DEVELOPMENT OF INFORMATION SYSTEM USING SUPPLY CHAIN MANAGEMENT APPROACH IN PT. SYGMA EXAMEDIA ARKANLEEMA

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ABSTRACT

PT. Sygma Examedia Arkanleema (SEA) is one of the industrial companies that is engaged in printing and publishing with an Islamic culture in Indonesia. PT. SEA has published several products of the Qur'an and one of their product is syamil quran. Syamil Quran has 2 types of al quran. The first one is alquran with a hardcover (cover). It have 6 products and the second one is al quran with the jacket cover. And it have 4 products. The problem faced by the company at this moment is the lack of the raw materials that they have to purchased because it is still done intuitively, this causes of a shortage of raw material stock resulting in inhibition of production process, if the production process is hampered (disturb) it will be causing the distribution to the consumer to be late. Supply Chain strategy that they used is Push Supply Chain, because the product production process is done first and then stored in the warehouse, after there are some purchase from the consumer then we will finished product distributed to the consumer or in the another word it's called 'make to stock'. For Predicting of a raw materials we have left we're using Single Moving Average method and monitoring product safety using Safety Stock method. Black box test results, user acceptance test and beta it can be concluded that this system can help companies in determine the amount of raw materials to be purchased to suppliers and it help for monitoring stock raw materials and product at warehouse.

Keyword : Supply Chain, Push Supply Chain, make to stock, Single Moving Average, Safety Stock.

1. INTRODUCTION

PT. Sygma Examedia Arkanleema (SEA) is one of the industrial companies engaged in printing and publishing in Indonesia is nuanced Islamic. Syamil Quran is a name published for various variants of the Qur'an. There are 2 types of al quran that is the Qur'an with hardcover (cover) and al quran with cover (jacket quran). The strategy used by the company is make to stock that is to supply raw materials to be manufactured into a product and when there is a purchase from the consumer the product is taken from the inventory in the warehouse. PT. SEA has supply chain activities from upstream to downstream. Upstream activities of PT. SEA is to process the procurement of raw materials to suppliers, receive raw materials from suppliers and make the production process from raw materials into products, while downstream activities undertaken by PT. SEA is product sales and product distribution to consumers.

The results of interviews conducted with Mr. Dias as Logistic Manager, stated that the current activities contained upstream of PT. SEA is to procure raw materials to suppliers and acceptance of raw materials in the warehouse. Raw materials purchased are divided into 2 types, namely semi-finished goods (cover quran) and raw materials such as paper, ink, bismatros, glue, and tire capital. Determining the amount of raw materials to be purchased either semi-finished goods or raw materials still use intuition or estimates. The results of intuition still have errors in determining the amount of raw materials resulting in the lack of raw material stock in the warehouse, as happened in March 2017 (Appendix D). PT. SEA purchased raw materials of quran paper to suppliers in February of 300 rim for March inventory, but the inventory did not meet production needs, which resulted in production process inhibition due to lack of raw material stock in the warehouse.

Results of interview with Mr. Dedi as Production Manager, explained that the production process begins from production planning made by Production Manager based on data from product sales in the previous month, due to purchases from consumers are not fixed and not yet known how many purchases. Production Manager has difficulty in determining the production plan for the next month because the number of purchases from consumers is not yet known, resulting in a mismatch between the production plan and the amount of raw materials available in the warehouse. The raw material inventory data in March (Appendix D) shows that the raw material inventory of quran paper is deficient and unable to meet production needs. As a result of the shortage of raw material inventory causes the amount of production is not in accordance with the previously planned, this can harm the

company due to not being able to meet purchases from consumers.

The results of interview with Mr. Dias as Logistic Manager, that downstream activities undertaken by the company that distributes products to consumers using two ways, namely by using internal courier (freight company) and expedition services for delivery out of town (eg form expedition services D). Internal courier has 3 units of vehicles, 1 pickup car and 2 box cars, two types of cars have different capacity. Distribution process is done after the consumer make advance payment (DP) and the company will directly deliver the product to the consumer. Distribution of the company has problems when there is a large number of purchases in one day, while internal vehicles are distributing products to consumers who first make a purchase then the distribution process to new customers will be late, as happened in March 2017 and June 2017 (Appendix D).

Results from the exposure found the problems in PT. Sygma Examedia Arkanleema, namely the need of a tool that can process supply chain information. Therefore, supply chain management becomes the right choice to handle the problems that exist in the company.

The purpose of the construction of this information system is:
a. Assist the process of procurement of raw materials involving Production Manager, Logistic Manager and Finance Manager in determining the amount of raw materials to be purchased to suppliers.
b. Assist the process of distributing products to consumers involving Logistic Manager and Finance Manager in determining the scheduling of distribution of products to consumers in order not to delay delivery.

2. RESEARCH OF CONTENT

1.1. Information System

There are several definitions of information systems, according to Alter (1992) Information systems are a combination of working procedures, information, people, and information technology organized to achieve goals within an organization. According to Hall (2001) Information Systems is a set of formal procedures in which data are grouped, processed into information, and distributed to users [18].

From some of these definitions, it can be concluded that the information system includes a number of components (human, computer, information technology, and work procedures), something is processed (data into information), and is intended to achieve a goal or goal [18].

1.2. Supply Chain Management (SCM)

"Supply Chain Management is a total approach system to deliver products to end consumers using information technology to coordinate all supply chain elements from supplier start to retailer, then reach the next level of competitive advantage not available in traditional logistics systems [1].

Meanwhile, according to Simchi-Levi et. al "Supply chain Management is defined as a set of approaches used to effectively integrate suppliers, manufacturers, warehouses and stores in order that inventory can be produced and distributed at the right amount, to the right location, and at the right time so that the overall cost of the system can minimized while trying to satisfy needs and services "[1].

1.2.1. Component Supply Chain Management

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

The entire activity of the manufacturing company by its distribution or distributor relationship can be extended to several levels. The main activity in Upstream Supply Chain is the procurement of goods.
2. Internal Supply Chain

Internal Supply Chain is the process of delivering goods to the warehouse. The main activities in Internal Supply Chain are production management, manufacturing, and inventory control.
3. Downstream Supply Chain

Activities within the Downstream Supply Chain involve the delivery process to the end consumer. The main activities in Downstream Supply Chain are the distribution of goods, warehouses, transportation.

1.2.2. Types Of Supply Chain

The following are common supply chain types [5]:
1. Integrated make-to-stock

This model's supply chain tracks possible consumer demand for a time, so that the production process can efficiently procure inventory. This can be overcome by using an integrated information system. By using the integrated information system, the company can know the information about consumer demand in a timely manner, so that information can be used to develop and modify the planning and production schedule [5].
2. Continuous Replesnishment

In the supply chain this model, carried out procurement of goods on a continuous basis. This type is particularly suitable for corporate environments where consumer demand patterns are stable [5].

3. Build-to-order

In the supply chain of this model, the assembly of finished goods is made when the consumer has made a request or order for the item [5].

4. Channel Assembly

Channel assembly is a modification of the build-to-order model. Supply chain model, the assembly process of goods occurs when the movement of goods on the distribution line [5].

1.2.3. Push and Pull Supply Chain

"The pull process is based on consumer orders, while the push process begins and is done by anticipating consumer orders" [7]. Pull supply chain is a "make-to-order" production strategy whose main benefit is to avoid inventory waste or to be a corporate strategy, especially a manufacturing company where new production is always done after market demand and is actually done on consumer demand [7].

Push Supply Chain is a Make-to-Stock production strategy. This strategy is the opposite of the Pull strategy in which appeals are pulled, push strategies are more popular because their production systems are based on forecasting and generate large amounts of output that will later enter into inventory before being distributed to consumers [7].

This strategy focuses on activity efficiency and standardization. Push strategy can be connoted with lean supply. The more companies have a little variety of products then this strategy is right. However, for products with volatile market situations, the use of push systems will result in some losses, such as [7]:

1. Inability to meet changing market demands.
2. The buildup of inventory that will bring in a lot of waste and requires a lot of storage space.
3. Large production batch.
4. The risk of large obsolete product.

1.2.4. Area Of Supply Chain Management Coverage

The main activities included in the Supply Chain Mangement classification are as follows [1]:

1. Activities to design new products (product development)
2. Activities to obtain raw materials (procurement, purchasing or control)
3. Planning activities of production and inventory (planning & control)
4. Activities of production (production)
5. Activities of delivery / distribution (distribution)
6. Activity management of return of product / goods (return).

1.2.5. General Definition of Monitoring (Monitoring)

"Supervision is the control performed by conducting inspection, ability assessment, improving and perfecting, both management and operational areas" [1].

Based on the above two opinions the authors conclude the monitoring (Monitoring) is the process of observation, inspection, control and correction of the results of work evaluation so that in accordance with the previously established plan continuously and regularly. Monitoring helps alert when things go wrong and help keep the work on track. The purpose of Monitoring is as follows [1]:

1. Assess whether the activities implemented are in accordance with the plan
2. Identify problems that arise to be directly addressed
3. Conduct an assessment of whether the work patterns and management used are
4. appropriate to achieve the objectives of the activity.
5. Know the link between the activities with the aim of obtaining a measure of progress. Adjusting activities with changing environment, without deviating from goal.

1.2.6. Transportation and Distribution Management

Transportation and distribution activities are becoming increasingly important for today's supply chain as more companies have to ship directly to consumers. The growth of the dot com industry that provides on-line purchasing services with direct delivery to consumer doors (such as Amazone.com, Borders.com, Dell.com, Tesco.com) makes distribution and transport activities more important and the cost component of this activity getting bigger on the supply chain. Consumers who buy books at stores will bear lower transportation and distribution costs compared to those who buy books on-line and delivered directly to the consumer's address [4].

1.2.7. Distribution Strategy

There are generally three product distribution strategies from factory to consumer. Each of these strategies has advantages and disadvantages. The three strategies are as follows [6]:

1. Direct Shipment

In this model, direct shipments from factory to consumer. Without through a warehouse or buffer facility. So with this strategy the need for a warehouse or buffer facility will be lost. Usually this strategy is suitable for goods that are generally short and easily damaged goods process loading / unloading or removal.

2. Delivery Through Warehouse

In this model, the goods are not directly sent to the consumer, but pass through one or more warehouses or buffer facilities. In contrast to the above direct shipment model, the warehousing model is suitable for products with high demand / supply uncertainty as well as durable product durable products.

2.1. Safety Stock

Security inventory or safety stock serves to protect errors in predicting demand during lead time. The security provision will work if the actual demand is greater than the average value [1]. To get an idea of how uncertain the demand during the lead time is, the company needs to collect data to get its distribution. The formula to find the value of safety stock can be seen in equation 2.1.

Safety Stock = Z x S_{dl} (2.1)

Dimana,

Z = *Service Level* (The ability of a company to serve requests or translate from management decisions)

S_{dl} = Determined from the uncertainty of demand with the provisions can be seen in Gambar 1

Sdl = Sd x $\sqrt{l}$
Safety Stock ditentukan oleh ketidakpastian permintaan

Gambar 1 Interaction between demand and lead time on determination of safety stock [1]

2.2. Single Moving Forecasting Method

Single moving average method uses a number of actual new query data to generate prediction value for future demand. This method will be effectively applied if we can assume that the market demand for the product will remain stable over time. This method has two special properties that is to make forecasts require data. Historically over a period of time, the longer moving averages will result in a smoother moving average, the systematic moving averages can be calculated by 2.8 [8].

$$S_{t+1} = \frac{x_t + x_t - 1 + \cdots + x_t - n + 1}{n} \quad (2.8)$$

Information :

S_{t+1} = *Forecast* for period *t+1.*

Xt = Data in period t.

n = Duration *Moving Averages*

2.3. Measuring Forecasting Errors

Mean Squared Error (MSE) ie the average of forecasting error is squared and can be seen in equation 2.11 [8].

$$MSE = \frac{\sum(X_t - F_t)}{n} \quad (2.11)$$

Information:

X_t= Data actual in periode t

F_t= Forecast data of the model used in period t

n = Many predicted data

2.4. System Testing

Testing is the process of inspection or evaluation of system or system components manually or automatically to verify whether the system meets the needs that are specified or identify the differences between the expected results and the results that occur. Testing should include the following three concepts [2]:

1. Demonstrate software validity at each stage in the system development cycle.
2. Determination of the validity of the end system is associated with the needs of the user.
3. Examination of system behavior by executing the system on test sample data.

2.4.1. Classification Black Box Testing

The classification of black box testing includes several tests, namely [2]:

1. Functional testing
2. User acceptance (user acceptance)
3. Beta testing (beta testing)

2.5. Supply Chain Management (SCM) Analysis

Supply chain management analysis is used to apply supply chain management approach to the system to be built.

2.6. Supply Chain Analysis at PT. Sygma Examedia Arkanleema

Supply chain analysis is done to describe supply chain management process to be built in PT. Sygma Examedia Arkanleema based on supply chain model on Gambar 3.



Gambar 3 Supply Chain Management at PT. Sygma Examedia Arkanleema

1. Production Plan Analysis

Analysis of the production plan that will be done is to predict the number of products that must be produced to be used as a reference list of raw material requirements. The data to be used as a

reference that is product sales data quran cordova A6 can be seen on Tabel 1.

Tabel 1 Sales Data Product Quran Cordova A6

No	Period	Actual Sales Sales Quran Cordova A6 (pcs)
1	Januari	800
2	Februari	910
3	Maret	1120
4	April	1085
5	Mei	1150
6	Juni	955

The next step is to forecast using the method of forecasting a single moving average. The period of moving average value used is 3 months and 5 months period because in the third and fifth months there is considerable fluctuation.

a. Calculation of 3 month period (n = 3)

The 3-month period forecasting is obtained by entering 3 months of order data before the month to be forecast. Suppose we will forecast in July 2017, which means we will need booking data for June, May, and April by 2017.

$$F\ Juli\ = \frac{X_{Juni} + X_{Mei} + X_{April}}{3}$$

$$F\ Juli\ = \frac{955 + 1150 + 1085}{3}$$

$$F\ Juli\ = 1063{,}33\ \approx 1063$$

a. Calculation period of 5 months (n = 5)

Forecasting period of 5 months obtained by entering 3 months of order data before the month to be predicted. Suppose we will forecast in July 2017, meaning we will need booking data for June, May, and April, March, and February by 2017.

$$F\ Juli\ = \frac{X_{Juni} + X_{Mei} + X_{April} + X_{Maret} + X_{Februari}}{5}$$

$$F\ Juli\ = \frac{955 + 1150 + 1085 + 1120 + 910}{5}$$

$$F\ Juli\ = 1044$$

Below are all the forecasting results by using the moving average forecasting method can be seen on Tabel 2.

Tabel 2 Results of Forecasting Quran Cordova A6

No	Periode	Data Pemesanan	3 Bulan	5 Bulan
1	Januari	800	-	-
2	Februari	910	-	-
3	Maret	1120	-	-
4	April	1085	943	-
5	Mei	1150	1038	-
6	Juni	955	1118	1013
Hasil Peramalan untuk Bulan Juli			**1063**	**1044**

Forecasting used can be measured accuracy in forecasting. There are several methods to calculate the accuracy of the error rate, one of which used in this research is the MSE (Mean Square Error) method. Here are the results of the calculation of MSE (Mean Square Error) from product forecasting Quran Cordova A6 in period of 3 months and 5 months can be seen on Tabel 3.

Tabel 3 Mean Square Error Calculation

No	Periode	Data Aktual	3 Bulanan			5 Bulanan		
			Data Peramalan	Error	Error Kuadrat	Data Peramalan	Error	Error Kuadrat
1	Januari	800	-	-		-		
2	Februari	910	-	-		-		
3	Maret	1120	-	-		-		
4	April	1085	943	-142	20069	-		
5	Mei	1150	1038	-112	12469	-		
6	Juni	955	1118	163	26678	1013	58	3364
Jumlah			**3100**	**-90**	**59217**	**1013**	**58**	**3364**
Rata-rata			**1033**	**-30**	**19739**	**1013**	**58**	**3364**

It was concluded that July 2017 PT. SEA is recommended to procure raw material for Quran Cordova A6 product 1044 pcs (rounding result). Here is the composition of the product Quran Cordova A6 can be seen on Tabel 4.

Tabel 4 Product Composition Quran Cordova A6

KOMPOSISI PRODUK Al - Quran Cordova A6					
NO	**NAMA BARANG**	**UKURAN (cm)**	**Q**	**SATUAN**	**KETERANGAN**
1	QPP (Quran Paper)	10,5 x 15	338	lembar	338 lembar ukuran A6
2	Duplex	25 x 15	1	lembar	1 lembar ukuran A6
3	Art Paper & paper glossy	25 x 15	1	lembar	1 lembar ukuran A6
4	Tinta Warna			Kg	
5	Bismatros	25 cm	3	pcs	
6	Kapital Ban	21 cm	1	pcs	
7	Lem Kertas			Kg	
8	Cover Quran Cordova A6	25 x 15	1	pcs	

Given the composition of the product Quran Cordova A6, then the need for raw materials to meet the results of forecasting of 1044 pcs can be seen on Tabel 5.

Tabel 5 Composition of Quran Cordova A6 Based on Forecast Results

NO	NAMA BARANG	Perhitungan	Jumlah Bahan Baku	Jumlah yang harus dibeli	Keterangan
1	QPP (Quran Paper)	1044	30 rim	30 rim	1 rim qpp untuk ukuran A6 menjadi 35 pcs quran.
2	Duplex	1044 x 1	1044 lembar ukuran A6	42 lembar	1 lembar duplex untuk ukuran A6 menjadi 25 pcs quran.
3	Art Paper & paper glossy	1044 x 1	1044 lembar ukuran A6	42 lembar	1 rim art paper & glossy untuk ukuran A6 menjadi 25 pcs quran.
4	Tinta Warna	1044	1Kg	1Kg	1Kg bisa digunakan untuk 20 rim
5	Bismatros	1044 x 25 cm	25.325 cm	3 roll	1 roll = 90 meter
6	Kapital Ban	1044 x 21	21273 cm	3 roll	1 roll = 100 meter
7	Lem Kertas	1044	1Kg	3Kg	1 Kg lem bisa untuk 500 pcs
8	Cover Quran Cordova A6	1044 x 1	1044 pcs	1044 pcs	

2. Analysis of Raw Material Inventory Monitoring

The next stage is to monitor raw material inventory and determine the safe limit of raw materials that must be in the warehouse of raw materials that aims to avoid the lack or void of raw

materials by using the method of Safety Stock. Examples of raw material inventory calculations based on product inventory results using the formulas 2.1 and 2.2 are as follows:
Safety Stock Calculation *:*
The number of forecasts for July 2017 = 1044 pcs
Number of workdays in a month = 22 hari
Lead Time procurement (l)= 14 Hari

Average sales in a month (d)

Standard Deviation of July 2017 forecasting

(sd) = 47/10= 4,7 pcs

Standard Deviation from Lead Time (sl)
Safety Stock = Z x Sdl
Sdl = $\sqrt{(d^2 \text{ x } sl^2 + l \text{ x } sd^2)}$
Sdl = $\sqrt{47^2 \text{ x } 1{,}4^2 + 14 \text{ x } 4{,}7^2}$
Sdl = $\sqrt{4638{,}9}$
Sdl = 68 (rounding result)
Safety Stock = 1.75 x 68
Safety Stock = 119 pcs quran cordova A6.

Safety stock for each raw material can be seen on Tabel 6.

Tabel 6 Safety Stock Quran Cordova A6 Raw Material

Safety Stock	Nama Bahan Baku	Kebutuhan Produk	Jumlah bahan baku yang dibutuhkan	Keterangan
119 pcs	QPP (Quran Paper)	4 rim	4 rim	1 rim menjadi ± 35 pcs.
	Duplex	5 lembar	1 rim	1 lembar ± 25 pcs
	Art Paper & paper glossy	5 lembar	1 rim	1 lembar ± 25 pcs
	Tinta Warna	1 Kg	1 Kg	1Kg bisa digunakan untuk 20 rim
	Bismatros	1 roll	1 roll	1 roll = 90 m
	Kapital Ban	1 roll	1 roll	1 roll = 100 m
	Lem Kertas	1 Kg	1 Kg	1 Kg lem bisa untuk 500 pcs
	Cover Quran Cordova A6	119 pcs	119 pcs	

3. Procurement of Raw Materials Analysis

In the analysis of raw material procurement, logistics section make raw material demand based on needs production plan. Booking against suppliers include Quran paper, duplex, art paper & glossy paper, ink, paper glue, tire caps, bismatros, cover quran, procurement process done by ordering raw materials to suppliers by phone or directly come supplier. The amount of raw material ordered can seen on Tabel 7.

Tabel 7 Number of Raw Materials to Purchase

NO	NAMA BARANG	Perhitungan	Jumlah Bahan Baku produk + safety stock	Jumlah yang harus dibeli	Keterangan
1	QPP (Quran Paper)	1044	30 + 4 rim	34 rim	1 rim qpp untuk ukuran A6 menjadi 35 pcs quran.
2	Duplex	1044	42 lmbr + 1 rim	2 rim	1 lembar duplex untuk ukuran A6 menjadi 25 pcs quran.
3	Art Paper & paper glossy	1044	42 lmbr + 1 rim	1 rim	1 rim art paper & glossy untuk ukuran A6 menjadi 25 pcs quran.
4	Tinta Warna	1044	2 + 1 Kg	3 Kg	1Kg bisa digunakan untuk 20 rim
5	Bismatros	1044 x 25 cm	3 + 1 roll	4 roll	1 roll = 90 meter
6	Kapital Ban	1044 x 21 cm	3 + 1 roll	4 roll	1 roll = 100 meter
7	Lem Kertas	1044	3 + 1 Kg	4 Kg	1 Kg lem bisa untuk 500 pcs
8	Cover Quran Cordova A6	1044 x 1	1044 + 119 pcs	1163 pcs	

= 14/10= 1,4Servis Level 96% (Z) = 1.7

3. Production Analysis

In production analysis, Production Manager scheduling production plan. The number of products produced is calculated based on forecasting results divided by the number of working days in a month. Here is an example of calculating the quantity of production of Quran Cordova A6.
Number of forecasting in July 2017= 1044 pcs
Number of workdays in a month = 22 hari
Total Production = 1044 / 22
= 47 pcs

Tabel 8 Kebutuhan Bahan Baku untuk Produksi Quran Cordova A6

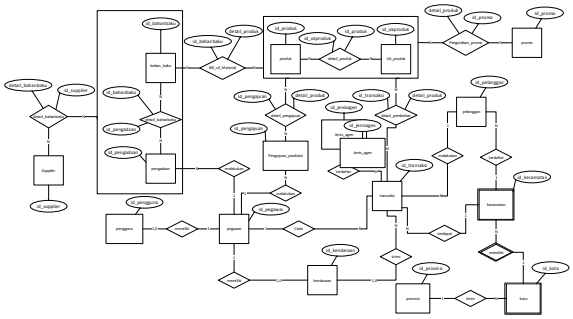
Rencana Produksi	Nama Bahan Baku	Kebutuhan Rencana Produksi	Jumlah bahan baku harus tersedia	Stok Bahan Baku	Status
47 pcs	QPP (Quran Paper)	2 rim	2 rim	0	Kosong
	Duplex	2 lembar	2 lembar	14 rim	Tersedia
	Art Paper & paper glossy	2 lembar	2 lembar	14 rim	Tersedia
	Tinta Warna	1 Kg	1 Kg	116 Kg	Tersedia
	Bismatros	1 roll	1 roll	45 roll	Tersedia
	Kapital Ban	1 roll	1 roll	50 roll	Tersedia
	Lem Kertas	1 Kg	1Kg	30 Kg	Tersedia
	Cover Quran Cordova A6	47 pcs	47 pcs	80 pcs	Tersedia

4. Product Distribution Analysis

In the analysis of the distribution of this product is the determination of the quantity of freight transport products and conducted monitoring process so that companies know with certainty the purchased product is up to the consumer.

2.6 Database Analysis

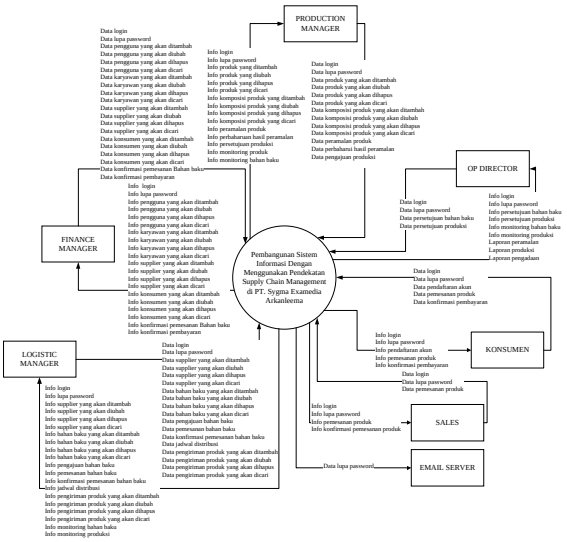
Database analysis on information systems using supply chain management approach in PT. Sygma Examedia Arkanleema will be built using Entity Relationship Diagram (ERD). The Entity Relationship Diagram (ERD) is depicted in Gambar 4.



Gambar 4 Entity Relationship Diagram of Information Systems Using SCM Approach at PT. SEA.

2.7 Context Diagram

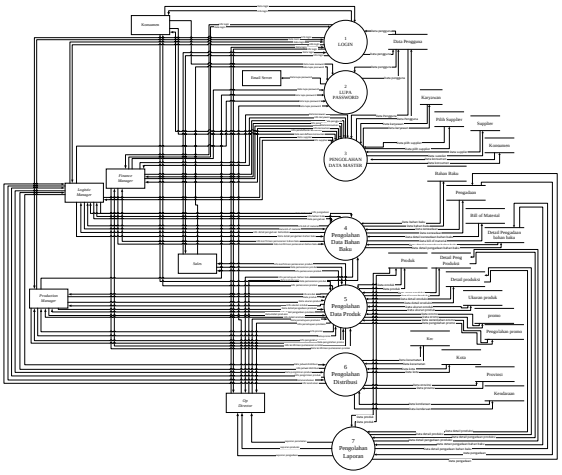
The context diagram is a simple diagram illustrating the relationship between the outer entity, the input and output of the system. The context diagram is represented by a single circle representing the whole system. There are 6 users who play a role in this system namely Operation Director, Finance Manager, Logistic Manager, Consumer, Production Manager, Supplier where each user has different information and data rights. Context diagram on the system can be seen on Gambar 5.



Gambar 5 Context Diagram SCM Information System PT. Sygma Examedia Arkanleema.

2.8 Data Flow Diagram (DFD)

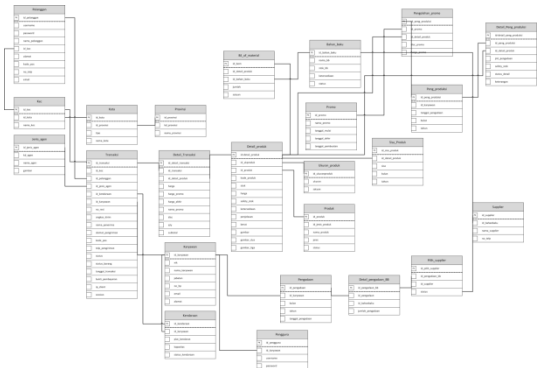
DFD Level 1 development of information systems using supply chain management approach in PT. Sygma Examedia Arkanleema on Gambar 6.



Gambar 6 Data Flow Diagram Development of Information Systems Using SCM Approach in PT. SEA.

2.9 Relationship Table Design

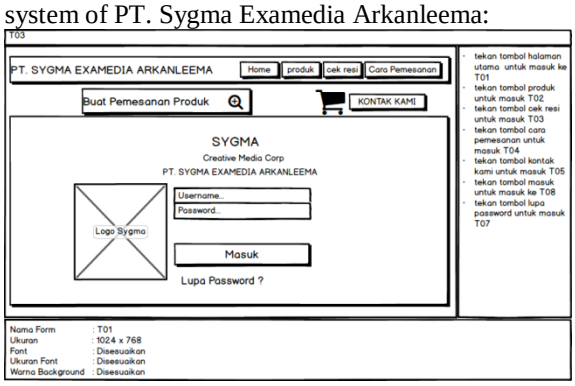
Table relation describes the relationship between data, meaning data and limitations.



Gambar 7 Relation Table

2.10 Interface Design

The design of the interface in the information system of PT. Sygma Examedia Arkanleema with supply chain management approach. Here is the design of the interface in the information system of PT. Sygma Examedia Arkanleema:

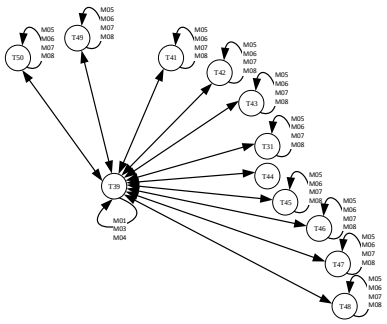


Gambar 8 Interface Log Design

2.11 Semantic Network Design

Semantic network design is a representation of interface design that shows where each interface is connected. Semantic network design in the development of information systems using supply chain management approach method can be seen in the following figure:

1. Design Semantic Production Manager



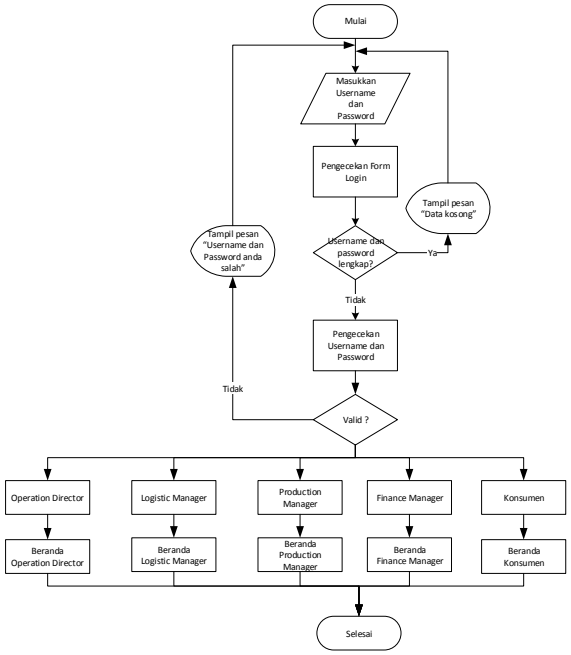
Gambar 9 Semantic Network Production Manager

2.12 Procedural Design

Procedural design transforms the structural elements of the program architecture into a procedural description of the software components. The procedural design for the application to be built is as follows:

1. Procedural Login

The login process takes place when the user opens the system start page. Users are required to login to log into the system. The login process is depicted on Gambar 10.



Gambar 10 Procedural Login

2.13 System Testing

The test used to test the new system is the black box testing method. Black box testing focused on testing the functional requirements of information systems.

The test plan that will be done is to test the system built in Black Box, UAT and beta. Testing of supply chain management information system in PT. Sygma Examedia Arkanleema uses test data based on given data from some data that has been given.

2.14 Black Box Testing

Based on the test results with the test sample case that has been done to give the conclusion that the process is correct and appropriate. Filtering process errors in the form of landing page view messages is quite maximal. Functionally the system is able to produce the expected output.

2.15 User Acceptance Test (UAT) Testing

UAT Testing (User Acceptance Test) is done as a condition that the built application has been accepted by the user.

Based on the results of User Acceptance Test (UAT) testing which has been done to supply chain management information system in PT. Sygma Examedia Arkanleema, it can be concluded that the system can already proceed to the end user acceptance testing stage.

2.16 Beta Testing

Beta testing is a direct test of the real environment. Users make an assessment of the software using interview methods. From the results of these interviews it can be concluded whether the software built in accordance with the purpose or not.

Interview conducted for the user of the system consisting of Logistic Manager, Production Manager, Operation Director, Finance Manager, and Sales. This research was conducted at PT. Sygma Examedia Arkanleema in order to know the extent to which the system built can be a solution and the solution of the problems that have been described previously.

Based on the user acceptance test, it can be concluded that:

1. The system can help the operation director, production manager, logistic manager, finance manager, and sales in carrying out their respective jobs.
2. Built-in system is easy to use after guide.
3. Sitem has a fairly easy to understand interface.
4. The use of Language applied to the system is easy to understand.

3. CLOSING

This section, describes the conclusions that contain the results obtained after the analysis, design, and implementation of the design of built

and developed software and suggestions that will provide important records and possible improvements that need to be made to the previous software development .

3.1. Conclusion

Based on the results obtained from black box testing, user acceptance test, and end user acceptance testing after the system is applied in the company environment can be drawn conclusion as follows:

1. Supply chain management system in PT. Sygma Examedia Arkanleema can help in determining the amount of raw materials to be purchased so that production activities continue and run smoothly.
2. Supply chain management information system at PT. Sygma Examedia Arkanleema can assist Logistic Manager in product delivery process by scheduling product delivery to consumer.

3.2. Suggestion

Based on the results of testing, as for suggestions for the development of this information system. There are several suggestions that can be done, among others:

1. Perform repair / development of the system on the distribution because the system built on the distribution is still less than the maximum and not enough to help the relevant sections.
2. Develop a system in the e-commerce section to facilitate consumers in making product purchase transactions.

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