

# INFORMATION SYSTEM DEVELOPMENT WITH SUPPLY CHAIN MANAGEMENT APPROACH IN PT. WISKA

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## ABSTRACT

PT. Wiska is a private company engaged in the textile industry which has domestic and foreign market share and was established on March 5, 1973. Products offered by PT. Wiska has various models such as towels, vitrage, tablecloths, and others.

PT. Wiska in procuring raw materials to suppliers often has difficulties due to the amount of raw material procurement that still uses estimates. The supply chain strategy used is the push supply chain, because it determines the products that are produced first before an order is made to make a stock of products in a warehouse or can be called make to stock. The forecasting method used to estimate the number of product requests is the Single Exponential Smoothing method. Calculation of predictions of availability of raw materials and products in the warehouse using the method of inventory security (Safety Stock). Schedule of product delivery is adjusted to the business rules in the company.

Based on the results of blackbox testing and final testing after application in the PT. Wiska can be concluded that this system has helped PT. Wiska in helping estimate the number of raw material orders that must be purchased to the supplier, helps in the delivery process by scheduling the product to the Consumer's place.

**Keywords:** Supply Chain Management, Single Exponential Smoothing, Push Supply Chain, Safety Stock, blackbox

## 1. PRELIMINARY

PT. Wiska is a private company engaged in the textile industry which has domestic and foreign market share established on March 5, 1973. Products offered by PT. Wiska has various models such as towels, vitrage, tablecloths, and others. Based on product sales data from August 2017 to January 2018, minimalist vitrage

products are the products most in demand by consumers. The current supply chain process at PT. Wiska starts from upstream to downstream. Upstream activities include procurement of raw materials, receipt of raw materials to processing raw materials into products, while activities in the downstream include ordering products from consumers and shipping products to consumers. In its business process, PT. Wiska uses the make to stock strategy, namely the production process is carried out continuously even though there is no product demand from consumers. This is done because PT. Wiska focuses on meeting the product needs of consumers.

Based on the interview with Mrs. Dini as the head of the procurement department stated that the process of procuring raw materials in PT. Wiska's company every month was uncertain, only doing estimates. The purpose of the estimation here is that the procurement of raw materials is not fixated on the amount of raw material available, and ordering products from consumers is uncertain every month which causes the procurement head to experience problems in determining the amount of raw materials to be ordered to suppliers for the following month. This is a problem if there is an increase in product orders, there is a shortage of raw materials in the warehouse as contained in the Stock Data of raw materials in October 2017 is 19500 kg while the raw material needed for the month is 20,000 which results in the production process not running smoothly.

Based on the interview with Ms. Nina as the head of the shipping department stated that the shipment consisted of 2 types of shipping, namely overseas shipping (expedition) and domestically, for domestic delivery using company vehicles. The time of booking in the country is carried out the day after ordering with the number of requests that have been determined by the consumer. Unlike the types of shipments abroad, the process is carried out 5 days after ordering and using third parties (freight forwarding services). Domestic

and overseas shipments often do not match the number of products that will be sent because the number of finished products in the warehouse does not match the number of orders entered. Seen in the data of domestic orders in September 2017 is 250 pcs minimalist vitrage while the stock in the warehouse is 200 pcs. And it can be seen in the data of overseas orders in October 2017 that it was 3500 pcs minimalist vitrage while the stock in the warehouse was 2500 pcs. Which resulted in delays in shipping to domestic and overseas by using third parties. The shipping department has experienced several obstacles in the process of sending products to consumers, because there is no scheduling.

Based on the problems that currently exist at PT. Wiska, a system is needed to determine the amount of raw material inventory, and schedule product delivery using the Supply Chain Management system.

### 1.1 Formulation Of The Problem

Based on the background of the problem raised, the problems that occurred at PT. Wiska is how to build an information system using the Supply Chain Management approach at PT. Wiska.

### 1.2 Purpose and objectives

The purpose of this final project research is to build Supply Chain Management at PT. Wiska.

The goal of building Supply Chain Management at PT. Wiska is as follows:

- Facilitate the procurement head to determine the amount of raw material to be ordered to suppliers to meet production needs.
- Facilitate the delivery head by scheduling product delivery to the customer's place.

### 1.3 Scope of problem

- The limitations of the problem in this study are as follows:
- The Supply Chain strategy used is Push supply Chain because it is in accordance with the condition of the product ordering, namely Make-to-Stock, which is a supply chain strategy based on product or production orders prior to demand. Push Supply Chain strategies are used to produce large quantities that aim to meet consumer demand for products.
- Input data processed is product sales transaction data from August 2017 to January 2018 consisting of: product data, product

stock data, supplier data, raw material stock data, sales data and shipping data.

- Processed product data are sales data for minimalist vitrage products due to the large number of requests for these products.
- The forecasting method used is Single Exponential Smoothing.
- The analytical method that will be used in the construction of this system is based on structured analysis, where the data modeling uses ERD (Entity Relationship Diagram) and to describe the functional modeling using DFD (Data Flow Diagram).
- To predict reserve inventory using Safety Stock calculations.
- The system is built in the form of a web-based application.

### 1.3 Research Methodology

Methodology is a process used to solve a logical problem, which requires data to support the implementation of a study. The methodology used in this study is descriptive. Descriptive methodology is a methodology in examining the status of a group of people, an object, a set of conditions, a system of thought or a class of events in the present. Where is the purpose of this descriptive methodology to get a clear picture of facts and information in the situation or current events systematically, factually, and accurately.

The steps to be taken during the research can be seen in Figure 1.

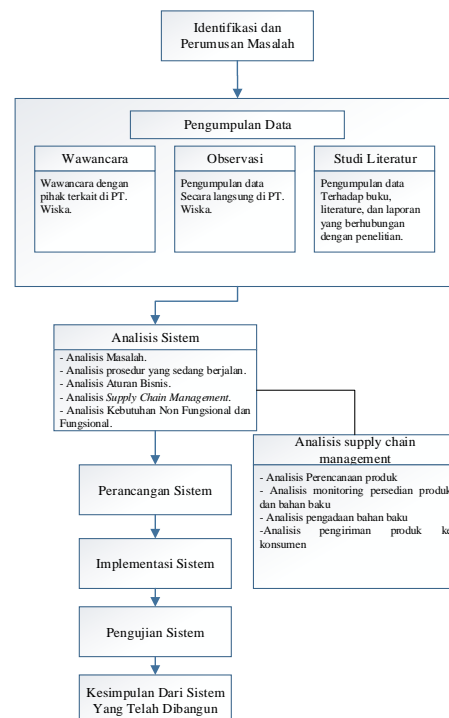


Figure 1 Regarding the Flow of Research

### **1.5 Identification Of Problem**

This stage is the initial stage of starting research by looking for problems that occur at PT. Wiska, then formulate the problem at PT. Wiska, then what method is suitable to apply to the problem

#### **1. Formulation of Purpose and Objectives**

At this stage the researcher determines the purpose and objectives to be carried out to solve the problems that exist in PT. Wiska.

#### **2. Data Collection**

At this stage the researcher determines all data needed to be used on the system as input data at the forecasting stage and product control. The following are the steps used in data collection.

#### **3. Interview**

Interviews were conducted to parties involved with research at PT. Wiska.

#### **4. Observation**

Observations made are data collection obtained directly at PT. Wiska.

#### **5. Study Of Literature**

Literature study is carried out by collecting study data on books, literature, and reports relating to solving research problems.

#### **6. Design of the System to be Built**

At this stage the researcher analyzes the needs of system design. The following are the stages used in analysis and design.

#### **7. System Analysis**

System analysis stage is analyzing the system to be built to fit the needs in accordance with the problems that occur. This stage consists of:

1. System analysis in progress
  - a. analysis of the problem
  - b. analysis Procedure that runs
  - c. analysis of the business rules in progress
  - d. analysis of the business rules of the system to be built
2. Analysis Method Of Supply Chain Management (SCM)
  - a. Analysis of forecasting the amount of raw material needs using Single Exponential Smoothing method and calculate the value of the error using the MSE (Mean Square Error).
  - b. Analysis of the supply of products and raw materials using the safety stock.
  - c. analysis of the procurement of raw materials.

- b. analysis of product delivery
2. Non Functional requirements analysis
  - a. needs analysis Hardware
  - b. needs analysis Software
  - c. User Analysis
3. Functional requirements analysis
  - a. Data Base Analysis
  - b. the context Diagram
  - c. Data Flow diagrams
  - d. the specification process and Data Dictionary DFD

#### **8. The design of the system**

The design of the system is the stage of designing a system that will be built in accordance with the results of the analysis. This step consists of:

- a. Scheme Relation
- b. table structure
- c. the design of the Menu structure
- d. Interface Design
- e. The Design Of The Message
- f. Design Semantic Networks
- g. Procedural Design

#### **9. System Development**

This stage is to build a system based on the results of the analysis and the design of the system so that the system will be built according to your needs.

#### **10. Test the system that has been built**

This stage is a stage which is done to find out the system or software that has been made to address the problems occurred and do a test run to users who are using the system in pt. Wiska.

#### **11. The withdrawal of the Conclusion**

The last stage of research done is withdraw conclusion against a system that has been built is already in accordance with the original purpose of the research.

## **2. CONTENT OF THE STUDY**

### **2.1 Grounding Theory**

The cornerstone of the theory is a framework in the writing of scientific papers to explain things any support in the development of scientific papers. The Foundation supports this theory in a study, then some explanations here support for the construction of the information system by using the method of Supply Chain Management (SCM) PT. Wiska.

#### **2.1.2 system information**

Information system is a system in an organization to meet the needs of daily transaction processing, supporting operations,

are managerial and strategic activities of an organization and provides a certain outside parties with the required reports.

### 2.1.3 Supply Chain Management (SCM)

Supply Chain Management is a necessary method of coordination and collaboration among companies. A good SCM can enhance the ability of competing for supply chain but not cause one party gives up something in the long run, because the necessary understanding, trust, and clear rules. [3]

## 2.2 Forecasting

Used for forecasting demand forecasting companies which will be used as a benchmark in the planning of production.

### 2.2.1 Single Exponential Smoothing Forecasting Method

Single Exponential Smoothing method is its ability to use past data by administering the weights based on data now. More data is now being given greater weight in comparison with previous data. Single Exponential Smoothing formula is:

$$F_{t+1} = aX_t + (1 - a)F_t$$

Description:

$F_{t+1}$  = The results of the forecast for the period t-1

$a$  = Seamless constants

$X_t$  = Actual demand data for the period t

$F_t$  = Forecast period t

### 2.2.2 Measurement Errors of forecasting

Measurement errors of forecasting using the Mean Squared Error (MSE), the Mean Squared Error (MSE), namely the average of the squared forecasting errors and can be seen in the Parallels.

$$MSE = \frac{\sum (X_t - F_t)^2}{n}$$

Description:

$MSE$  = The Value Of The Mean Square Error

$X_t$  = The actual data in the period t

$F_t$  = Forecast data from the model used in the period t

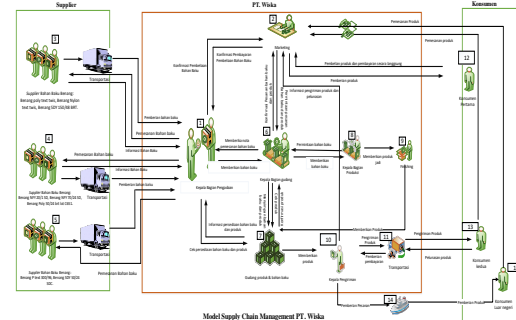
$n$  = A lot of data results forecast

## 2.3 System Analysis

System analysis which aims to study the business processes running and the need to use to build the application. In system analysis done parsing in detail to get the evaluation process and identification of issues that are more directional and correspond to the needs that exist.

The stage is done is system analysis, problem analysis, analysis of the running procedures, business rules analysis, analysis of methods of supply chain management, needs analysis, functional and non functional needs analysis.

### 2.3.1 Supply Chain Management model



**Figure 2 Supply Chain Management Model at PT. Wiska**

A description of the perpetrator of the Supply Chain in Figure 2 Supply Chain Management Model at PT. Wiska is as follows:

PT. Wiska using push supply chain approach also make to stock on a production system that is by the way of producing the product prior to the booking of the consumers and for the inventory stock in the warehouse therefore production at PT. Wiska strongly influenced by the presence of supplies of raw materials.

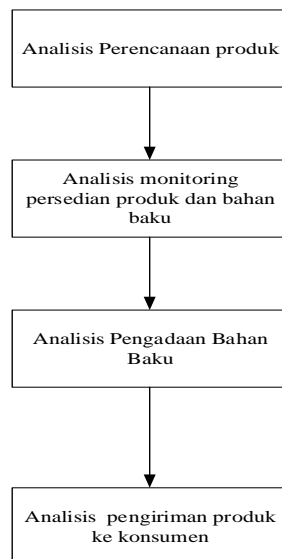
Stage in the supply chain PT. Wiska begins from the procurement of raw materials procurement head way confirm the purchase of raw materials to marketing, and marketing will print the raw material form and confirm your payment, and then confirmed again by the head of procurement and ordering raw materials to manufacture products which have been lodged a head of procurement to marketing. Materials you ordered will be delivered by the supplier directly to the company to produce appropriate letter path created by marketing.

PT. Wiska has 8 suppliers of raw materials for its production activities. The selection of suppliers based on the products sold by suppliers and purchases with the main supplier in advance and have worked together with PT. 8 Wiska supplier is in table 1.

**Table 1 Supplier of raw materials**

Bahan Baku	Supplier	Satuan	Harga
Nylon Mono Fill	Indahtex	Kg	Rp140.000
	Indorama Syntetic	Kg	Rp130.500
	Apf	Kg	Rp150.000
	Its	Kg	Rp145.000
Poly Text Twis	Insan Sandang	Kg	Rp250.000
	Sulindafin	Kg	Rp280.000
	Indahtex	Kg	Rp300.500
	Indachi Prima	Kg	Rp175.000
	Indorama Polychem	Kg	Rp350.000

### 2.3.2 stages of Supply Chain Management in PT Wiska

**Figure 3 stages of Supply Chain Management in PT Wiska**

#### 1. Analysis of product planning

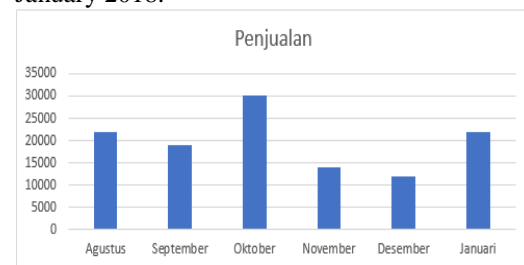
The perpetrators involved in the stages of product forecasting is part of procurement, the procurement section will foresee the amount of product needs to be in production. Calculation of required data product sales forecasting some of the earlier period. The data that will be used as an example of that is the products with most sales period August 2017 until January 2018 i.e. product type Vitrage. Recap of the product sales

Vitrage minimalist period August 2017 until January 2018 are described in table 2.

**Table 2 minimalist vitrage product sales Recap**

No	Periode	Jumlah Penjualan
1	Agustus	22000
2	September	19000
3	Oktober	30000
4	November	14000
5	Desember	12000
6	Januari	22000
<b>Total</b>		<b>119000</b>

Based on the data that has been elaborated to produce a chart to figure out the pattern of the data product sales. It aims to find out the methods that will be used in accordance with the pattern of the data produced. Graph data product sales can be seen in Figure 4 Chart product sales Vitrage Minimalist Period August 2017 until January 2018.

**Figure 4 Chart product sales Vitrage Minimalist Period August 2017 until January 2018**

#### 2. Analysis of Monitoring Inventories of products and raw materials

After a stage of forecasting, the next step is to conduct monitoring of raw material supplies and determine the limits of safe raw materials which must be digudang the raw material that aims to prevent the occurrence of deficiencies or emptiness of raw materials using the method of Safety Stock. An example of raw material inventory calculations using the Safety stock.

#### 3. The Analysis Of Procurement Of Raw Materials

Reservations against supplier among other thread poly text twiss, and thread nylon mono fill. The procurement process is carried out by means of the agreed cooperation. When the raw materials have been ordered to come it will be handled by the procurement section.

4. The analysis of the product delivery to consumers

The perpetrators involved in the the sender product to consumers is part of delivery. Head of delivery will make product delivery schedules and determine the use of the car or the car box hino.

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



### Figure 6 implementation of Interface Login

**Figure 7 implementation of Interface  
Forgot Password**

**Figure 8 implementation of the Admin interface**



## 2.8 User Interface Implementation See

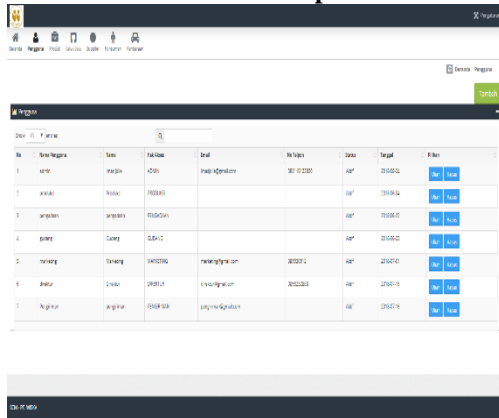


Figure 9 implementation of the User Interface See

## 2.9 Beta Testing Conclusions

Based on the results of interviews conducted against users who consists of admin, Director, marketing, production, parts procurement, head of warehouse and shipping States that supply chain management information system that built on the calculation of the purchase of raw materials is already quite correctly and in accordance with required. For the delivery of the product is already quite helpful in making the delivery schedule of the product to the consumer. As for the look of the built system is already quite interesting.

## 3. COVER

This chapter will explain about the conclusion that contains the results of the diproleh after analysis, design, and implementation of the design of software built and have been developed as well as suggestions that will provide notes It is important and possible repairs need to be done for the development of the software before..

### 3.1 Conclusions

Seen from several aspects, starting from the initial research to the study ends, it can be concluded that the single exponential smoothing forecasting method is very instrumental in this study proved to be based on the results obtained from blackbox testing and testing end user after pernerimaan applied in pt. Wiska then conclusion can be drawn as follows:

- with the supply chain management development PT. Wiska, who was initially raw material procurement processes in the company of PT. Wiska erratic every month, and supply chain management information system in PT Wiska can help in the procurement section determine the amount

of raw materials that must be reserved to the supplier to meet the needs of production.

- supply chain management information system in PT Wiska can help in the process of shipping parts delivery both in domestic and abroad to do the scheduling of the product to the place of the consumer.

### 3.2 Advice

Suggestions for the development of information systems there are a few suggestions that may be made, inter alia:

- the system can be expanded back to all fields, in particular on the process of pegadaan of raw materials and the process of new PT. Wiska.
- Expected to be developed for the assessment of the performance of an entire people who work in these agencies.

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