

# DEVELOPMENT OF RAW MATERIAL INVENTORY MANAGEMENTS INFORMATION SYSTEM IN PT ADVERTA NATA BUSINESS JAYA

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## ABSTRAC

PT. Adverta Nata Usaha Jaya is a company engaged in digital printing, located Bandung West Java established in 2010. The problem at PT. Adverta Nata Usaha Jaya, which is difficult to determine the amount of raw material purchase planning due to demand for raw material expenditure, of each type is known to be erratic, making it difficult to monitor the supply of raw materials in warehouses, this results in the frequent stock of raw materials that are in the minimum even empty quantities available at warehouse . The solution made to overcome the problems experienced by PT. Adverta Nata Usaha Jaya, that is needed a raw material inventory management information system. Calculation of raw material inventory in the warehouse using the Safety Stock method, in and out of raw material inventory by applying the First In First Out (FIFO) method. Based on the test results it was concluded that the inventory management information system built of raw materials can assist the warehouse admin in planning the amount of raw material demand planning and facilitate the warehouse admin in monitoring inventory in and out of raw materials in the warehouse.

Keywords: Raw Material Inventory Management, Safety Stock, First In First Out, System.

## 1. PRELIMINARY

PT. Adverta Nata Usaha Jaya is a company engaged in digital printing. The main consumers of PT. Adverta Nata Usaha Jaya, PT. Cendo Pharmaceutical, as the holding company, provides medicine box packaging needs. The printing division is responsible for handling product manufacturing. Warehouse owned by the company to store inventories of raw materials and finished products, whose duty is to stock raw materials, namely the Warehouse Admin position. 4 categories of raw materials stored in the warehouse, namely the paper, ink, coating and chemical categories. Kategori kertas the company uses 26 types of raw materials, for the ink category uses 68 types and the chemical category

uses 2 types of raw materials. The most widely used raw materials are 260 gram Art Carton type and Shapira Ink Pro type of ink.

PT. Adverta Nata Usaha Jaya has activities related to the supply of raw materials in the warehouse, starting from the request for the purchase of raw materials by the company-to the supplier, receiving raw materials sent from the supplier, storing the received raw materials, releasing raw materials from the warehouse based on the demand for expenditure from the production and control of raw materials available in warehouses. For example, the type of Art Carton 260 gram raw material in January 2017-December 2018 is 27,161 Pak Art Carton 260 gram type and Shapira Ink Pro ink type is 527 kg, and it is also known in the time period of expenditure, the raw material from each type of raw material known to be uncertain, resulting in the warehouse Admin experiencing difficulties in determining the number of raw material purchase requests to be ordered to the Supplier. Substitution of paper size usage when there is an expenditure request, the paper used is not available from the supplier, the warehouse Admin plans a purchase request with the previous paper size that will be used to determine the amount of raw material to be ordered. This becomes a problem when the demand for raw material expenditure from the Production Department increases due to a shortage of raw materials in the warehouse, which can hamper production activities. The raw materials that come out are obtained in the same table. This makes it difficult for the Warehouse Admin to monitor the% inventory of raw materials in the warehouse, so that errors in monitoring raw materials often occur which will have an impact on subsequent ordering of raw materials.

The purpose of this research is to build a Management Information System for Raw Materials in PT. Adverta Nata Usaha Jaya which is useful to be one of the solutions to these problems.

The system created aims to assist the warehouse admin in planning the purchase of raw materials so as to minimize raw material shortages when there is demand from the production department. Moreover, it can help the warehouse admin to monitor the inventory of raw materials in the warehouse so that they do not experience a shortage of raw materials.

## 2. RESEARCH CONTENT

### 2.1 Theoretical Basis

Theoretical Basis Explain about theory and discussion. that. related. with development. System. Information. Raw Material Inventory Management at PT. Adverta Nata Usaha Jaya.

#### 2.1.1 Information systems

Information systems are a combination of information technology and the activities of people who use the technology to support operations and management processes. According to Tata Subaru, information systems in a process aimed at interactions between people, algorithmic processes, data technology funds. This process aims to facilitate business processes [1]

#### 2.1.2 Sistem Informasi Manajemen

DR. Ir. Eddy Soeryanto Soegoto said in the book Entrepreneurship being an accomplished writer that the word management is "the process of planning, organizing, directing, and supervising the resources of each organization in order to achieve organizational goals that have been created [2] .

Management Information System is a collection of each related part, barkumpul into one unit, interacting and cooperating with one part with another part in several specific ways to carry out data processing functions, receive input in the form of data, then process it, and produce output in the form of information as a basis for decision making that is useful and has a value that can be felt as a result either at the moment or in the future, supporting the operational, managerial, and strategic activities of the organization, by utilizing the various resources available and available for the function to achieve the goals [ 3] ..

#### 2.1.3 Manajemen Persediaan

Inventory is a model that is commonly used to solve problems associated with controlling raw materials and finished goods in a company's activities. A distinctive feature of the inventory model is that the optimal solution is focused on guaranteeing supplies at the lowest possible cost [4]

Inventories are materials and products d ipunyai or provided specific company to meet production needs, as well as finished products supplied to meet product orders from consumers , distributors, retail in each period / time [5].

#### 2.1.4 Inventory Management Information System

Inventory is a stock of goods or any resources used in an organization. Inventory system is a set of policies and controls that oversee the level of inventory and determine the level of inventory that must always be available, when the stock will be empty and when it must be replenished, and the size

of the order that must be ordered at a certain period [6] .

#### 2.1.5 Safety Stock

The security inventory is an additional inventory held to maintain the possibility of a shortage of material (stock out). Besides being used to cope with the occurrence of the arrival of raw materials. The availability of safety raw material supplies is expected to be undisturbed by the production process-material insecurity. This safety stock is a certain number of units, where these amounts will be retained, even though the raw material can be replaced with new ones [7].

The formula used to calculate Safety Stock is:

$$Ss = (maximum\ use - average\ use)Lead\ Time \quad (1)$$

$$Ss = Z \times \sqrt{\left(\frac{PC}{T}\right) \times \sigma D} \quad (2)$$

Condition:

Ss	= Safety Stock
Z	= Safety Factor
PC	= Permormance Cycle
$\sigma D$	= Standard Deviation of Demand
T	= Cycle Period

$$Ss = Z \times \sqrt{\left(\frac{PC}{T} \times \sigma D^2\right) + (\sigma LTLT \times Daverage)^2} \quad (3)$$

Condition:

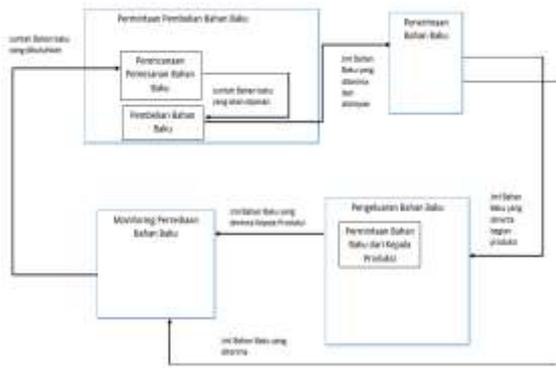
Ss	= Safety Stock
Z	= Safety Factor
PC	= Permormance Cycle
$\sigma D$	= Standard Deviation of Demand
$\sigma LTLT$	= Standard Deviation Lead Time
Daverage	= Demand average

## 2.2 Model Analysis of Raw Material Inventory Management Information System at PT. Adverta Nata Usaha Jaya

PT. Adverta Nata Usaha Jaya has 4 inventory activities including, raw material expenditure is part of the demand for material expenditure from the head of production to the warehouse, the second is monitoring of raw materials in the warehouse is checking the raw materials whose stock is still available in the warehouse, the third request for purchasing raw materials to supplier by showing the safety stock and the amount of raw materials needed, and finally the receipt of raw materials ordered from

the

supplier.



**Figure 1.** Model of Raw Material Inventory Management Information System at PT. Adverta Nata Usaha Jaya

### 1. Expenditures of Raw Materials

The process of the release of raw materials from the warehouse is an initial action that is the demand for production. The stage in this process is a request from the production department, by submitting a request for raw materials by providing a letter regarding information on the type of raw materials and the quantity of raw materials requested. In this case, one sample of PO data is taken with the type of raw material Art Carton 260 grams of size 79x109.

**Table 1.** PO Consumer

No. PO	Tanggal Pemesanan	Tanggal Pengiriman	Produk yang dipesan	Jumlah yang dipesan	Bahan Baku	Jumlah bahan baku yang dibutuhkan	Konsumen
-	6 Februari 2017	-	Asthesof	10000 pcs	Art Carton 260 gram Ukuran 79x109	67000 Lembar	PT. Cendo

### 2. Monitoring raw material inventory in the warehouse

The process is carried out to check the supply of raw materials, which are available in warehouses. To identify the amount of raw material, the minimum amount is even empty. Raw material checking The warehouse admin sees the monthly raw material stock table presented in tabular form, while the data used as an example is the raw material inventory data for the February 2017 period.

**Table 2.** Raw Material Inventory Monitoring

Nama Bahan Baku	Ukuran	Persediaan bulan Februari 2017	Permintaan Pengeluaran 6 Februari 2017	Status Persediaan	Jumlah yang dibutuhkan
Art Carton 260 gram	79x109	3000 Lembar	67000 Lembar	Tidak Aman	88000 Lembar
	109x79	17500 Lembar	0	Aman	

Based on checking raw material inventory, table 2 can be seen that raw material inventory in February 2017 is in an unsafe status to meet the demand for expenditure from the production department so that

the warehouse Admin must plan the purchase request for raw materials by looking at the quantity of raw materials requested by the head of production.

### 3. Purchase Requests - Raw Materials

The planning process is the stage of planning the amount of raw materials that must be ordered to suppliers based on the data of the demand for raw materials in one period (1 year). Data on the use of raw materials from the warehouse over a two-year period (January 2017 - December 2018) is taken as a sample.

**Table 3.** Raw Material Usage Data

Tahun	Art Carton 260 gr (Lembar)				Shapira Ink Pro (gram)			
	79x109	109x79	76x106	70x92	Yellow	Magenta	Cyan	Black
2017	682500	406500	176500	492000	72258	35255	77452	50900
2018	0	0	0	958550	77025	51452	111835	50770
<b>Total</b>	<b>682500</b>	<b>406500</b>	<b>176500</b>	<b>1450550</b>	<b>149283</b>	<b>86707</b>	<b>189287</b>	<b>101670</b>

Determination of the number of raw materials that must be ordered based on the calculation of the number of available raw materials reduced by the results of the calculation of safety stock

The following is the calculation of the safety stock of 260 grams of 79x109 art carton type raw materials.

Amount of stock needed = 341250 sheet  
 The number of workdays for a period = 312 days  
 Lead Time (l) = 4 day (average yield)  
 Average procurement per day = 341250/312 = 1093,75

Service Level 90% (Z) = 1,28  
 Standard Deviation Lead Time (s<sub>l</sub>) = 312/10 = 31,2

Standard deviation of the number of forecasting (s<sub>d</sub>) = 1093,75/10 = 109,38

$$\text{Safety Stock} = Z \times S_{dl}$$

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

$$S_{dl} = \sqrt{(19149376 \times 973,44) + (4 \times 11963,98)}$$

$$S_{dl} = \sqrt{(18640768573,44) + (47855,92)}$$

$$S_{dl} = \sqrt{18640816429,36}$$

$$S_{dl} = 136531,38$$

$$\text{Safety Stock} = 1,28 \times 136531,38$$

$$\text{Safety Stock} = 174760,17$$

$$\text{Safety Stock} = 174760 \text{ Lembar}$$

**Table 4.** The amount of raw material that must be ordered

No	Nama Bahan Baku	Stok	Safety Stock	Status	Jumlah yang harus dibeli
1	Art Carton 260 gram ukuran 79 x 109	3000 Lembar	14563 lembar	Tidak Aman	287 pack
2	Shapira Ink Pro Yellow	3000 gram	9555 gram	Tidak Aman	12,5 kg
3	Shapira Ink Pro Magenta	3000 gram	5550 gram	Tidak Aman	5 kg
4	Shapira Ink Pro Cyan	2000 gram	12115 gram	Tidak Aman	15 kg
5	Shapira Ink Pro Black	2000 gram	6507 gram	Tidak Aman	7,5 kg

#### 4. Ordering Raw Materials

This process is carried out when purchasing raw materials with an amount in accordance with the calculation of the purchase plan that has been done. Finance Section at PT. Adverta Nata Usaha Jaya saw the results of calculations made by the warehouse Admin. ordered to Supplier

No	Nama Bahan Baku	Tanggal Pesan	Jumlah yang harus dibeli	Satuan	Supplier
1	Art Carton 260 gram ukuran 19 x 109	1 Maret 2017	287	Pak	PT. Esa Kirana Nusa
2	Shapura Ink Pro Yellow	1 Maret 2017	12,5	Kg	PT. Heidelberg
3	Shapura Ink Pro Magenta		5	Kg	
4	Shapura Ink Pro Cyan		15	Kg	
5	Shapura Ink Pro Black		7,5	Kg	

#### 2.3 System Analysis and Design

The analysis is performed on all system components that are being used and are needed in the construction of an information system.

##### 2.3.1 Database Analysis

Database analysis on Raw Material Inventory Management Information System at PT. Adverta Nata Usaha Jaya uses Entity Relationship Diagram (ERD).

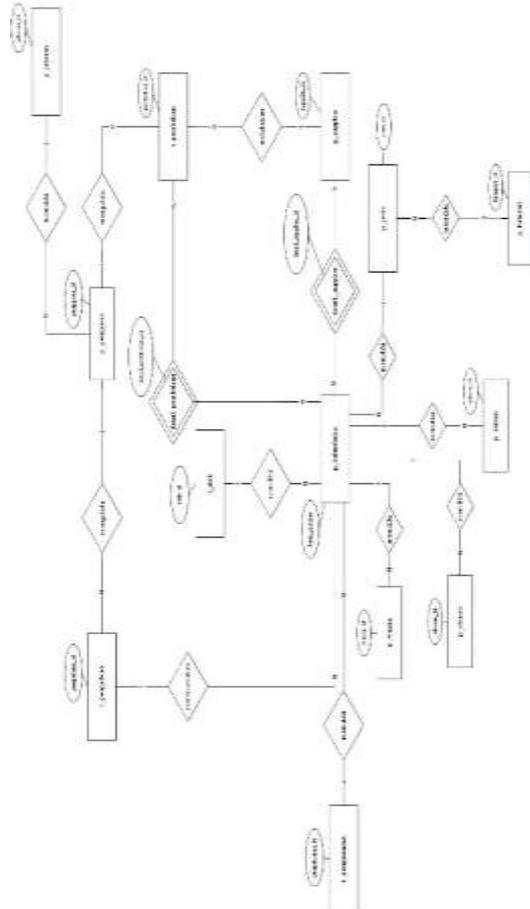


Figure 2. Entity Relationship Diagram

##### 2.3.2 Context Diagram

Context diagram is a model consists of the process scope of the system how the data is

transformed through a particular process or describe, the whole system flow both data input data into and out of the system.

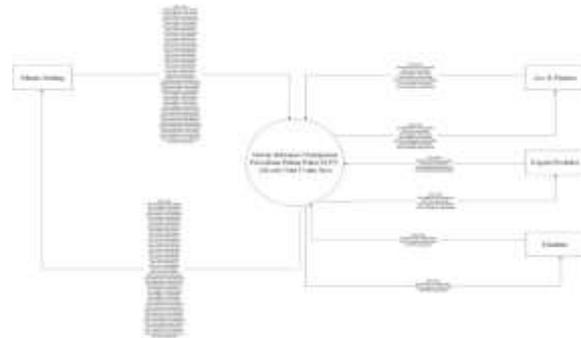


Figure 3. Context Diagram

##### 2.3.2 Data Flow Diagram (DFD)

Data flow diagram (DFD) is a logic data model or process created to describe the flow of data, becoming more detailed. DFD is divided into several levels according to the data flow needed by the system to be built.

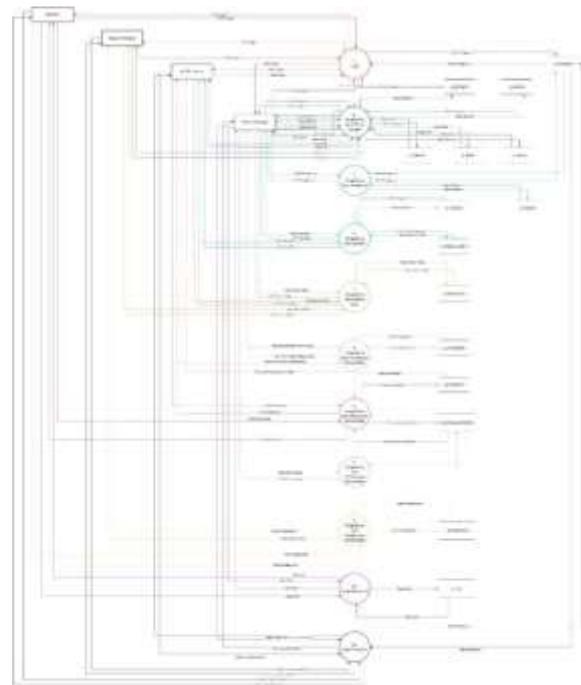


Figure 4. DFD Level 1

Based on Figure 4 DFD level 1 above, there are 4 main processes in this management information system, which are in the form of:

1. Raw Material Demand Data Management  
This process is in the form of submission of raw material purchase planning conducted by the warehouse admin and submitted to the acc and finance
2. Data Processing for Purchasing Raw Material

This process is in the form of data management carried out by ACC and Finance

3. Management of raw material acceptance data

This process is the management of raw material data coming from suppliers, this process is carried out by the warehouse admin

4. Raw Material Expenditure Data Management

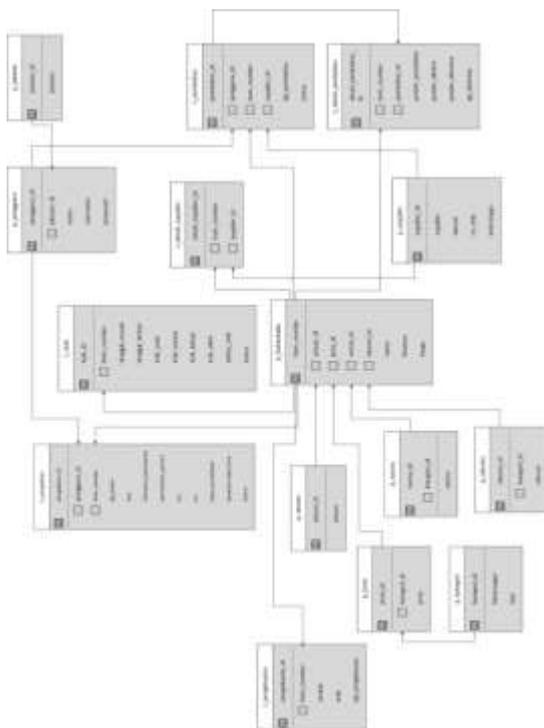
This process is the management of raw material data that comes out of the warehouse based on a request from the head of production that will be approved by the warehouse admin.

**2.4 System Design**

The design is part of the software development methodology that must be done after going through the stages of analysis. The design is defined as the system application process that will be implemented

**2.4.1 Design Relationship Tables**

The relation table illustrates the relationship between data, the meaning of data and its limitations. The process of relation between attributes is a combination of attributes that have the same primary key, so that these attributes become a single unit that is connected by the key field.



**Figures 5.** Relation table

**2.4.2 Interface Design**

Interface design is used to describe the appearance of the system that will be used by users to interact with the system to be built [8].



**Figure 6.** Design Interface

**2.5 System Testing**

System testing is an important thing aims to find errors or deficiencies that occur in the system being tested. The purpose of the test is to find out the system that has been made already meets the performance of the design objectives made [9].

1. Functional Testing  
This test uses black box testing focused on the terms of the functional testing of the software or the system being built.
2. End User Testing  
This test is focused on acceptance of end users by using User Acceptance Testing (UAT) in order to find new defects found by the developer [10].

**3 CLOSING**

In this section, explaining the conclusions that contain the results obtained after analysis, design and implementation of the design of software that is built and has been developed as well as suggestions that will provide notes for previous software development.

**3.1 Conclusion**

Based on the results obtained in the writing of this final project, the following conclusions can be drawn:

1. The information system that was built can facilitate the warehouse Admin in planning the purchase of raw materials and make it easier to determine the amount of raw materials needed.
2. The information system that was built can facilitate the warehouse admin in monitoring the inventory of raw materials in the warehouse.

**3.2 Suggestion**

Based on the results of the system test, several suggestions can be taken into consideration. Suggestions that could be considered include during an interview with the director he gave an opinion.

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

1. This management information system needs to be developed like a display to make it more attractive.

2. This management information system is equipped with a more detailed cost analysis calculation using the appropriate method.

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