# SYSTEM INFORMATION DEVELOPMENT SUPPLY CHAIN MANAGEMENT IN PT. MIPACKO FARRELA

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## ABSTRACT

PT. Mipacko Farrela is a textile industry company, it have products with the main material is microfiber. The Products is various kinds of towels, various kinds of rags, handkerchiefs, kimonos, baby blankets, carpets, bed sheets, doormats and napkins. Production Manager in this company have a problem about determine the amount of raw material when product demand increases there will be a shortage of raw materials so Production Manager have to buy finished product to another company and the Warehouse Supervisor encountered problems with the delivery schedule when the product to be distributed is not same as order. PT. Mipacko Farrela uses the make-to-stock strategy, which is to always keep the inventory of raw materials and products before the customer places an order, so its need a system about supply chain management, to plan the amount of raw material needs using a single moving average method to avoid a empty or lack of raw materials, monitoring raw material inventory using the safety stock method and ensuring delivery scheduling same as the order so there is no problem. The test results using Black Box, UAT and Beta can be concluded that this system helps the Production Manager to plan raw materials, and helps the Warehouse Supervisor to schedule deliveries to customers.

**Keywords :** Supply Chain Management, Make To Stock, Single Moving Average, Safety Stock

## 1. INTRODUCTION

. Mipacko Farrela is a company engaged in the textile industry that has a product with the main ingredient in the form of microfiber. Products produced include various kinds of towels, various kinds of rags, handkerchiefs, kimonos, baby blankets, carpets, bed sheets, doormats and napkins. Production system at PT. Mipacko Farrela uses the make to stock strategy for products and raw materials, namely the production of products before ordering from customers and has a series of work ranging from upstream to downstream [1]. The series of work systems in the upstream section carried out by PT. Mipacko Farrela towards suppliers, namely the Supervisor Purchasing, orders and receives raw materials based on requests from the Production Manager to be processed into finished products. While the activities contained in the downstream section carried out by PT. Mipacko Farrela with Customers namely Marketing Admins to do product sales and Warehouse Supervisors carry out the distribution process to Customers who have purchased the product.

The results of the interview with Mr Kemil as a Production Manager, stated that the procurement of raw materials is carried out only once every month based on the product sales report in the previous month requested from the Accounting Supervisor, so that the product production process varies every month because there are product sales increasing and decreasing, as an example for the most sold bath towel products, in January the product sold 15000 pcs, in February the product sold 14300 pcs, in March the product sold 10000 pcs, in April the product sold 15,000 pcs, in May products sold 27000 pcs, in June the product sold 1500 pcs, in July the product sold 2500 pcs, in August the products sold 14300 pcs, and when in January the number of production of bath towels could not be sufficient because the remaining supplies of raw materials for microfiber cloth were only 250 while the roll to be produced requires 683 roll. The production process does not go well because of a shortage of raw materials and must order raw materials in the following month, so the company must purchase products to other companies with the price of producing products that are more expensive than the price of product production at PT. Mipacko Farrela and for the selling price of the product to the Customer remain the same, resulting in the profits that PT. Mipacko Farrela is reduced. Therefore the Production Manager has difficulty in determining the amount of raw material for the product based on product sales data in the previous month so that the current product stock in Gudang suffers when the demand for the product rises in the following month, and the Production Manager overcomes it by buying the product so from other companies so as not to disappoint customers.

The results of interviews with Ms. Dian as Warehouse Supervisor , stated that ordering products from customers will be handled by the Marketing

Admin by way of customers being able to place orders by telephone or directly come to PT. Mipacko Farrela , payment can be made in cash or transfer. After the payment process is complete Warehouse Supervisors process the product distribution to Customers in 2 ways based on the location of the Customer, if the location of the Customer is in the area of Bandung then use the company-owned vehicle in the form of 1 unit box with a capacity of 80 boxes, 1 unit pickup box with capacity 40 boxes are large and if the customer's location is outside Bandung, it will be sent using shipping services such as Wahana Prestasi Logistik, Indologistic and DHL. The distribution process experiences problems such as the number of products to be sent is not the same as the number of products ordered by the customer because the stock of products in the warehouse is less or even empty, resulting in a longer duration of delivery than previously prepared. It also makes shipping products outside the city that use shipping services suffer losses on the part of customers and shipping services so that it has an impact on company profits and company relations to customers.

The results of the presentation found a problem that exists today at PT. Mipacko Farrela, which is needed an Information System Development Using the Supply Chain Management Approach that can regulate raw material management and delivery scheduling management.

The purpose of building this information system is:

a. Assisting the Production Manager in determining the right amount of raw material for planning the amount of production so that when there is a shortage of raw materials, it does not purchase products from other companies.

b. Warehouse Supervisor assist in regulating the product delivery schedule in accordance with the order so that the process pendistribusia nb erjalan smoothly, according to customer orders.

## 2. RESEARCH CONTENT

### 2.1. Landasan Teori

The foundation of the theory aims to provide an overview of the sources and studies of the theories relating to system development .

#### 2.1.1 Sistem Informasi

The system is a network wherein there are procedures that are interconnected and work together to carry out activities or achieve certain goals [6] . In general, information is data that is processed into a form that is more useful and more meaningful to recipients, which will later be used to make decisions both now and in the future. The function of information is to reduce uncertainty in the decision making process about a situation.

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#### 2.1.2 Supply Chain Management (SCM)

Supply Chain is a system for distributing production goods and services to customers and is also a network of various organizations that have a relationship with each other to achieve the same goal, namely trying as best as possible to procure these goods and services [1]

The concept of supply chain is a logistical problem that can be seen as a broad problem, starting from basic materials to finished goods used by end customers which are the supply chain of goods so that it can be said as L ogistic Network . In this connection, the main components who have the same interests, namely [1]:

##### 2.1.2.1 Component of Supply Chain Management

Supply Chain Management has 3 main components that support the running of a business process as follows [1 ]:

1. Upstream Supply Chain

Part of Upstream (upstream), the overall activities of manufacturing companies with their distribution or distributor relations can be expanded to several levels. The main activity in Upstream Supply Chain is procurement of goods.

2. Internal Supply Chain

This part of the Internal Supply Chain is the process of shipping goods to the warehouse. The main activities in the Internal Supply Chain are management of production, fabrication and inventory control.

3. Downstream Supply Chain

Downstream (downstream) supply chain includes all activities that involve the delivery of products to end customers. In the downstream supply chain, attention is directed to distribution, transportation warehousing and after-sale service.

##### 2.1.2.2 Supply Chain Management Process

The product processing process starts from raw materials, semi-finished products until finished products are obtained and then sold through various facilities connected by chains throughout the product and material flows . When described in form the chart will appear as follows:

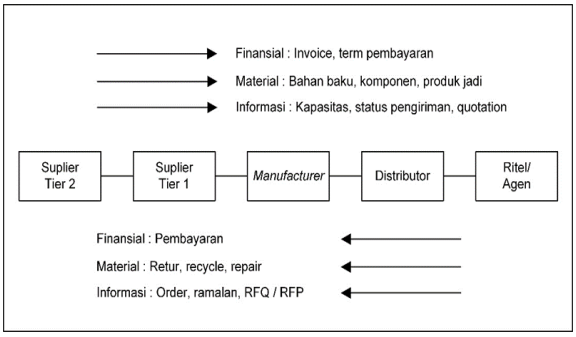


**Figure 1** Supply Chain Process and 3 types of flow managed

Show that supply chain management is the coordination of material, information and finance among participating companies.
1. First is the flow of goods flowing from upstream to 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.

**2.1.2.3 Types of Supply Chain Management**

The following are common types of supply chains:

1. Integrated make-to-stock

This supply chain model traces the possible customer demand for a time, so that the production process can procure inventory goods efficiently. This can be overcome by using an integrated information system that is, companies can find out information about customer requests at the right time, so that information can be used to develop and modify planning and production schedules.

2. Continuous Replesnishment

In this supply chain model, procurement of goods is carried out continuously. This type is very suitable for a corporate environment where customer demand patterns are stable.

3. Build-to-order

In this supply chain model, assembly of finished goods is done when the customer has made a request or order for the item.

4. Channel Assembly

Channel assembly is a modification of the build-to-order model. This supply chain model, the process of assembling goods occurs when the goods are moved on the distribution line.

**2.1.2.4 Push dan Pull Supply Chain Management**

Pull supply chain is a Make-to-Order production strategy whose main benefit is to avoid waste inventory or the company's strategy, especially manufacturing companies where new production is carried out always after the sale of the market and is really done on orders from customers.

Push Supply Chain is a Make-to-Stock production strategy. The push system is basically a system of planning and controlling production [4]. Push strategy is more popular compared to the pull system because the production system is based on forecasting or forecasting and produces large amounts of output which will later enter into inventory before being distributed to customers.

**2.1.3 Peramalan Single Moving Average**

The single moving average method uses the average of all forecasting data. This moving average is more used to forecast the next period. The formula for a moving average singlet can be seen in Equation 1 [2] :

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

Information:
$S_{t+1}$ = Forecast for periode ke t+1.
Xt = Data in period t.
n = Moving Averages period

**2.1.4 Calculating forecasting errors**

Calculating errors is usually used Mean Absolute Error Square. or Mean Square. Mean Square Error (MSE), which is the average of forecasting errors squared and can be seen in equation 2 :$MSE = \frac{\sum(|X_t - F_t|)^2}{n}$ (2)

Information:
MSE = Value of mean squares error
$X_t$ = Actual data in period t
$F_t$ = Forecast data from the model used in period t
N = Lots of forecast data

Calculating forecasting errors is used to determine the accuracy of the forecasting results that have been made on the actual data.

**2.1.5 Safety Stock**

Inventory can be classified in various ways, one of which is based on its function. Safety stock is one example of a stock based on its function, namely the Company hold more than required during a given period so that when the need for more can be met without having to wait. The size of the safety inventory is related to inventory costs and service level [1] . The amount of safety stock (SS) in general can be formulated as follows in Equation 3 :

$$SS = Z \times S_{dl} \quad (3)$$

Information:
Z = The value of a standard normal distribution table that correlates with a certain probability. Usually the z value correlates with service level .
$S_{dl}$= Standar deviasi permintaan selama lead time.

Value $S_{dl}$ b can be searched by collecting direct demand data during the lead time for a long enough period, or obtained first to obtain the average data and standard deviation of the two constituent components, namely demand per period and lead time. By getting the four parameters then the value $S_{dl}$ can be calculated as follows in Equation 4 :

$$S_{dl} = \sqrt{(d^2 \times S_{;}^2 + l \times {S_d}^2)} \quad (4)$$

Information:
$d^2$ = Average request
$S_{;}^2$ = Standard deviation lead time
$l$ = Lead time
${S_d}^2$ = Standard demand deviation per period.

### 2.3 Research Methods

The research methodology is a process used to solve a logical problem. In making this research used descriptive research methods that describe facts and information systematically, factually, and accurately. The flow of this research is illustrated in Figure 2

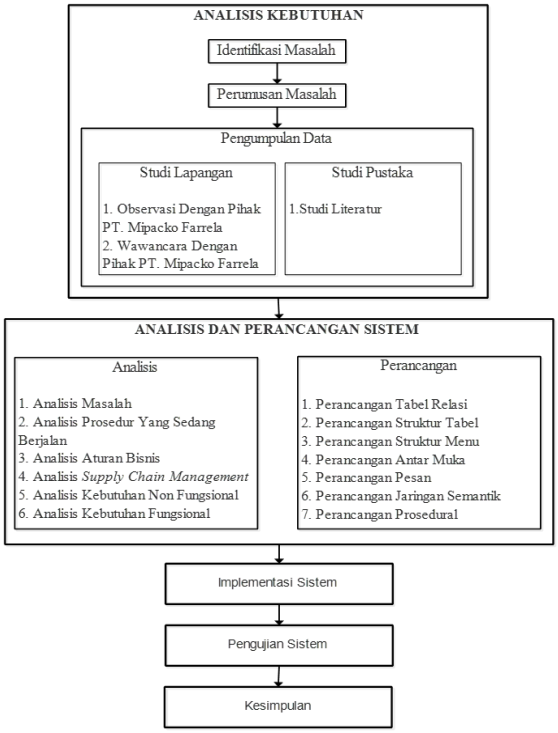


**Figure 2** Research Methodology

### 2.2 Analysis of Problems

Problem analysis is an assumption of the problem that will be described in data processing procedures in the Information System development program using the *Supply Chain Management* approach at PT. MIPACKO FARRELA. Analysis of the problem of the system currently running is:

1. The absence of efficient planning of raw material needs to meet the number of products each month, which is often lacking when demand for products increases so that it must buy products from other parties so as not to disappoint customers.
2. There was a delay in delivery due to a lack of product stock in the Warehouse so that it was not in accordance with the order which resulted in disruption of the delivery schedule.

### 2.3 Analysis of Stages of Supply Chain Management at PT. Mipacko Farrela

Analysis of the supply chain stages is carried out to describe the Supply Chain Management process that will be built at PT. Mipacko Farrela. Analysis of the stages of supply chain at PT. Mipacko Farrela can be seen in Figure 3


Figure 3 Analysis of the stages of *Supply Chain Management* at PT. Mipacko Farrela

The explanation of the analysis stages in figure 2 is as follows :

1. Analysis of Product Production Plans

The analysis of the production plan to be carried out is to predict the number of products that must be produced as a reference for making a list of raw material requirements. Forecasting techniques used are quantitative forecasting techniques with time series analysis models (time series). The technique is chosen based on past (historical) data and projects the data into the future. The data that will be used as a sample is data on the sales of Bath Towel products. The product data was taken because of the sale of Bath Towels is the most sold product in the period January 2016 - December 2017 among other products. Table 1 is the sales data of Bath Towels .

**Table 1** Data on Bath Towel Sales

| **Month** | **Year** | |
|---|---|---|
| | **2016** | **2017** |
| | **Sold Products** | |
| January | 15000 | 34000 |
| February | 14300 | 1500 |
| March | 10000 | 1000 |
| April | 15000 | 15000 |
| May | 27000 | 1010 |
| June | 1500 | 1500 |
| July | 2500 | 10000 |
| August | 14300 | 14300 |
| September | 4700 | 10000 |

| | | |
|---|---|---|
| October | 15000 | 15000 |
| November | 27000 | 1500 |
| December | 2000 | 100 |

The next step is forecasting using the Single Moving Average method . The period of the moving average value used is the period of 3 months and 5 months

a. Calculation of 3 Months Period

A 3 month forecast period is obtained with enter 3 months order data before the month which will be predicted. Suppose we will predict in January 2018, this means requiring order data in December, November and October in 2017 . The following formula used can be seen in Equation 1

$$F\ Januari\ 2018 = \frac{\begin{matrix}\text{X } desember2017 \\ +\text{X } november\ 2017 \\ +\text{X } oktober2017\end{matrix}}{3}$$

$$F\ Januari\ 2018 = \frac{100 + 1500 + 15000}{3}$$

$$F\ Januari\ 2018 = 5533{,}333 = 5553$$

b. Calculation of 5 Months Period

5- month period forecasting is obtained with enter 5 months order data before the month which will be predicted. Suppose we will predict in January 2018, it means requiring ordering data for the month of December, November, October, September, August in 2017. The following formula is used can be seen in Equation 1

$$F\ Januari\ 2018 = \frac{\begin{matrix}\text{Xdesember2017} \\ +\text{X novemeber 2017} \\ +\text{Xoktober2017} \\ +X\text{septemeber 2017} \\ +X\text{agustus2017}\end{matrix}}{5}$$

$$F\ Januari\ 2018 = \frac{100 + 1500 + 10000 + 14300}{5}$$

$$F\ Januari\ 2018 = 8180$$

Here are all the results of forecasting with using a single moving forecasting method average can be seen in Table 2

**Table 2** Bath Towel Forecasting Results

| | **Month** | **Sold Products** | **Single Moving Average** | |
|---|---|---|---|---|
| | | | **3 Month** | **5 Month** |
| **Year 2017** | Juli | 10000 | - | - |
| | Agustus | 14300 | - | - |
| | September | 10000 | - | - |
| | Oktober | 15000 | 11433 | - |
| | November | 1500 | 13100 | - |
| | Desember | 100 | 8833 | 8483 |
| **2018** | **Januari (Hasil Peramalan)** | | 5533 | 8180 |

The forecasting used can be measured accuracy , to calculate the accuracy of the level error used in this research is the MSE method ( *Mean Square Error* ). The following formula used can be seen in Equation 2 is the result of MSE calculation (Mean Square Error) from forecasting towel products in a period of 3 months and 5 months can be seen in Table 3

**Table 3** Calculation of Mean Square Error

| **Month** | **Sold Products** | **3 months** | | | **5 months** | | |
|---|---|---|---|---|---|---|---|
| | | **Forecasting** | **Error** | **Squared Error** | **Forecasting** | **Error** | **Squared Error** |
| Juli | 10000 | - | - | - | - | - | - |
| Agustus | 14300 | - | - | - | - | - | - |
| September | 10000 | - | - | - | - | - | - |
| Oktober | 15000 | 11433 | -3567 | 12723489 | - | - | - |
| November | 1500 | 13100 | 11600 | 134560000 | - | - | - |
| Desember | 100 | 8833 | 8733 | 76265289 | 8483 | 8383 | 70274689 |
| Jumlah | | 33366 | 16766 | 223548778 | 8483 | 8383 | 70274689 |
| Rata-Rata | | 11122 | 5589 | 74516259 | 8483 | 8383 | 70274689 |

It was concluded that the month of January 2018 recommended the procurement of raw material is 5 months for the product's eba a multitude of bath towels 8180 pcs (the result of rounding).

Product composition of bath towels can be seen in table 4.

**Table 4** Bath Towel Product Composition

| No | Raw material | Size | Unit | Information |
|---|---|---|---|---|
| 1 | Microfiber Cloth | 50 x 100 cm | Roll | 1 Roll Width: 2 meters Length: 27.5 meters |
| 2 | Thread | 150 cm | Pcs | 1 Pcs Length: 2000 cm |
| 3 | Label | 1 pcs | Lusin | 1 Dozen : 12 Pcs |
| 4 | Polybag | 1 pcs | Lusin | 1 Dozen : 12 Pcs |
| 5 | Carton Box | 1 pcs | pcs | 1 pcs Length: 60 cm Width: 40 cm Height: 40 cm |

Then the need for raw materials to meet the results of forecasting as many as 8180 pcs can be seen in table 5

**Table 5** Bath Towel Product Composition Based on Forecasting

| No | Raw material | Calculation | Total Raw Material | Amount to be purchased | Information |
|---|---|---|---|---|---|
| 1 | Microfiber Cloth | 8180 x 1 | 8180 | 75 Roll | 1 Roll for Bath Towels to 110 pcs |
| 2 | Thread | 8180 x 150 cm | 1.227.000 cm | 614 Pcs | 1 Pcs for Bath Towels to 13 pcs |
| 3 | Label | 8180 x 1 pcs | 8180 pcs | 682 Dozen | 1 Dozen for Bath Towels to 12 pcs |
| 4 | Polybag | 8180 x 1 pcs | 8180 pcs | 682 Dozen | 1 Dozen for Bath Towels to 12 pcs |
| 5 | Carton Box | 8180 x 1 pcs | 8180 | 315 Pcs | 1 Pcs for Bath Towels to 26 Pc |

2. Raw Material Inventory Analysis

The next step is to do it monitoring raw material inventory and determining safe limits of raw materials that must be in warehouse raw material that aims to not occur shortages or vacancies of raw materials with using the Safety Stock method

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The number of forecasting in January 2018 = 8180 pcs

The number of working days in a bull n = 26 days

Procurement lead time to supplier (l) = 5 days

Average sales in one month (d)

= 8180/26 day = 315 pcs (rounded up)

Standar Deviasi Lead Time ($S_{;}$)

= 5 / 10 = 0,5

Standar Deviasi of demand ($S_d$)

= Number of workdays one month / 10

= 26 / 10 = 2,6

*Service Level* 96% (Z) = 1,75

$$S_{dl} = \sqrt{(d^2 \times S_{;}^2 + l \times {S_d}^2)}$$

$$S_{dl} = \sqrt{(315^2 \cdot 0{,}5^2 + 5 \cdot 2{,}6^2)}$$

$$S_{dl} = \sqrt{(24806{,}25 + 33{,}8)}$$

$$S_{dl} = \sqrt{24840{,}05}$$

$$S_{dl} = 157{,}61$$

$$Safety\ Stock = Z \cdot S_{dl}$$

$$Safety\ Stock = 1{,}75 \cdot 157{,}61$$

$$Safety\ Stock = 275{,}817 \approx 276$$

Safety Stock for each raw material for towel products with the amount of 276 pcs can be seen in table 6

**Table 6** Raw Material Safety Stock

| Safety Stock | Name of Raw Material | Product Requirement | Amount of Raw Material Needed | Information |
|---|---|---|---|---|
| 276 Pcs | Microfiber Cloth | 50 x 100 cm | 3 Roll | 1 Roll Width: 2 meters Length: 27.5 meters |
| | Thread | 150 cm | 21 Pcs | 1 Pcs Length: 2000 cm |
| | Label | 1 pcs | 23 Lusin | 1 Dozen: 12 Pcs |
| | Polybag | 1 pcs | 23 Lusin | 1 Dozen: 12 Pcs |
| | Carton Box | 1 pcs | 11 Pcs | 1 pcs Length: 60 cm Width: 40 cm Height: 40 cm |

3. Raw Material Procurement Analysis

In the analysis of raw material procurement, the warehouse part requests raw materials based on the needs of the production plan. Ordering of suppliers, among others, is the procurement process by ordering raw materials to suppliers via telephone or directly to suppliers. The amount of raw material ordered for bath towel products can be seen in Table 7

**Table 7** Amount of Raw Material that Must Be Purchased

| No | Name of Raw Material | Forecasting Towel | Remaining Raw Materials in the Warehouse | ( Amount of Product Raw Material + Safety Stock) - Remaining Raw Materials in the Warehouse | Amount to be purchased | Information |
|---|---|---|---|---|---|---|
| 1 | Microfiber Cloth | 8180 pcs | 0 Roll | (74 Roll + 3 Roll) – 0 Roll | 77 Roll | 1 Roll Width: 2 meters Length: 27.5 meters |
| 2 | Thread | 8180 pcs | 20 Pcs | (613 Pcs + 22 Pcs) – 20 Pcs | 615 Pcs | 1 Pcs Length: 2000 cm |
| 3 | Label | 8180 pcs | 0 Lusin | (682 Lusin + 23 Lusin) – 0 Lusin | 705 Lusin | 1 Dozen: 12 Pcs |
| 4 | Polybag | 8180 pcs | 1 Lusin | (682 Lusin + 23 Lusin) – 1 Lusin | 704 Lusin | 1 Dozen: 12 Pcs |
| 5 | Carton Box | 8180 pcs | 10 Pcs | (315 Pcs + 11 Pcs) – 10 Pcs | 316 Pcs | 1 pcs Length: 60 cm Width: 40 cm Height: 40 cm |

4. Production Analysis

In the analysis of production, the Production Manager schedules production plans. The number of products produced is calculated based on forecasting results divided by the number of working days in one month

The number of forecasting in July 2017 = 8180 pcs

Number of working days in one month = 2 6 days

Total Production = 8180/26 = 315

5. Analysis of Product Purchases

In the analysis of product purchase receipts, Marketing Admin accepts product purchases and accepts sales transactions for bath towel products with customers. Product purchases are made by the way customers come directly or call the Marketing Admin to make product purchase transactions.

6. Distribution Analysis

In this distribution analysis is the delivery of bath towel products to customers, based on the location of delivery if the shipment is in the city using company vehicles and if shipping is outside the city using shipping services .

7. Return Analysis

In return analysis is the return of products that have been received by customers to be returned to the company and return of raw materials that have been received by the company to be returned to the supplier.

## 2.5 Context Diagram

Context diagram explains how data is used and transformed for processes in the form of data flow into and out in the Information System using the *Supply Chain Management* approach at PT. Mipacko Farrela . Context diagram on the system can be seen in Figure 4

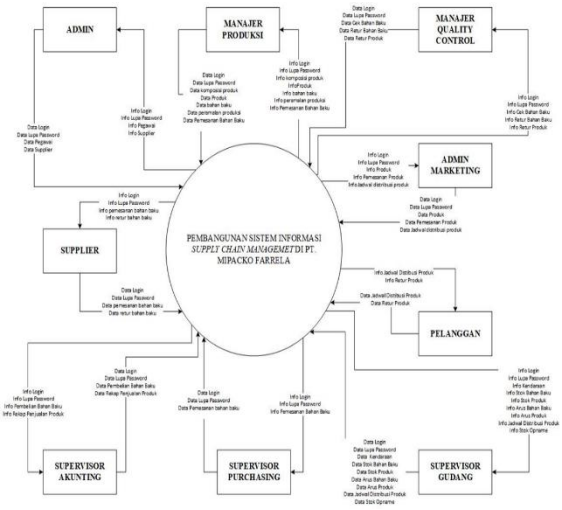


**Figure 4** Context Diagram at PT. Mipacko Farrela

## 2.6 Data Flow Diagram (DFD

Data flow diagrams show how the data flow describes the processes that occur in the system until the process is more detailed. The context diagram in Images can be broken down into several DFDs, which are divided into several levels. DFD Level 1 Information System uses the *Supply Chain Management* approach at PT. Mipacko Farrela can be seen in Figure 5 which explains in general what processes can be done on the system.

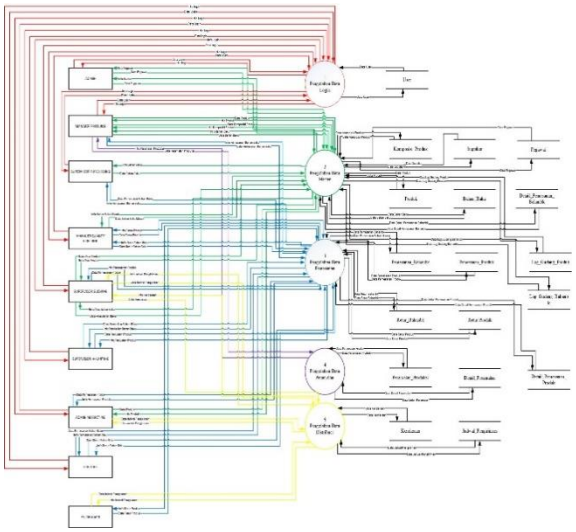

**Figure 5** Level 1 DFD Development of SCM at PT. Mipacko Farrela

## 2.7 Relationship Scheme

Relationship Scheme describes the relationship between data, the meaning of data and its limits. The process of relations between attributes is a combination of attributes that have the same primary key, so that these attributes become a single unit connected by that key field. Relationship Scheme of the Construction of the SCM Information System at PT. Mipacko Farrela can be seen in Figure 6

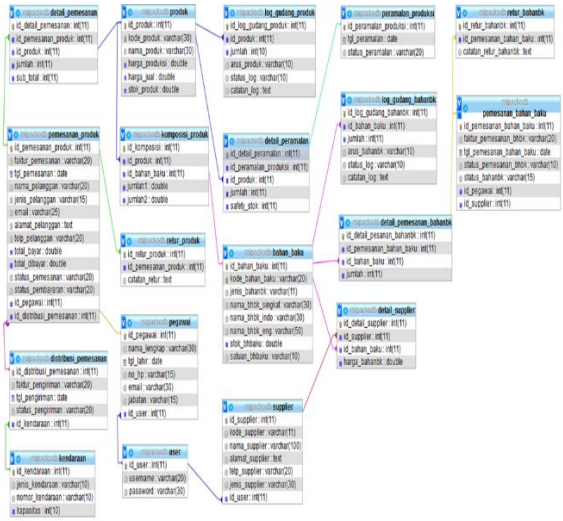

**Figure 6** Relationship Scheme

## 2.12 System Testing

System testing is the most important thing that aims to find errors or deficiencies in the information system being tested. Testing intends to find out information systems that have been made to meet performance in accordance with the design goals. Testing plan for systems built using Black Box, UAT, and End User Testing

### 2.12.1 Black Box Testing

*Black box* testing plan is used to explain testing of a system. This plan describes the sequence and things that are tested on the *supply chain management* information system at PT. Mipacko Farrela

### 2.12.2 User Acceptance Test

The newly built system must be tested for its suitability and reliability through the UAT test ( *user acceptance test* ) as a condition that the system has been accepted by the user. It can be said that UAT is a test to find a new *defect* that was not found by the developer.

### 2.12.3 Testing of End User Acceptance After Applied In Company environment

This test was conducted at PT. Mipacko Farrela to find out whether the system meets user expectations and works as expected. Users will assess the system using the interview method addressed to the Admin, Production Manager, *Quality* Manager *Control* , *Purchasing* Supervisor , Accounting Supervisor, Warehouse Supervisor, *Marketing* Admin , *Supplier* with questions that match the research objectives, so the questions given are clearer and more targeted.

## 3. CLOSING

This chapter will explain the conclusions that contain the results obtained after analysis, design, testing, and implementation of the design of software that has been built and developed along with suggestions that contain important notes and improvements that need to be made for the development of software

### 3.1 Conclusions

Based on the results obtained in this thesis, it can be concluded that the p Application of i nformation s ystem built *supply chain management* is can help the Production Manager to determine the number of products produced each month and also can help the Warehouse Supervisor in determining the product delivery schedule that matches the customer's order.

### 3.2 Suggestions

Suggestions are given for thesis research in the development of this system is p erlu the development and maintenance of the system already built, so that the system can be used according to need in the future dating and training to users of the system, so that the use and utilization of the system can be done with well.

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