DEVELOPMENT OF SUPPLY CHAIN MANAGEMENT INFORMATION SYSTEM AT CV. MUSTIKA FLAMBOYANT

Riki Achmad Nurzaman[1], Utami Dewi Widianti[2]

[1,2] Informatic Engineering – Indonesia Computer University
Dipatiukur Street 112-114 Bandung
E-mail : riki_achmad81@yahoo.co.id [1], utami.dewi.widianti@email.unikom.ac.id[2]

ABSTRACT

CV Mustika Flamboyant is a company engaged in the beverage industry located in Kuningan, West Java with the results of its product in the form of product health drink with lime base material with a product called JENIPER. Problems occurred is the difficulty determines the number of production because of the uncertain sales every month by a significant amount, so the impact on the determination of raw materials, other than because sales did not specify, in the determination of the amount of the purchase of raw materials often still use the approximate IE when visible inventory of raw materials which is owned digudang had almost run out. The other problem that is not yet the existence of scheduling in arranging delivery of the products along with information about the vehicles used and the number of products that will be shipped as well as the determination of the closest distance delivery.

Based on problems occurred, then it needs a construction system information using supply chain management approach. The purpose of this system is to facilitate the development of the head of Production in determining the amount of finished products to fit the needs of sales agents, make it easy to head of production determine the amount of raw materials should be available, to meet the supply of finished product inventory to meet the request of the Agency, makes it easy to head of marketing in the distribution process by having shipment scheduling and determining the closest distance. Demand forecasting method of booking the product used is a single Moving Average method to evaluate errors of forecasting method using Mean Square Error (MSE), while for the calculation of prediction method using digudang product availability safeguards inventory (Safety Stock).

Based on the results of testing, black box testing, UAT and end-user testing after applying in the environment it can be concluded that this system can help the head of production in determining the amount of production of the product and the determination of the amount of raw material that will be ordered and ease the head of marketing in arranging the schedule distribution amount of the right product to stock available.

keyword : *supply chain management, single moving average,black box*

1. INTRODUCTION

1.1 Background

CV Mustika Flamboyant is a company engaged in the beverage industry located in the District of Kuningan, West Java with the results of its product in the form of beverage products kesahatan base material with lime juice with its product named JENIPER (lime squeeze). CV Mustika Flamboyant producing 2 products i.e. sizes 140 ml (ready to drink) and size of 650 ml (syrup). CV Mustika Flamboyant use of the strategy of make to stock for the production process, namely the existence of a production process before the existence of the order. Supply chain management activities in CV Mustika Flamboyant done from upstream to downstream. Sales of finished products is carried out to the agent to some regions in West Java such as Kuningan, Cirebon, Indramayu, Bandung, and other jobs

Based on the results of the interview with Father Yus Indriadi as the head of production at CV Mustika Flamboyant exposes related activities that occur in production at CV Mustika Flamboyant and data analysis that has been done, the production is done to satisfy every request of the Agency, CV Mustika Flamboyant doing production any day from Monday-Saturday 09.00 – 15.00. The determination of the amount of production that do parts production based on sales results each month, CV Mustika Flamboyant JENIPER product sales data from January until August 2016 with the amount of 48399 bottle (Attachment F. 6) with average monthly sales of bottled 6050. Jeniper products are the most widely sold that is JENIPER READY to DRINK with the number of sales reached 35105 bottle (Attachment F. 6). Based on these data it is known that the number of sales each month with a sales amount of erratic wrote significant differences in number. With the erratic sales each month resulted in a head of production is difficult to determine the number of finished product that should be produced

each month. It also had an impact on the determination of the amount of raw materials that must be reserved to the supplier.

In addition to the uncertainty of the sale noted that raw material procurement processes currently carried out at regular intervals and in determining the amount of raw materials which are often still use the approximate IE when visible inventory of raw materials in the warehouse already owned nearly depleted or even in the same amount in each month it will have an impact on raw materials shortage so as inhibit the production or if the excess raw materials would be bad for the quality of raw materials especially vulnerable Orange foul if stored too long. Not to mention a pause time of booking until the delivery of raw materials by the supplier 3-5 today, these problems result in frequent shortages of stock of raw materials and the production process is interrupted even stalled a few days, in addition to the difficult determining the difficulty of determining raw materials production will have an impact for the sale to the agent agent request was not met because the finished product shortage or even emptiness as happens on data production and stock of products in January-August 2016 vacancy for 7 times (Attachment F. 7) in the period. The process of payment of the purchase of raw materials products using cash or a cash transfer system.

Based on the results of the interview with the father of Didi as the head of marketing Process pendistribusi carried out by marketing also often experience problems when the number of finished products to be sent less or do not fit because the available stock can not meet consumer demand for the order, this has resulted in more and delivery time the delivery process is hampered because if a shortage of stock, it will wait until the new stock can do on-demand shipping which previously have not been fulfilled or the agent will cancel and the cost for the delivery of any increase. In addition to the availability of stock of the troubled company also still the difficulty of determining the types of vehicles that must be worn and the determination of the distance to the delivery process also became obstacles for marketing because at the end, so the payment for shipping is usually part of marketing is doing it with a random process the shipment without any provision which customers route have to be served in advance it less good because if there are any agents that are closer and shot it would be detrimental for the agent. With regard to return of the goods of the parties does not accept the Flamboyant Mustika CV. Process payments made by agencies using cash when goods in between then the direct payment.

2 CONTENT OF RESEARCH

2.1 The Cornerstone Of The Theory

The cornerstone of the theory on writing this thesis will explain about the theories related to the application of information system In Supply Chain Management CV Mustika Flamboyant

2.1.1 Information System

Information systems (information system) is a combination of people, hardware (hardware), software (software), a communications network, and data resources that collect, transform, and distribute information within an organization. People depend on information systems to communicate between each other using various types of physical tools, commands and procedures information processing, telecommunications or network channels, and data stored data or resources.

2.1.2 Supply Chain Management

Supply Chain (chain of procurement) is a system of funneling goods organization places of production and services to its customers. The chain is also a network or networks of interconnected organisations which have the same purpose, namely as best we can organise the procurement or distribution of the goods.

The concept of the supply Chain is a new concept in terms of looking at the question of logistics. In the old concept, logistics internal problems as more of each company, and a possible solution was placed on solving in intern in the company respectively. While in this new concept, the problem of logistics is seen as a broader issue which is very long, starting from raw materials to finished goods used the end consumer, which is the chain of procurement. It can be said that the supply Chain is the logistics Networks. In this connection, there are a few major players which are the companies that have the same interests, namely:

1. Suppliers;
2. Manufacturer;
3. Distribution;
4. Retail outlets;
5. Customers.

Chain 1 : Suppliers

The network at the start of the supplier, which is the source that provided the first ingredient, where the chain of distribution of goods will be started. This first material can be in the form of raw materials, raw materials, materials, auxiliary materials, spare parts, merchandise and so on. The first source is named suppliers. Number of suppliers could be many or few, but suppliers typically amount to much at all.

Chain 1 – 2 : Suppliers – Manufacturer

The first chain linked to the second, namely chain Manufacturer or plants or assembler or

fabricator or any other forms that do the work of making, mengfabrikasi, mengasembling, assemble, convert, or completed goods (finishing).

Chain 1 – 2 – 3 : Suppliers – Manufacturer – Distribution

Stuff already so generated by the Manufacturer already had to start distributed to customers. Although there are many ways for channelling merchandise to customers, the public is through a distributor and is usually reached by most of the supply chain. The goods from the factory via Keflavík transmitted to warehouse distributors or wholesalers in large quantities, and large traders later in time shall transmit such items in smaller quantities to retailers or retailers.

Chain 1 – 2 – 3 - 4 : Suppliers – Manufacturer – Distribution – Retail Outlets

Wholesalers usually has its own warehouse facilities or can be also rented from other parties. The warehouse is used for stockpiling goods prior to transferring it again to the retailer. Here again there is a chance to acquire the savings in the form of the amount of inventories and the cost of the warehouse, with the way the design patterns return shipment from the Manufacturer or warehouse to the store retailers (retail outlets). Although there are some factories that directly sell its results to the customer, but the relative amount not much and most use this pattern.

Chain 1 – 2 – 3 - 4 – 5 : Suppliers – Manufakturer – Distribution – Retail Outlets – Customers

The retailers or retailers offers the goods directly to the customer or buyer or user of the item. That includes outlets are shops, stalls, Department stores, supermarkets, cooperative store, Mall, Club store, and so on, anyway the end where buyers make a purchase. New supply chain completely stopped after the goods concerned arrive at the user end of the goods or services.

2.1.3 Supply Chain System

Based on the opinions of experts about the system and the authors conclude supply chain supply chain system is a system in the supply chain which has the aim of creating mutually beneficial cooperation in controlling, regulating and improving the flow of material and information of a product from supplier to end users. Development of supply chain system in the CV Mustika Flamboyant author in development using supply chain management approach.

2.1.4 Supply Chain Management (SCM) Process

Supply chain management process is a process of processing of products from raw material still start, semi-finished products to finished product is obtained and then sold through a wide range of facilities which are connected by chains along the flow of products and materials. When depicted in the form of a chart will appear as follows:



Fifure 1. Model simplification supply and 3 kinds of streams run

Figure 1 shows that the supply chain management is the coordination of materials, information and financial flows between the participating companies..

a. flow of material involving the flow of physical products from the supplier to the consumer through a chain, as well as feedback from returns a product, service, recycling and disposal.
b. information flows include forecast demand, transmission of orders and order status report.
c. financial flows include credit card information, credit terms, payment schedules, assignment of ownership and delivery.

2.1.5 Push dan Pull Supply Chain

Pull supply chain is a strategy of production make-to-order "that the main benefit is avoiding waste or inventory is a strategy the company mainly manufacturing companies where new production done always after the market demand and actually done at the request of the customer.

Push the Supply Chain is a strategy of production Make-to-Stock. The push system is essentially a system of planning and controlling production-based material requirments planning (MRP) [8]. The pull strategy more popular compared to the production system because the pull system based upon forecasting or forecasting and generating large amounts of output that would later go into inventory before it is transmitted to the customer.

2.1.6 Single Exponential Smoothing Forecasting Method

Forecasting based on refinement method exponential (exponential smoothing) is generally used to estimate sales of products individually. This method is often considered better than the previous two methods, namely simple average and a single moving average because of its ability to use past

data by administering the weighting based on the present data. More data is now being given greater weight in comparison with previous data. The assumption is that more data is now always have a stronger influence against the results of the forecast compared with the more obsolete data [8].

2.1.7 Mean Squares Error (MSE)

Counting errors of forecasting used to know the accuracy of forecasting results that have been made against actual data. There are many models for forecasting errors doing the calculations. The method used to calculate the fault forecasting (forecast error) is a method of MSE (Mean Squared Error). MSE is the average of the difference in the squares of the values predicted with observed [5]. MSE is used by generating an existing error indicates how large the difference results estimation with the destinations. This makes it different due to the randomness in the data or because it does not contain a more accurate estimation. The formula for the MSE can be seen in equation 2

Where,
At = Actual Demand in the period t
FT = demand forecasting in the period t
n = the number of forecasting period involved

2.1.8 Avability (Inventory)

Supplies along the supply chain have implications on the financial performance of a company. The amount of money that are embedded in the form of supplies is usually so great that supplies is one of the largest asset owned by the supply chain. Many companies have a value of persediaanya melibihi 25% of the overall value of owned assets. This means that the cost of capital that is stuck in the form of supplies in an enterprise/supply chain is very large. [5].

2.1.9 Engineering Safety Stock

Based on the classification of the preparation which is already explained earlier the author uses techniques of Safety stock to mngakomodasi requests that the uncertainty effect on supplies [5].

Safety inventory (Safety stock) is useful to avoid shortages of raw materials at a particular moment or moment of lag time (lead time) in the process of booking the next security, inventory (safety stock) is useful to protect the company from risks running out of [5].

Formula safety stock (SS) to find the value of safety stock can be seen in Equation 3.

Safety Stock = Z x S_{dl}

Z = Service Level (the ability of the company to serve the request or translated from decision management)
S_{dl} = determined from the request with conditions of uncertainty can be seen in Figure 2

variabel		
Permintaan	Sdl = Sd x $\sqrt{(l)}$ *Safety Stock* ditentukan oleh ketidakpastian permintaan.	Sdl = $\sqrt{(d^2 \times Si^2 + l \times sd^2}$ *Safety Stock* ditentukan oleh interaksi dua ketidakpastian.
konstan	Tidak diperlukan *safety stock*, situasi deterministik (S_{dl} = 0).	Sdl = d x sd *Safety Stock* ditentukan oleh ketidakpastian *lead time*.
	konstan	variabel

Lead Time

Figure 2. Interaction between demand and lead **time**

2.2. Analysis Of The Problem

Analysis of the problem is an assumption of the problem which will be outlined in the procedure of data processing procedures on the development program of information system in Supply Chain Management CV Mustika Flamboyant. Analysis of the problems of the system that is running at the moment is:

1. The head of the Production difficulties determining the amount of production to fit the needs of the sales agents.
2. The head of the Production difficulties determining the amount of raw materials should be available, to meet the supply of finished product inventory to meet the demand of the agents.
3. Head of marketing difficulties in planning for scheduling delivery of products that have not been going well and the difficulty in menentuan the distance to the delivery.

2.3 Analysis Supply Chain Management (SCM)

Analysis of supply chain management is used to work on components of the information system will be built. Supply chain management has a framework is a component development for the system.

2.3.1 Model Supply Chain Management (SCM) in CV Mustika Flamboyant

Based on the analysis of the SCM that is described in the previous section, as for the model of supply chain in Mustika Flamboyant CV can be seen in Figure 3.

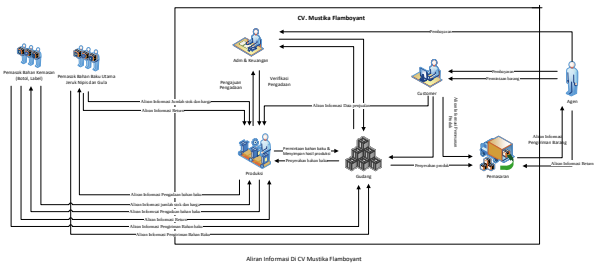


Figure 3. Model Supply Chain in CV Mustika Flamboyant

2.3.2 Analysis Supply Chain in CV Mustika Flamboyant

Supply chain analysis conducted to describe the supply chain management process that will be built in the Flamboyant Mustika CV based on supply chain model in Figure 3 as for the analysis of the

supply chain in Mustika Flamboyant CV can be seen in Figure 4.

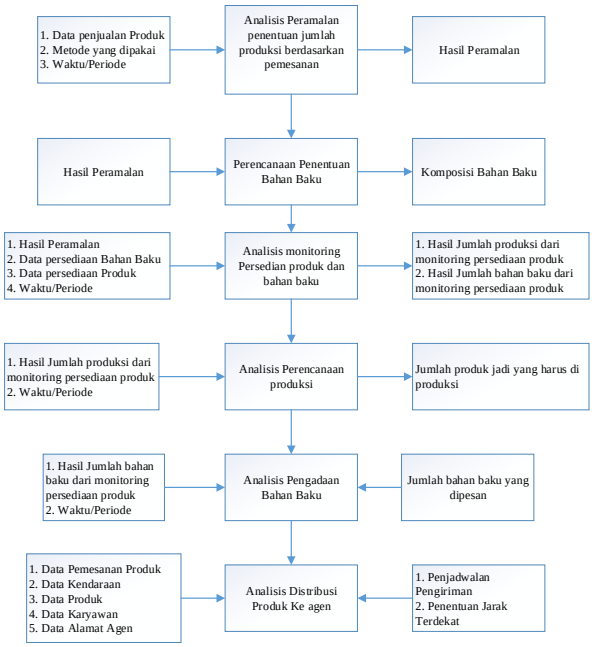


Figure 4. Analysis SCM in CV Mustika Flamboyant

2.4 Analysis Database

Database analysis is the analysis of the data sets are interlinked with each other so that it can support the information system will be built. The data obtained will be used to design the database accompanied by attributes-the attributes of each of the entities and the relationships between these entities. in designing the database, the data model that will be used is an Entity Relationship Diagram (ERD). Model ERD Development information system in Supply Chain Management CV Mustika Flamboyant can be seen in Figure 5.

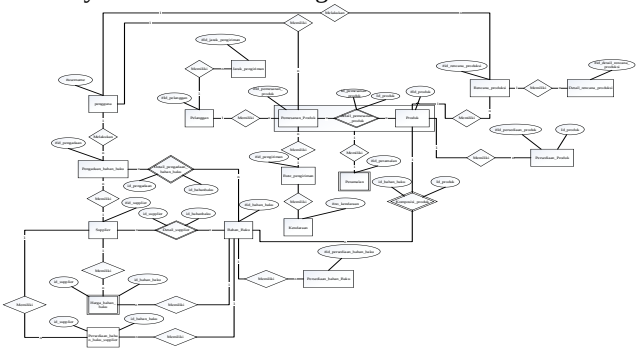


Figure 5. ERD Development information system in Supply Chain Management CV Mustika Flamboyant

2.5 A Context Diagram

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. This system context diagrams can be seen in Figure 6

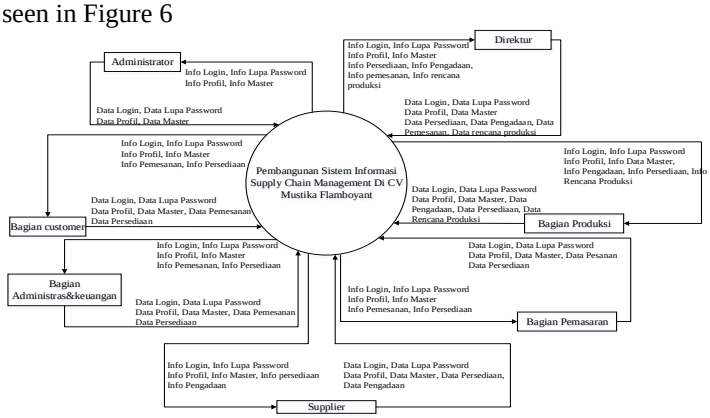


Figure 6. Context Diagram SCM CV. Mustika Flamboyant

2.6 Data Flow Diagram (DFD)

Data flow diagram shows how the flow of data and outlines the processes that occur in the system until the process in more detail. the processes that occur in the system until the process in more detail.

2.7 Table Relation

Table relation is used to describe the relationships between tables in the system in detail or clear. Table relation will be depicted in Figure 7.

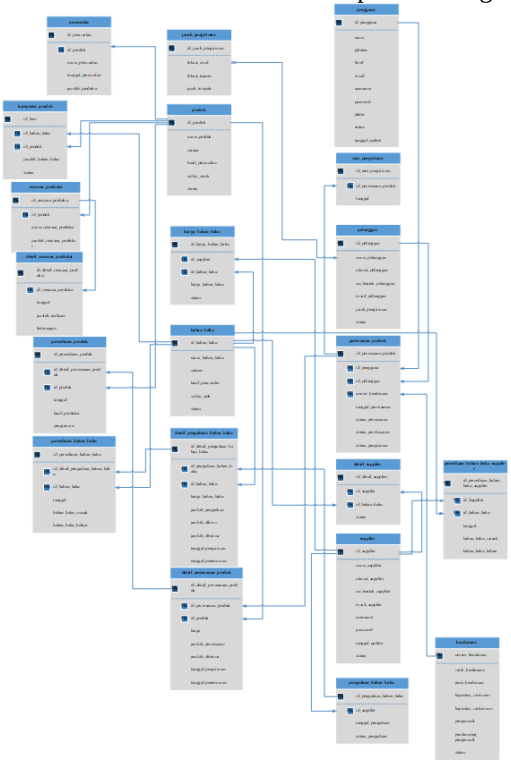


Figure 7. The Table Relation

2.8 The Design Of The Interface

The design of the interface is created to describe the display control rogram which will be

used by the user to interact with the system to be built. The design is based on the display of the input as well as output either interface to be generated when the application is implemented

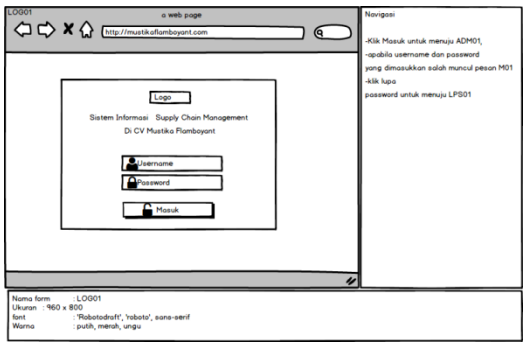


Figure 8. The Design Of The Interface

2.9 The Design Of The Semantic Network

The design of the semantic network administrator describes the process of linking the menus which can be accessed by the administrator with the error messages that occur at each process. The design of the semantic network administrators can be seen in Figure 9.

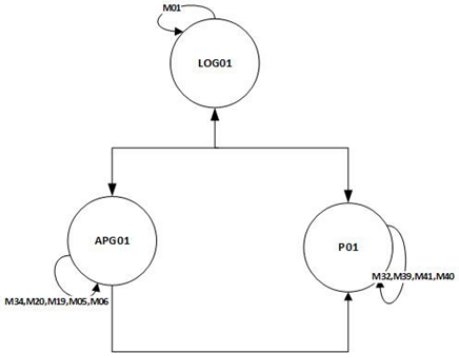


Figure 9. The Design Of The Semantic Network

2.10 Testing The System

System testing is the most important thing that aims to find any errors or omissions in the information system tested. Testing the system in question to know the performance of information systems that have been made in accordance with the objectives of the design of information systems. Testing the system using black box testing. Black box testing focuses on the functional requirements of the software and user acceptance testing (end users).

1. Functional Testing

Black box testing is a test used to test the new system. Black box testing is focused on testing the functional requirements for information systems.

2. User Acceptance Testing (End User)

User acceptance testing (end users) is testing undertaken where objectively tested directly onto the field that is concerned about the company's user satisfaction with the content of points i.e. the initial goal fulfillment and display interface of information system in Supply Chain Management.

In the user acceptance testing (end users) there are two test scenarios that will be made of them by using the UAT (User Acceptance Testing) done software testing process involves prospective users in the company that is selected by the developer as well as chaperoned when done. This is done with the aim of finding defects (defects) that are not found by the developer. Then the end user acceptance testing done after the system is implemented in an enterprise environment by using the interview to end users who use the software.

The interview was done testing against for any users of the page consists of a section head of marketing, head of production, the head of the Pack, head of the Chief of procurement and distribution. Testing is done on the end user acceptance testing after the system is implemented in the corporate environment is done directly in the corporate environment or place of research i.e. CV. Mustika Flamboyant. This is done with the purpose of knowing whether software that is built can provide the solution of problems faced by the company.

3 COVER

Pada bagian ini, menjelaskan tentang kesimpulan yang berisi hasil-hasil yang diperoleh setelah dilakukan analisis, desain, dan implementasi dari perancangan perangkat lunak yang dibangun dan telah dikembangkan serta saran-saran yang akan memberikan catatan penting dan kemungkinan perbaikan yang perlu dilakukan untuk pengembangan perangkat lunak sebelumnya.

3.1 Conclusion

Based on the results obtained from the research that has been done in the writing of this final project about the construction of information system in supply chain management CV Mustika Flamboyant then conclusion to be drawn as follows:

1. Supply chain management information system that can facilitate this head of production in determining the approximate number of production of the product to be created by using the help of forecasting and monitoring existing stocks of the product digudang using monitoring products.
2. Supply chain management information system that can facilitate this head of production in determining the approximate amount of purchases raw materials will be ordered and monitor existing stocks of raw material digudang by using the monitoring of raw materials.
3. Supply chain management information system built this can ease the head of marketing in a set of scheduling the delivery of products to consumers, help determine the vehicle that will be used in

shipping, helps determine the amount of product to be delivered and helps determine the distance delivery and shipping routes to determine the agents.

3.2 Advice

Based on all the results that have been achieved at present, supply chain management information system in CV. Mustika Flamboyant still has some drawbacks. It is recommended to add things that can supplement the system. As for suggestions for the development of information systems, supply chain management is as follows:

1. Information systems still need to be developed more of a side view of the interface and the language to make it more attractive and easier to use.
2. The development of information systems to implement customer relationship management which includes ordering products and customer complaint handling in order to simplify Agent in booking.
3. this information system still need to be developed more in the distribution process, namely the process of determining the distance that still haven't been fullest because of the methods used by the author is still difficult

REFERENCES

[1] Yakub, *Pengantar Sistem informasi*. Yogyakarta: Graha Ilmu, 2012.

[2] Mahendrawathi I. N. Pujawan, *Supply Chain Management Edisi 2*. Surabaya: Guna Widya, 2010.

[3] Sukarya Sinulingga, *Perencanaan dan Pengendalian Produksi*. Yogyakarta: Graha Ilmu, 2009.

[4] Sofian Assauri, *Manajemen Operasi Produksi Pencapaian sasaran Organisasi Berkesinambungan*. Depok: PT. Rajagrafindo Persada, 2016.

[5] Abdul Kadir, *Konsep dan Tuntutan Basis Data*. Yogyakarta: Andi, 2000.

[6] Fathansyah, *Basis Data*. Bandung: Informatika, 2004.

[7] Ian Sommerville, *Software Enginering Rekayasa Perangkat Lunak*. Jakarta: Erlangga, 2003.

[8] Wahana Komputer, *Panduan Aplikatif & Solusi (PAS) Sistem Informasi Penjualan Online untuk Tugas Akhir*. Yogyakarta: Andi, 2014.