DEVELOPMENT OF INFORMATION SYSTEM SUPPLY CHAIN MANAGEMENT (SCM) IN PT. BAIK RASA PERKASA

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ABSTRACK

PT Baik Rasa Perkasa is a company engaged in the manufacture of karoseri industry with various types of manufactured caroseries. Production is done by PT. Baik Rasa Perkasa if there is order from customer. In the process of booking the administration part is always wrong in informing the completion of the product to the customer. In the process of procurement of raw materials to suppliers so far the company still uses estimates by adding an average quantity of 35% of the amount of demand for some types of raw materials. The addition of these raw materials also often leaves raw materials stored in warehouses. The remaining raw materials of production are often damaged or decreased quality causing cost loss for the company. Other problems that arise namely the limited number of vehicles and vehicle capacity makes it difficult for companies in scheduling the distribution.

Supply Chain strategy used is pull supply chain, because the ordering of raw materials and new production is done after the customer demand and really done on customer demand or can be called make to order. Calculation of order estimation using genn chart, planning of raw material purchasing using Economic Order Quality (EOQ) method and distribution scheduling adjusted to vehicle number and capacity. Based on the problems that exist in PT. Rasa Perkasa then it needs an information system development Supply Chain Management.

Based on the test results can be concluded that the built system can facilitate the administrative head in providing information on the completion of production completion to the customer, facilitate the procurement head in determining the amount of procurement of raw materials to suppliers, and facilitate the head of distribution in arranging the scheduling distribution of products to customers with reference to the availability of vehicles along with its capacity.

Keywords: Supply Chain Management, Pull Supply Chai, Economic Order Quality

INTRODUCTION

PT Baik Rasa Perkasa is a company engaged in the manufacture of karoseri industry. PT. Baik Rasa Perkasa was established on August 27, 2015 by Mr. Bambang Nugraha Puspadikrama. PT. Baik Rasa Perkasa in production consists of the car body that is the frame / body of the type of Mitsubishi FE 71, Mitsubishi Colt L300 Pick-up, Mitsubishi L300 BOX, Mitsubishi T 120 SS Pick-up, Toyota Kijang Super KF40 / 50 Pick-up, Suzuki Carry Pick- Up Flat Deck and Suzuki Carry Pick-up Wide Deck. PT. . PT. Baik Rasa Perkasa might using a strategy make to order that the production process is done if there is order from customers.

Based on interviews conducted with Mrs. Seni as the administrative head who manages the booking states that the ordering of products from customers is done every working day at 08.30 - 15.00. The recap of the order is done within 10 days. Customers will be asked DP for 30% of the total product price to proceed to the production process. In the ordering process customers will be given information on the completion of the work and pengriman finished products are booked. However, during this time Mrs. Seni often receive complaints from customers because not reaching the completion of the product in accordance with the initial agreement, this will affect the process of scheduling delivery.. Furthermore, the interview was conducted with Mr. Bambang as the head of the procurement department. Mr. Bambang stated that the process of procurement of raw materials is done after the order of products from customers. The ordering of raw materials is done after the customer pays the DP. For the needs of raw materials are usually calculated the composition of each product multiplied by the number of products ordered. In the process of procurement of raw materials to suppliers so far the company still uses estimates by adding an average quantity of 35% of the amount of demand for some types of raw materials. The purpose of addition is to anticipate the defect of the product, but also to anticipate the late pengriman raw materials from suppliers for subsequent production, the result of the addition of these raw materials also often leaves raw materials remaining production stored in the warehouse. The remaining raw materials of such production often suffered damage or deterioration of quality causing cost losses for the company, besides the procurement which is still estimated also often lead to shortage of raw materials that result in cessation of production. Selanjutunya interview conducted with Mr. Tata as the head of delivery, delivery is done after the product

is completed. For the shipment of company products using 1 unit of Mitsubishi Dump Truck FE7 car with 4 shipping capacity for pick up type and 1 box type kaoseri. The limited number of vehicles and vehicle capacities makes it difficult for the company to deliver products to customers as shipping exceeds the vehicle capacity and delivery at the same time to multiple customers.

Based on the problems that have existed at this time, then PT. Baik Rasa Perkasa needs an information system development that can know the order estimation to give the completion time of production to the customer, arrange the raw material procurement management using Economic Order Quality (EOQ) method, delivery scheduling and vehicle according to the capacity of the vehicle to send the product to customer.

Based on the consideration of some problems that have been described then needed an information System "Development of Information Systems Suplly Chain Management (SCM) in PT. Baik Rasa Perkasa ".

Based on the description of the background above, then the existing problems PT. Good Rasa Perkasa is how to build supply chain management information system.

The purpose and purpose of this study are:

1. Facilitate the administrative head in determining the estimated ordering of products to be informed to the customer.
2. Facilitate the procurement head in determining the amount of raw material ordering to the supplier.
3. Facilitate the delivery of the delivery process by scheduling the delivery of the product to every customer who has made the order to be on time.

2. CONTENT of the STUDY

2.1. The Cornerstone Of The Theory

Theoretical basis on the writing of this thesis will explain the theories associated with the information system to be built at PT. Baik Rasa Perkasa

2.1.1. Information System

a. System is a network of procedures that are interconnected, gathered together to perform an activity or to complete a certain target while Information is data that is processed into a form that is more useful and more meaningful for those who receive it. The source of information is data. Data is a plural form of a single form of datum or data item. Data is a reality that describes a real events and unity. [1]

b. The system can be interpreted as a unified element of relevance. Some elements can be merged into a unit, group, or component of the system with a certain function while Information bears the meaning of benefits, if we can use it. Information means the meaning of effort, to get it, to understand it, to use it, to distribute it, to store it and to integrate it with other information into new information. [2]

With reference to the meaning of two sources above can be concluded that the Information System is a unity of interrelated elements to solve a particular purpose in which there are data that is processed into a form that is more useful if we can use it

2.1.2. Supply Chain Management

a. *Supply Chain Management* is a system for applying a total approach to managing the entire flow of information, materials, and services from raw materials through factories and warehouses to final consumers. Supply Chain Management is an integrative method or approach for managing an integrated flow of products, information, and money that involves parties from upstream to downstream. An important principle in SCM is the transparency of information and collaboration between the internal functions of the company and with the parties in the company along the supply chain [3].

b. *Supply Chain* Is a network of companies that work together to create and deliver a product into the hands of the end user. These companies usually include suppliers, manufacturers, distributors, stores or retailers while Supply Chain Management is a method, tool or management approach that is not only oriented to the company's internal affairs, but also external affairs involving relationships with partner companies [4]

Based on the above opinion it can be concluded that Supply Chain Management is a network of companies that work together and mutually benefit each other in controlling, managing and improving the flow of materials and information from suppliers to users. An important principle in SCM is the transparency of information and collaboration between the internal functions of the company and with the parties in the company along the supply chain

In the supply chain there are usually 3 kinds of flow that must be managed. Three kinds of flow that must be managed in the supply chain is as follows: [4]

1. First is the flow barag that flows from upstream (downstream) to downstream (downstream).
2. The second is the flow of money and the like that flows from downstream to upstream
3. Third is the flow of information that can occur from upstream to downstream or vice versa.

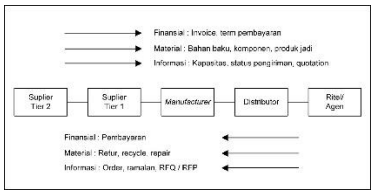


Figure 1. Simplification of Supply Chain Model and Three Types of Managed Flow

2.1.3. EOQ (Economic Order Quantity)

EOQ (Economic Order Quantity) is a simple model that can be used to determine the size of an economical order. This model considers two inventory costs - the cost of messages and the cost of saving. 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 storage is the cost incurred due to the company store the goods during a certain period.

Economic Order Quantity is a method used to optimize the purchase of raw materials that can reduce inventory costs so that the efficiency of the material inventory within the company can run well. The use of EOQ method can help a company in determining the number of units ordered to reach the cost of ordering and inventory costs to a minimum. Some of the Keuntunagan that can be given by EOQ is to eliminate the risk if the ordered material is not good so it must be returned, eliminating the risk of seasonal increase in price of goods or inflation, storing raw materials produced seasonally so that the company will not be difficult if the material is not available in the market , and others.

The purpose of the EOQ model is to minimize the total cost of inventory. Important costs are booking fees, order placement fees, and the cost of carrying or holding inventory units in stock. [6]

EOO formula that can be used is:

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

$$S = H/D \quad (2)$$

Information :

D: The expected use or demand per time period.

S: Booking fee (order preparation and machine setup) per order.

H: Storage cost per unit per year [6]

2.2. Model Supply Chain Management in PT. Baik Rasa Perkasa

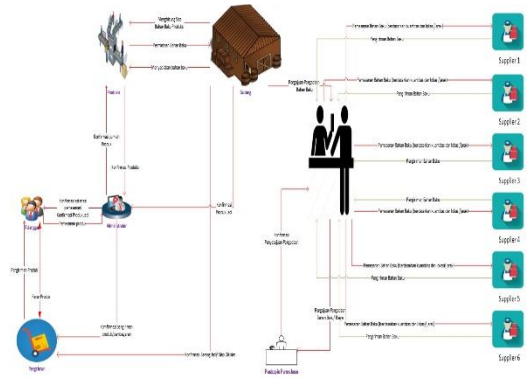


Figure 2. Model Supply Chain Management in PT. Baik Rasa Perkasa

Description of Supply Chain perpetrators in Figure 2 Model Supply Chain Management at PT. Baik Rasa Perkasa are as follows:

PT. Baik Rasa Perkasa has 2 flow of information, the first flow of information in the form of ordering products from consumers to the company PT. Baik Rasa Perkasa and the flow of product delivery information to consumers who have ordered products made via telephone or face to face directly to the office of PT. Baik Rasa Perkasa. Next is the flow of information that occurs is the information procurement of raw materials from PT. Good Taste to supplier and raw material information received from Supplier made via telephone.

2.3. Stages of Supply Chain Management at PT. Baik Rasa Perkasa

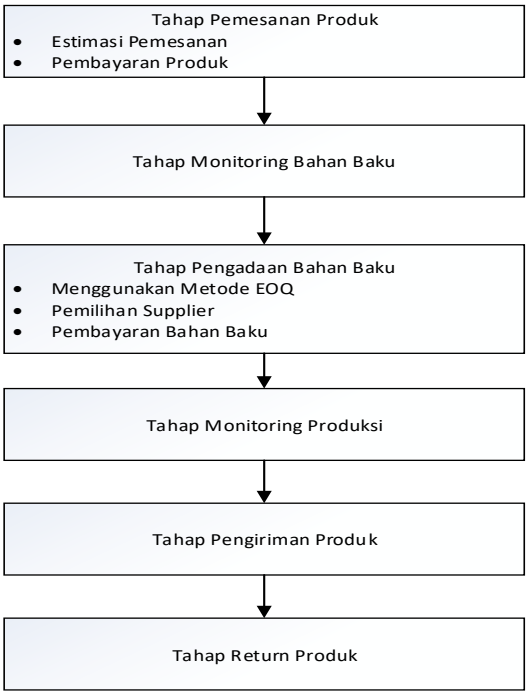


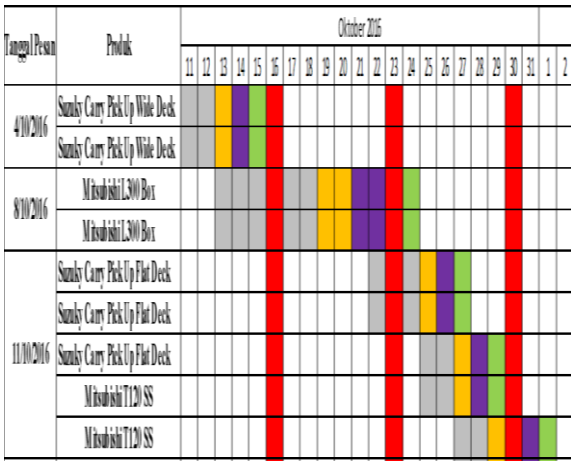
Figure 3. Stages of Supply Chain Management at PT. Baik Rasa Perkasa

1. Stages Ordering the product

Respond Figure 3 actors involved in the ordering stage is between the customer with the administration. The customer will order the product of the carosery to the administration department, then the administration will calculate the estimated workmanship of the product in the customer's message in order to know the time to settle all customer orders. The Administration Section shall inform the production time to the customer on the basis of the estimation result of the product. Estimated production is done using a gann chart.

Here are the results of production estimation calculations:

Table 1. Calculation of Production Estimation



Information :

	Libur (Minggu)
	Perakitan Dan Pengelasan
	Pendempulan
	Pengecatan
	Pemasangan Jok Dan Plafon
	Finishing

2. Stages of monitoring raw material inventory

Based on Figure 3 the actors involved in the monitoring of raw material inventory is the internal part of the company that is the warehouse. Monitoring of raw materials is done to find out whether there are raw materials remaining production in the warehouse or not. Monitoring of raw materials also aims to determine the needs of raw materials for production purposes.

The requirement of the raw material is determined by the number of incoming product orders such as the following order

Table 2. Customer ordering of products

No.	Produk	Jumlah
1	Karoseri Jenis Pick-Up	14
2	Karoseri Mitsubishi L 300 Box	2
3	Karoseri Mitsubishi FE 71	1

Based on the existing order in table 2 then required the need of raw materials as follows:

Table 3. Calculation of Raw Material Requirement

No	Nama Bahan Baku	Jumlah yang dibutuhkan	Bahan Baku Sisa Di Gudang	Satuan	Keterangan
1.	ABS	4	1	pack	
2.	AUTO REFINISH	21	-	kaleng	
3.	AMPLAS	1150	2 pack	lembar	100 lmbr /pack
4.	BAUT 10	188	-	pcs	100 pcs/dus
5.	BAUT 12	221	-	pcs	100 pcs/dus
6.	BESI BETON 8 ML	20	-	batang	
7.	BORKET	13	-	pcs	
8.	BUSA SANDAR	12	-	pcs	
9.	BUSA DUDUK	8	-	pcs	
10	BUSA TREKOT 8 ML	8	-	pcs	
11	CAT DASAR	22	3	liter	
12	CAT JADI	19	4	liter	
13	CUTTING	3		pcs	
14	DEMPUL	98	10	kaleng	

3. Stages of procurement of raw materials

Based on Figure 3 Actors involved in the procurement stage of raw materials is an internal part of the company that is the procurement department in PT. Baik Rasa Perkasa. The procurement department will calculate the procurement of raw materials based on product order data available in table 2 as well as calculate the ordering cost and the deviation fee in order to minimize the economical cost possible using the EOQ method, the result of raw material procurement is the list of raw materials to be used to support a production . Here are the raw material purchase plans:

Table 4. List of raw material purchases

No	Nama Bahan Baku	Jumlah yang dibutuhkan	Keterangan
1.	ABS	3 pack	
2.	AUTO REFINISH	21 kaleng	
3.	AMPLAS	950 lembar = 10 pack	100 lmbr /pack
4.	BAUT 10	188 pcs = 2 dus	100 pcs/dus
5.	BAUT 12	221 pcs = 3 dus	100 pcs/dus
6.	BESI BETON 8 ML	20 batang	
7.	BORKET	13 pcs	
8.	BUSA SANDAR	12 pcs	
9.	BUSA DUDUK	8 pcs	
10	BUSA TREKOT 8 ML	8 pcs	
11	CAT DASAR	19 kaleng	
12	CAT JADI	15 kaleng	
13	CUTTING	3 pcs	
14	DEMPUL	88 kaleng	

Then do the calculation using EOQ method in order to get economical result

Table 5. Calculation of EOQ

No	Nama Bahan Baku	Pembelian	Jumlah	Waktu antar pemesanan	Frekuensi pemesanan
1.	ABS	$\frac{\sqrt{2 \times 3 \times 266667}}{200000}$ = 2.82 = $\sqrt{2.82}$ = 1.68	2 pack	= Q/D = 2/3= 0,29 Bulan =0,67 x26 hari kerja= 17,42 = 18 hari	= D/Q =3/2 = 1.5 = 2 kali
2.	AUTO REFINISH	$\frac{\sqrt{2 \times 21 \times 266667}}{28571}$ = 19.78 = $\sqrt{19.78}$ = 4.47	5 kaleng	= Q/D = 5/21= 0,23 Bulan =0,23 x 26 hari kerja= 5.98 = 6 hari	= D/Q =21/5 = 4.20 = 5 kali
3.	AMPLAS	$\frac{\sqrt{2 \times 2 \times 266667}}{300000}$ =0.60 = $\sqrt{0.60}$ = 0.77	1 pack	= Q/D = 1/2= 0.5 Bulan =0.50 x 26 hari kerja= 13= 13 hari	= D/Q =2/1 = 2 = 2 kali
4.	BAUT 10	$\frac{\sqrt{2 \times 2 \times 266667}}{300000}$ =0.60 = $\sqrt{0.60}$ = 0.77	1 dus	= Q/D = 1/2= 0.5 Bulan =0.50 x 26 hari kerja= 13= 13 hari	= D/Q =2/1 = 2 = 2 kali
5.	BAUT 12	$\frac{\sqrt{2 \times 3 \times 266667}}{200000}$ = 2.82 = $\sqrt{2.82}$ = 1.68	2 dus	= Q/D = 2/3= 0,29 Bulan =0,67 x26 hari kerja= 17,42 = 18 hari	= D/Q =3/2 = 1.5 = 2 kali
6.	BESI BETON 8 ML	$\frac{\sqrt{2 \times 20 \times 266667}}{30000}$ = 18.86 = $\sqrt{18.86}$ = 4.34	5 batang	= Q/D = 5/20 = 0,25 Bulan =0,25 x 26 hari kerja= 6,5 = 7 hari	= D/Q =20/5 = 4 = 4 kali
7.	BORKET	$\frac{\sqrt{2 \times 13 \times 266667}}{46153}$ = 12.26 = $\sqrt{12.26}$ = 3.50	4 pcs	= Q/D = 4/13= 0,31 Bulan =0,36 x 26 hari kerja= 8.06 = 8 hari	= D/Q =13/ 4 = 3.25 = 4 kali

The next stage is to sort the supplier based on the quantity of raw material availability and distance

Table 6. Supplier Selection

No	Nama Bahan Baku	Jumlah Yang Dibutuhkan	Jumlah Bahan Baku Yang Tersedia		
			Mitra Baja (12 km)	TB. Septi Baja (126 km)	TB. Jaya Mandiri (45 km)
1	*ABS*	*3 pack*	*20 pack*	20 pack	30 pack
2	Amplas	2 pack	25 pack	20 pack	10 pack
3	Baut 10	1 dus	20 dus	30 dus	40 dus
4	Baut 12	2 dus	20 dus	30 dus	40 dus
5	Besi Beton 8 ML	5 batang	50 batang	0	30 batang
6	Kanal U5	4 batang	30 batang	0	30 batang
7	Kawat CO	3 gulung	10 gulung	0	15 gulung
8	Petrit	2 pcs	50 pcs	100 pcs	100
9	Plat Hitam 1.2 ml	3 lembar	0	20 lembar	20 lembar
10	Plat Galvanil 1.0 ml	3 lembar	30 lembar	20 lembar	20 lembar
11	Plat Galvanil 0.8 ml	6 lembar	15 lembar	10 lembar	10 lembar

4. Stages of Production Monitoring

Based on Figure 3 the actors involved in the production monitoring stage is the internal part of the company that is the head of production at PT. Good Mighty. The production department will record the product that is being worked with and the product that has been done which is stored in storage and ready to be shipped.

Table 7. Worker monitoring

Pelanggan	Tanggal Pesan	Produk	Oktober 2016												
			11	12	13	14	15	16	17	18	19	20	21	22	23	24
H. Ade Amir	4/10/2016	Suzuky Carry Pick Up Wide Deck	R1/R2	R1/R2	C1/C2	C1/C2	F1									
		Suzuky Carry Pick Up Wide Deck	R3/R4	R3/R4	C3/C4	C3/C4	F2									
H. Didi Mahdi	8/10/2016	Mitsubishi L300 Box			R1/R2	R1/R2	R1/R2		R1/R2	R1/R2	C1/C2	C1/C2	C1/C2	C1/C2		F1
		Mitsubishi L300 Box			R3/R4	R3/R4	R3/R4		R3/R4	R3/R4	C3/C4	C3/C4	C3/C4	C3/C4		F2

Keterangan :

	Libur (Minggu)
	Perakitan Dan Pengelasan
	Pendempulan
	Pengecatan
	Pemasangan Jok Dan Plafon
	Finishing

Table 8. Production Monitoring

Nama Pelanggan	Nama Produk	Jumlah	Alamat	Tanggal Selesai	Status
H.Ade Amir	Suzuky Carry Pick Up Wide Deck	2 unit	Darma, Majalengka	15/10/2016	Selesai
H. Didi Mahdi	Mitsubishi L 300 Box	2 unit	Talaga, Majalengka	24/10/2016	Selesai
H. Isub	Suzuky Carry Pick Up Flat Deck	3 unit	Cihideung, Tasikmalaya	1/11/2016	Selesai
	Mitsubishi T120 SS	2 unit			
Pa Atim	Suzuky Carry Pick Up Flat Deck	3 unit	Cikijing, Majalengka	8/11/2016	Selesai
	Suzuky Carry Pick Up Wide Deck	3 unit			Selesai
Hj. Tuting	Suzuky Carry Pick Up Wide Deck	1 unit	Sindang Kasih, Ciamis	8/11/2016	Selesai
H. Momon	Mtsubishi FE 71	1 unit	Panjalu, Ciamis	17/11/2016	Proses

5. Stages Delivery of products to consumers

Based on Figure 3 the actors involved in shipping the finished product to the consumer is the internal part of the company that is the delivery department. The shipping section will create a product delivery schedule and specify the officer who will deliver the finished product to the customer's premises. Here is the scheduling for delivery

Table 9 shipping scheduling

Tanggal Pesan	Nama Pelanggan	Produk	Jumlah	Tanggal Pelunasan	Alamat	Tanggal Kirim	Ket.
4/10/2016	H. Ade Amir	Suzuki Carry Pickup Wide Deck	2 unit	14/10/2016	Darma, Majalengka	16/10/2016	-
8/10/2016	H. Didi Mahdi	Mitsubishi L 300 Box	2 unit	21/10/2016	Talaga, Majalengka	25/10/2016	-
11/10/2016	H. Isub	Suzuki Carry Pickup Flat Deck	3 unit	25/10/2016	Cihideung, Tasikmalaya	9/11/2016	Pkl. 08.00
		Mitsubishi T 120 SS	2 unit			9/11/2016	Pkl. 12.00
19/10/2016	Pa Atim	Suzuki Carry Pickup Flat Deck	3 unit	9/11/2016	Cikijing, Majalengka	9/11/2016	Pkl. 16.00
		Suzuki Carry Pickup Wide Deck	3 unit			10/11/2016	Pkl. 09.00
22/10/2016	Hj. Tuting	Suzuki Carry Pickup Wide Deck	1 unit	12/11/2016	Sindang Kasih, Ciamis	18/11/2016	Pkl. 13.00
26/10/2016	H. Momon	Mitsubishi FE 71	1 unit	14/11/2016	Panjalu, Ciamis	Masih proses produksi	

2.4. Database analysis

Database analysis on the information system to be built using ERD. ERD is a data model that uses several notations to describe data in the entity context and the relationships described in the data. The diagram is illustrated in Figure 4

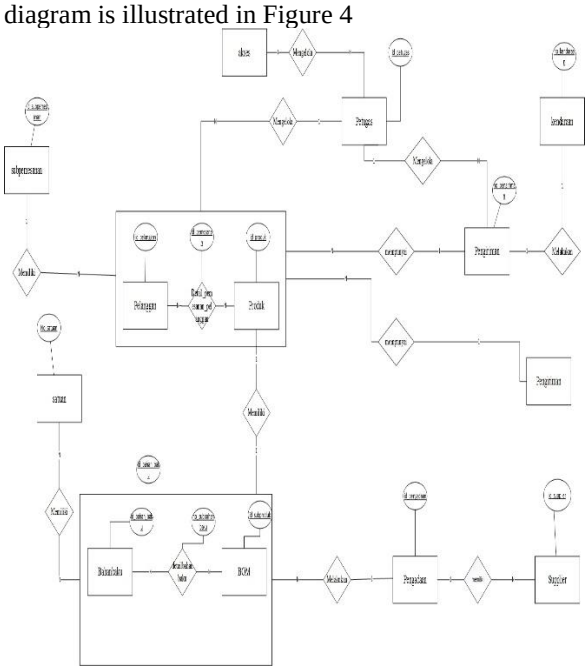


Figure 4. ER Diagram

2.5. Diagram Konteks

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 on this system can be seen in Figure 5

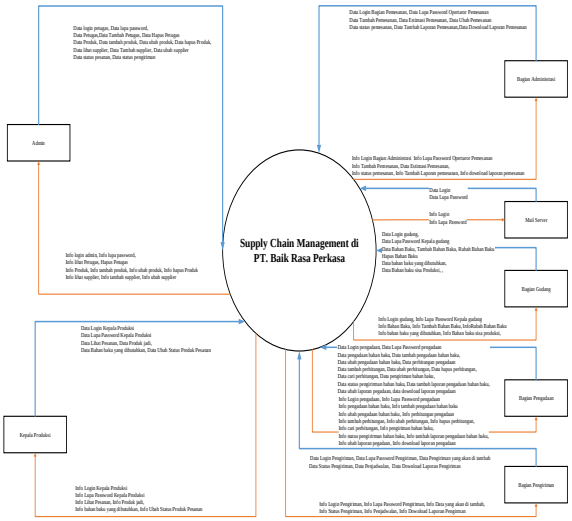


Figure 5 Context Diagram

2.6. Data Flow Diagram (DFD)

Data flow diagram shows how the data flow and describe the processes that occur in the system until the process more detail. Processes that occur in the system until the process is more detailed. In the context diagram of information systems such as Figure 5 can be decomposed into several DFD. DFD

will be explained starting from Level 1 DFD

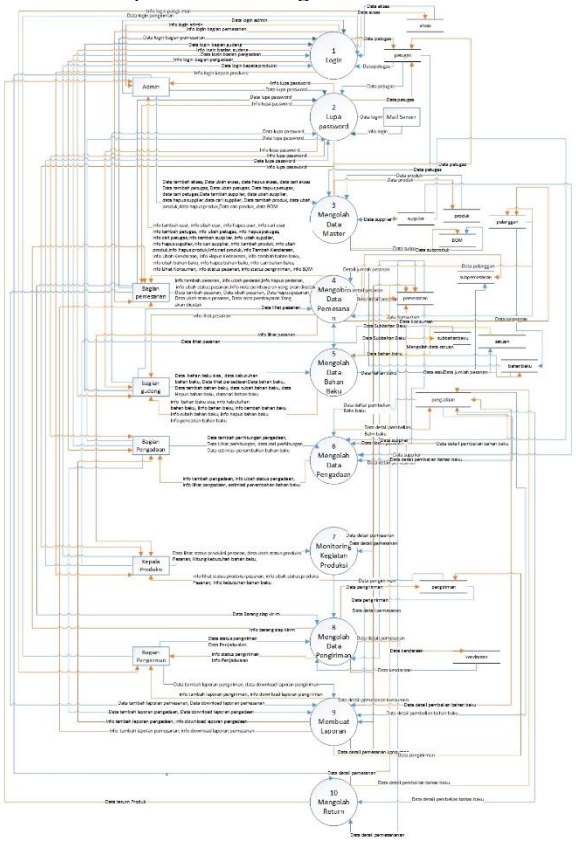


Figure 6.DFD Level 1

2.7. Relation Table

Table relation describes the relationship between data, meaning data and limitations. The process of relation between attributes is a combination of attributes that have the same primary key, so that these attributes into a unity that is connected by the key field. Table relation is described in Figure 7

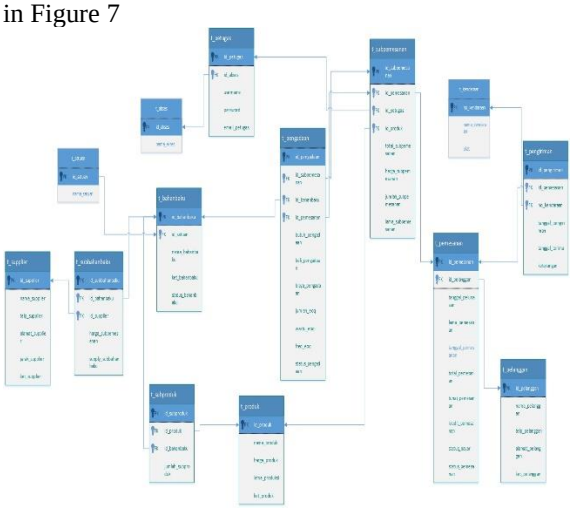


Figure 7. Relation Table

2.8 Interface design

Interface design is made to describe the appearance of the program that will be used by the user to interact with the system to be created. Interface design in information systems with supply chain management approach

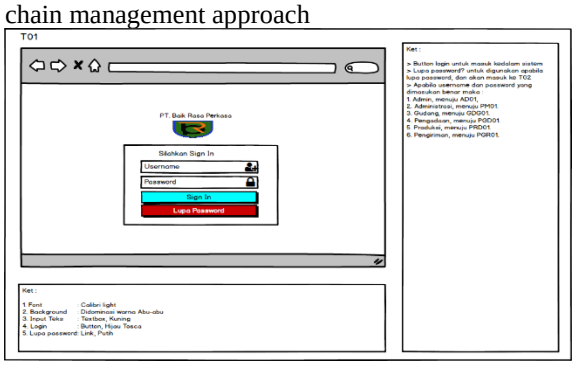


Figure 8. Interface login design

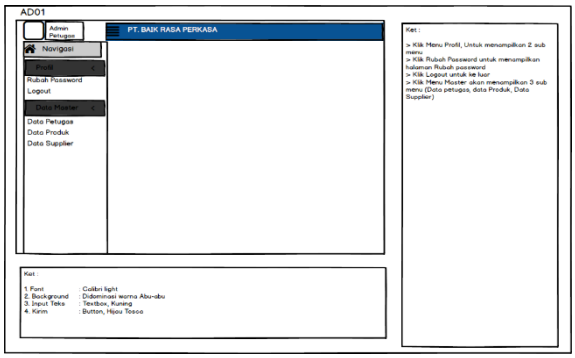


Figure 9. Designing the admin interface

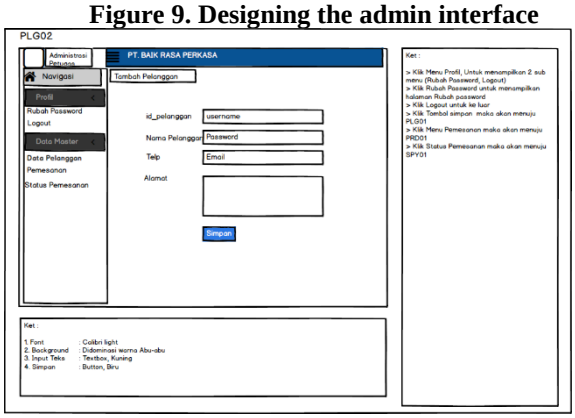


Figure 10. The design of the booking interface

2.9. The conclusion of blackbox testing

Based on the results of testing systems that have been done as a whole can be concluded that the application process Information System Supply Chain Management is quite maximal and system functionality has been able to produce the expected output.

2.10. Conclusion beta testing

1. The information system built this can facilitate easier Head of Administration in processing the process of ordering products from customers

2. The information system built can facilitate the head of the warehouse in monitoring raw materials remaining raw material production in the warehouse
3. The built information system can facilitate procurement in estimating the procurement and procurement frequency

3. Closing

3.1. Conclusion

1. Based on the results obtained in the writing of this thesis, it can be concluded as follows:
2. Supply chain management system can help the booking department to know the exact schedule of completion of each order to inform the customer, no longer rely on intuition in calculating the completion of ordering, so that no more complaints from customers because the information submitted will be sure and timely.
3. Supply chain management system can help the procurement department to determine the procurement of raw materials that must be purchased in accordance with the necessary needs, so that the production activities run smoothly no more problems or excess of raw materials thus the production stage and the stage of delivery runs with Good and timely in the delivery of products according to a predetermined length of production.
4. Supply chain management system can assist the delivery department in determining the delivery schedule of products that must be sent by looking at the production status, delivery is done when the product has been completed produced by the duration of a product ordered by the customer, and make it easier to choose the vehicle that must be used in the company .

3.2. Suggestion

Suggestions for the development of this information system there are several suggestions that can be done, among others:

1. Make it look more interesting because the display is still used now simple, And need the development and better maintenance of the system that has been built, so the system can be used in accordance with the needs in the future.
2. Need to develop more order estimation features to be more understandable
3. Distribution system needs development such as production scheduling to be more monitored production process.

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