at PT. Sansyu Precision Indonesia which will be built using Entity Relationship Diagram (ERD). ERD is a data model that uses several notations to describe data in the entity context and the relationships described by the data. The diagram is illustrated in Figure 4.

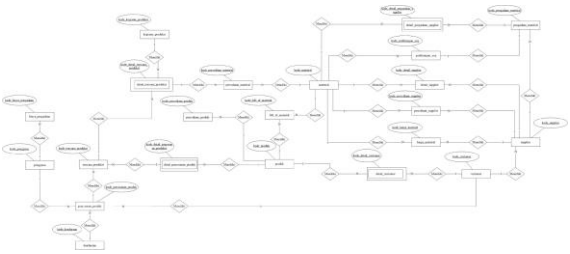


Figure 4. Entity relationship diagram of supply chain management at PT. Sansyu Precision Indonesia

2.5 Context Diagram Context

diagram is a model to explain globally how data is used and transformed to process or describe the flow of data into and out of the system. Context diagram in the system can be seen in Figure 5.

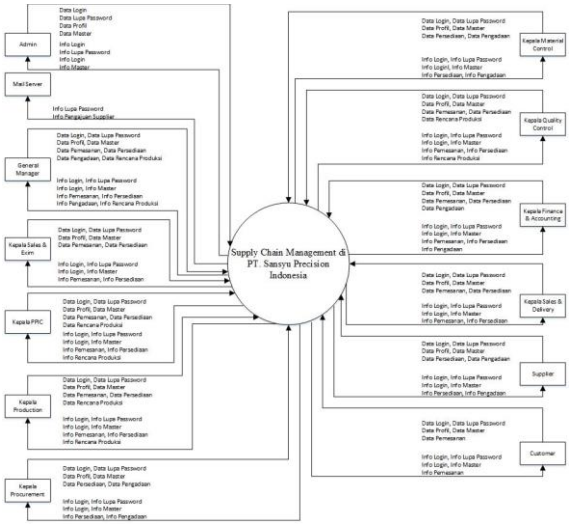


Figure 5. Supply chain management context diagram at PT. Sansyu Precision Indonesia

2.6 Data Flow Diagrams (DFD)

Data flow diagrams show how the data flow describes the processes that occur in the system until the process is more detailed. In context diagrams such as Figure 5. can be described into several DFDs.

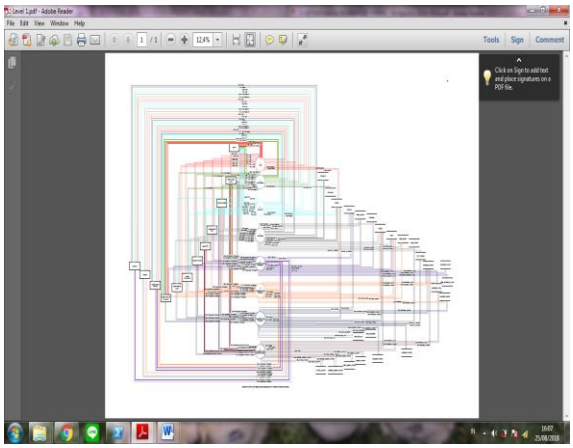


Figure 6. DFD Level 1 supply chain management at PT. Sansyu Precision Indonesia

2.7 Table Relationships

Table relationships describe the relationship between data, the meaning of data and its limits. The process of relations between attributes is a combination between attributes that have the same primary key, so that these attributes become a single unit that is connected by the field key. The relation table will be explained in Figure 7.



Figure 7. Table of supply chain management relations at PT. Sansyu Precision Indonesia

2.8 Interface

Design The interface design is designed to describe the program view that will be used by users to interact with the system to be built. The design is based on the interface both input and output that will be generated when the application is implemented. Here is an example of designing ainterface login which can be seen in Figure 8.

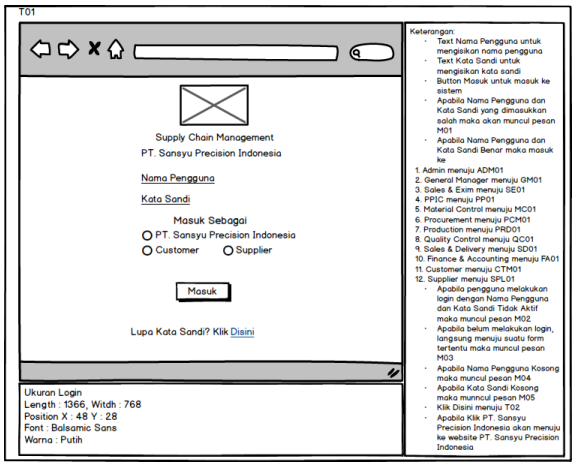


Figure 8. T01 Designing aInterface Login

2.9 Semantic NetworkSemantic

Designnetwork design is a representation of interface design that shows where each interface is

connected. Semantic network design in supply chain management at PT. Sansyu Precision Indonesia can be seen in Figure 9.

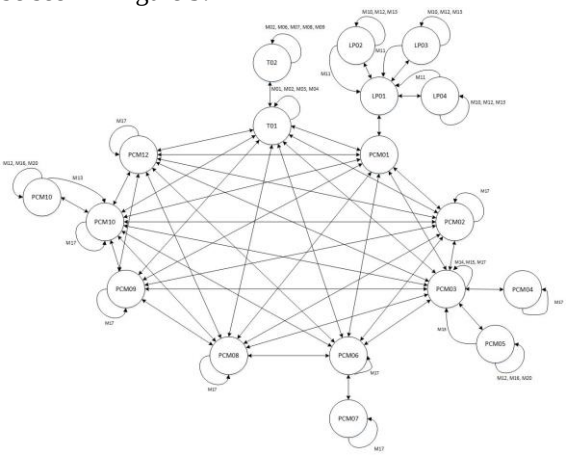


Figure 9. Designing a Semantic Head ofHead Users Procurement

2.10 SystemSystem

Testingtesting is the most important thing that aims to find errors or shortcomings in the system being tested. The test intends to find out the system made has fulfilled the performance in accordance with the design objectives.

The first test used to test the new system is thetesting method black box, the two tests are focused on receiving users (end users) using UAT (User Acceptance Testing), the three tests are focused onacceptance user (end user).

1. **Testing Black Box**

testing Black box is focused on the functional requirements of software built.

Testing is done by testing each process for possible errors.

Based on the results of testing with thecase sample testthat has been carried out gives the conclusion that the process is correct. Filtering process errors in the form of directional message page views is quite maximal. Functionally the system can produce the expected output.

2. **Testing of User Acceptance Testing (UAT)**

Testing focused on receiving users (end users) using UAT (User Acceptance Testing) that aims to finddefectsnewthat are not found by the developer and in the software testing process involving potential users found in the company chosen by the developer and accompanied by the test.

3. **End User**

Testing Testing focused onacceptance user (end user) is testing the end user acceptance after the system is implemented in the company environment by using interviews to end users who use the software.

Interviews are conducted for users of the system consisting of administrators, administration, directors, procurement, warehouse, procurement, marketing, production and supplier fields. This research was conducted at PT. Sansyu Precision Indonesia in order to find out the extent to which the system built can be a solution and the solution to the problems described earlier.

Based on the end user testing, it can be concluded that: The

1. system helps the General Manager, administrator, Head of Sales & Exim, Head of PPIC, Head of Material Control, Head of Procurement, Head of Production, Head of Quality Control, Head of Sales & Delivery, Head of Finance & Accounting, Customer, and Suppliers in carrying out each job.
2. The system that has been built is quite easy to use after a guide.
3. The interface display in the system is easy to understand.
4. The language used in the system is quite easy to understand.

4. CLOSING

In this section, describes the conclusions that contain the results obtained after the analysis, design, and implementation of the software design that has been developed and has been developed as well as suggestions that will provide important notes and possible improvements that need to be made for device development soft before.

3.1 Conclusion

Based on the results obtained in this final assignment, the following conclusions can be drawn:

1. This information system can facilitate theHead Production Planning & Inventory Control (PPIC)in determining the product completion time until the product is delivered to the customer.
2. This information system can facilitate theHead Material Control in determining the amount ofprocurement material that must be ordered to the supplier.
3. This information system can facilitate the Head of Sales & Delivery in determining the scheduling of product delivery to each customer who has made an order.

3.2 Suggestions

Suggestions aim for the development of information systems in the future that can be carried out, including:

1. Information systems need development such as E-commerce to facilitate ordering transactions.
2. Can manage payment data that already exists in the information system that has been built.
3. Information systems need development with Customer Relationship Management (CRM).

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