SUPPLY CHAIN MANAGEMENT AT TASYA PRODUCTION

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ABSTRACT

Tasya Productions is an industrial company that is engaged in the manufacture of baby clothes with different models and sizes. The process that occurs is the process of booking deals consumer products baby clothing to companies experiencing obstacles i.e. the uncertainty of the amount of transaction bookings made by consumers. This makes it part of the warehouse have difficulty in determining the number of submissions to the purchasing of raw materials that require a waiting time of three to five days, so it may inhibit the process of distributing the products of baby clothes.

Based on the existing problems in current Production, Tasya needed a Supply Chain Management with the goal of makes it easy to determine the number of submissions to the raw materials purchasing and scheduling easier distribution of baby clothes to consumers. The methods used for forecasting raw material is a single exponential smoothing and prediction of the availability of raw materials in the warehouse using the method of safeguarding inventory (safety stock).

Based on the test results it can be concluded that the system built in the warehouse section can facilitate determining the number of submissions related to the purchasing of raw materials, allowing manager marketing in menjadawalkan distribution with vehicles that are used.

Keywords : Supply Chain Management, Single Exponential Smoothing, Safety Stock.

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1. INTRODUCTION

Tasya Productions is an industrial company that is engaged in the manufacture of baby clothes with different models and sizes. Tasya Productions has the Supply Chain Management activities from the upstream to the downstream i.e. Goto the procurement of raw materials to suppliers, receiving raw materials and performing the processing of raw materials into products of baby clothes. Tasya Production using the approach of make-to-stock production process i.e. prior to booking. Tasya Productionsteamed up with nine suppliers, among others, PT Multi, PT Multirona, PT Maria and others. For the selection of the raw materials with the same supplier the company chose suppliers with the price of raw materials have a standard of quality. Tasya Production has five categories of suppliers of raw materials, suppliers of raw material suppliers of fabrics, threads, materials suppliers, suppliers of chemical drug labels and packing materials, suppliers and has 39 machines in the production process which every day produce an average of 500 dozen. While the lower part is done by Tasya Production with buyer is accepting reservations products baby clothing and distributing it to the store. To process payments made by consumers using the method of payment is due, the payment rules apply to customers old and new customers will have to pay for in cash. As for the purchase of raw material products to suppliers using the system cash and maturity at the discretion of each company.

Based on interviews with the mother of Iis as the head shed at Tasya Production stated that procurement of raw materials made by the head of the warehouse is currently done each month with the number of bookings of the same raw material. As a result there was a problem when demand high booking number shortage of raw materials in the warehouse which resulted in the production process is not running so when there's a booking purchase baby clothes reservations cannot be made. Vice versawhen booking request down excess raw materials often occur and result in the buildup of the amount of raw materials in the warehouse.

Based on the results of the interview with Mr. Deni as section Manager of Marketingat Tasya Production, stating that the process of distribution of the products is doneevery working day in accordance with the number of consumer demand, and orderbookings in advance. Bookings occur on August 1, 2016, is the transaction a booking with the largest number of requests such as ordering Heri store as many as a dozen 2100 where the booking is the product of long pants Tara TCP M the most widelyrequested. As a result there is a delay in sending the product to the store, which will be sent to the store is done directly by the parties based on the data warehouse ordering given by the Manager

of Marketing. Tasya Productions has three units of vehicles made up of two units with a capacity of 1500 box car a dozen and one unit of truck box with a capacity of 4000 dozen.

2. CONTENT RESEARCH

2.1 System

The system is an aggregation of connected components with an obvious limitation of working together to achieve a set of goals [1].

2.2 Distribution System

Based on opinions about the system and distribution, authors conclude distributionsystem is a system of distribution that has the purpose of knowing the condition of the product up to the admissibility to the wearer's last with the speed of delivery and service offers that satisfy.

2.3 Supply Chain management

Supply Chain Management is the method or integrative approach to managing the flow of products, information, and integrated money involving parties ranging from upstream to downstream. Important principle in supply chain management is the transparency of information and collaboration among internal corporate functions as well as with the parties concerned with throughout the supply chain. In supply chain management activities include product development control of materials and components, produks planning, inventory control, production, and distribution/transportation.

Supply chain management is also differenciated into two: (1) physical activities which include the procurement of raw materials/components of production, storage, transportation/distribution, and return the product, (2) activities of mediation market consisting of market research, product development, and after-sales service. Two major challenges in the management of the supply chain is the complexity and etidapastian. The complexity arises due to the large number of parties involved in a supply chain. Ketidapastian can be derived from the direction of demand, from the direction of suppliers, as well as from internal company [2].

According to I Nyoman and Mahendrawati [2] on the supply chain there are usually 3 kinds of flow that must be managed. Three kinds of flow that must be managed supply chain pad is as follows:

1. the first is the flow of goods that flow from upstream (upstream) to downstream (downstream).
2. the second is the flow of money and the like which flows from upstream to downstream
3. Third is the flow of information that may occur from the upper to the lower or vice versa.

2.4 Components Of Supply Chain Management

Supply Chain Management has three main components that support berjalnnya a business process as follows [2]:

1.Upstream Supply Chain

The overall activities of the manufacturing company with pendistribusiannya or distributor can be expanded to multiple levels. The main activities in the Upstream Supply Chain this is the procurement of goods.

2.The Internal Supply Chain

This internal Supply Chain is the process of delivery of the goods to the warehouse.The main activities in the Internal Supply Chain was production management, fabrication, and inventory control.

3.the Downstream Supply Chain

Activities in the downstream supply chain involves the process of delivery to the end consumer. The main activities in the downstream supply chain this is the distribution of goods, warehousing, transportation.

2.5 *Push* dan *Pull Supply Chain Management*

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. This strategy is the opposite of the Pull strategy where on appeal the pull, the push strategy is more popular because of the production-based system to forecasting and generating large amounts of output that would later go into inventory before it is transmitted to the customer.

This strategy has focused on efficiency and standardization activities. Push strategycan be dikonotasikan with lean supply. The more the company has little variation products then this strategy that fits. However, for products with the changing market situation, the use of the push system will incur some losses, such as [3]:

1. The inability to meet the changing market demand.
2. inventory Buildup that will bring a lot of waste and requires a lot of storage space.
3. large production Batches
4. The risk of obsolete product great.

2.6 Theory of forecasting

Theory of forecasting used for demand forecasting companies which will be used as a benchmark in the planning of production. Demand forecasting is the activity to mengestimasi the magnitude of demand for certain goods or services in a given period and certain marketing area.

2.6.1 Variety of Forecasting

Ada beberapa macam tipe peramalan yang digunakan. Tipe peramalan yang digunakan antara lain sebagai berikut [4]:

1.Times Series Model

Metode time series adalah metode peramalan secara kuantitatif dengan menggunakan waktu sebagai dasar peramalan.

2.Casual Model

Model peramalan yang menggunakan hubungan sebab-akibat sebagai asumsi, yaitu bahwa apa yang terjadi di masa lalu akan terulang pada saat ini.

3.Judgemental Model

If the time series and causal model is based on quantitative, on a judgemental includes factors to include quantitative/subjective into methods of forecasting. Specially useful when the subjective factors which are expected to become very important when an accurate quantitative data already acquired [4].

2.6.2 General Purpose Forecasting

When viewed in terms of the time, the goal of forecasting can be seen as follows [4]:

1. Short term (Short Term)

Determine the quantity and time of production made items. Usually daily or weekly and are determined by the Low Management.

2. Medium-term (Small Term)

Determine the quantity and time of production capacity. Usually monthly or quarterly and are determined by the Middle Management.

3. Short term (Long Term)

Plan the quantity and time of production facilities. Is usually an annual 5 years, 10 years, or 20 years and determined by Top Management.

2.7 *Safety Stock*

Ordering an item until the item it comes necessary period of time varies from a few hours to months. The time difference between the time of order until the item came is known by the term Grace time (Lead Time). Grace time is influenced by the availability of ordered goods and the distance between the location of the customer and suppliers. The uncertain lag time resulted in a shortage of goods for example due to the use of goods that are greater than previously expected, thus it takes a persediaaan safety (safety stock)

If the Safety Stock set too low, the supplies will be exhausted before the inventory replacement is received so that production could be disrupted or customer requests could not be met. Planning the supply of raw materials which have been taken into account but is often the raw material inventory is insufficient because of frequent meloncatnya supplies production company that supplies or goods damaged and does not meet the standards to meet consumer demand.

Formula safety inventory (safety stock) can be calculated by equation 1.

Safety Stock = Z x Sdl (1)

Description:

Z = Service Level 1.645 = NORMSINV 95%

The value of the Sdl is determined from the uncertainty of demand and lead time uncertainty with terms that can be seen in Figure 2

variabel	konstan	variabel
Permintaan	$Sdl = Sd \times \sqrt{(l)}$ *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 ($S_{dl} = 0$).	$Sdl = d \times sd$ *Safety Stock* ditentukan oleh ketidakpastian *lead time*.
	konstan	variabel
	Lead Time	

Figure 1 interaction between demand and Lead Time on the determination of Safety Stock

2.8 Single Exponential Smoothing Forecasting Method

Single Exponential Smoothing method is used in conditions where the weighting of the data from the one different from the data in the previous period and formed the Exponential function. This method reduces the problem a lot of deviations of data because no longer need to store historical data. The influence of the great small α opposite direction with the influence of entering the number of observations. This method always follow any trend in the data is actually for it does no more than set the upcoming forecast by a percentage of the last error. Determine optimal α approaches require trial several times [4].

If a series of historical data Xt for t = 1,2,3, ..., N then the exponential forecasted data for data time t is the Exponential smoothing Method ft. simple developed from the moving average method. If there are data from t observations packed the forecasted value at time t + 1 can be calculated with the equation (2.1) and (2.2) for the calculation of the Exponential to N can be seen in the equation (2.3).

$$F\text{t+1} = \frac{x1 + x2 + \cdots + xT}{T} = \frac{1}{T}\sum_{1}^{T} = 1^{x1} \quad (2)$$

$$F_{t+2} = F_{t+1} + \frac{1}{T} = (X_{T-1} - X_1) \quad (3)$$

Metode Exponential untuk N pengamatan adalah sebagai berikut :

$$F\text{t+2} = F\text{t+1}\left(\frac{Xt}{N} - \frac{Xt-N}{N}\right) \quad (4)$$

Suppose a long observation − is not available so it should be replaced with a value approach (approximations). One of the possible replacements are the forecasted value previous periods so that it can be calculated with equations 5 and 6.

$$F_{t+1} = F_t + \left(\frac{Xt}{N} - \frac{Ft}{N}\right) \quad (5)$$

$$F_{t+1} = \left(\frac{1}{N}\right) X_t + \left(1 - \frac{1}{N}\right) F_t \quad (6)$$

So the forecasted value at time t + 1 depending on the weighting value of observation time t, i.e. 1/N and by weighting the forecasted value is 1 − 1/N value between 0 and 1. When the 1/N = a, then it can be calculated with equation 7.

$F_{t+1} = \alpha \times_t + (1- \alpha)F_t$ (7)

scription

F_{t+1} = Results forecast for period t + 1

a = Constants pemulusan

X_t = Actual demand Data for the period t

F_t = The Forecast period t

Exponential smoothing method of data values can be determined freely, meaning that there is not a way that's sure to get the optimal value. Then the value of the selection done by trial and error. The magnitude is between 0 and 1.

2.9 Mean Squares Error(MSE)

Mean Squared Error (MSE) that is the average of the squared forecasting errors and can be seen in the equation (8).

$$MSE = \frac{\sum(Xt-Ft)2}{n} \quad (8)$$

scription

X_t = he 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

2.10 A Control Analysis Products

Analisis pengendalian produk yaitu analisis yang dilakukan untuk menetukan suatu produk yang harus disediakan pada gudang. Langkah-langkah dalam analisis pengendalian produk dapat dilihat pada Gambar 2.



Figure 2 Step Analysis Control Products

2.10.1 Forecasting Analisisis baby clothes

These stages are stages in analyzing the forecasting products baby clothes. at this stage, the products will be foreseen is the product of long pants tara tcp m.

2.10.2 Determines the composition of the Product

After doing the analysis of forecasting, the next step is to multiply the results of forecasting with the composition of the product in the product long pants Tara TCP m. Composition trousers Tara TCP M contained Tasya productions.

2.10.3 Analysis Of The Supply Of Products With Metodde Safety Stock

This step is monitoring preparations for the monitor and control of inventory in the warehouse. Inventory control for monitoring that is by looking at the inventory history data each month. Function monitoring in order to avoid the occurrence of the vacancy and the shortage of stock of baby clothes on the warehouse inventory control monitoring requires an indicator to determine how safe the baby clothes boundary should be available in the barn with the menggunalan method of safety stock.

Application of the method of safety stock calculation process, namely the preparation of safe limits that must be available in the warehouse for the next period and point of booking again.

2.10.4 Analysis Of Monitoring Supplies

These stages are stages in the preparation of raw materials and monitor the product in the warehouse that will display the status of the safe or unsafe.

2.10.5 Determine Ordering raw materials to suppliers

These stages are stages in making a booking to suppliers of raw materials in accordance with the status of the inventory at the warehouse

2.10.6 Distribution Analysis

These stages are stages in monitor delivery status, delivery scheduling and capacity of the vehicles that will be used in pendistribusia. Monitoring the distribution was done so that the product is up to konsunen at the time and the right place and know the shipping status

2.10.7 The Analysis Database

The analysis database on the system will be built using Entity Relationship Diagram (ERD). ERD is one of the ways to cultivate

the database so that the data can be known relationships between files and techniques, this data is used to address the occurrence of redudans data or the like. The following Entity Relationship Diagrams (ERD) will be built.

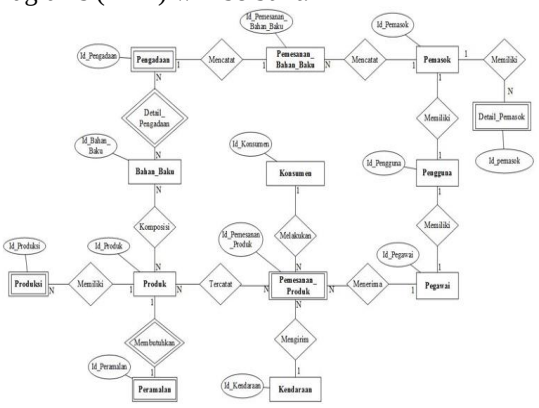


Figure 3 Entity Relationship Diagram (ERD) Supply Chain Management At Tasya Productions

2.11 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. As for the context diagram on the supply chain management System in Tasya Produtction can be seen in Figure 4

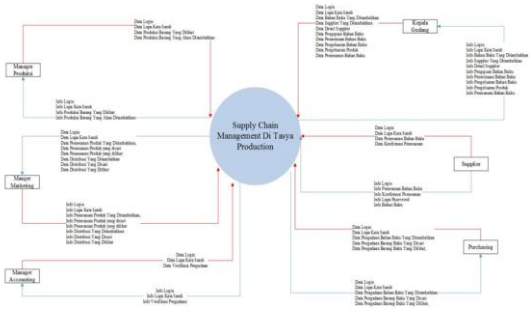


Figure 4 Supply Chain Management Context Diagram In Tasya Productions

2.12 Data Flow Diagram

lows on an information system. DFD systems distributing baby clothing consists of several processes in the data flow diagrams, more can be explained on the following description

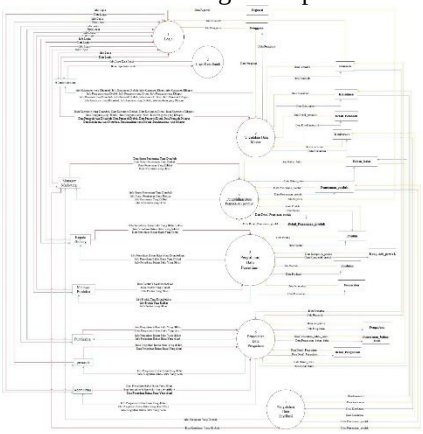


Figure 5 DFD Level 1 Supply Chain Management At Tasya Production

2.13 Tabel Relation

Table relation describing relationships between data, meaning data and restriction. The process of relationship between attributes is a combination between an attribute that has the same primary key, so that these attributes into a single entity linked by the key field. Table relationships can be seen in picture 7

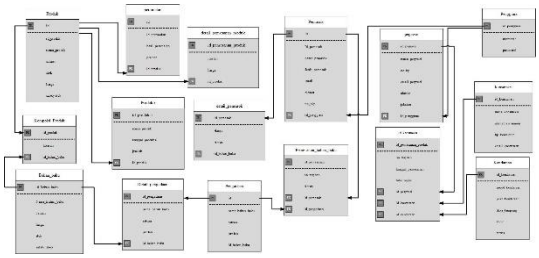


Figure 7 the table Relationships in Supply Chain Management Tasya Production

2.14 Tabel Structure

Table structure system of Supply Chain Management at Tasya Production are as follows:

Table 1 structure of Table Employees

No	Nama Field	Tipe Data	Panjang	Kunci
1.	Id	*Integer*	11	Primary Key, NOT NULL
2.	Id_pegawai	*Varchar*	4	NOT NULL
3	Nama_pegawai	*Varchar*	20	NOT NULL
4	No_hp	*Varchar*	12	NOT NULL
5.	Email	*Varchar*	30	NOT NULL
6.	Alamat	*Text*	-	NOT NULL
7.	Jabatan	*Enum*	-	NOT NULL
8.	Id_pengguna	*Integer*	11	NOT NULL

2.15 Design Menu Structure

The design of the structure of the menu is designed to provide the functions that will be used in the new systems will be built. A large number of menu structure designed in accordance with the corresponding number of users or users who have access privileges. The system has 7 permissions for a user that is an administrator, the menu structure menu structure menu structure, Marketing Manager of accounting, warehouse, menu struktrur menu structure menu structure, the supplier manager menu structure of production and purchasing. The design of the menu structure on the supply chain management system construction of baby clothes in Tasya Production are as follows.

1. The design of the structure of the Administrator Menu

The design of the structure of the menu the menu structure is the administrator of the dirancangan corresponds to the administrator user level. The design of the administrator menu structure can be seen at

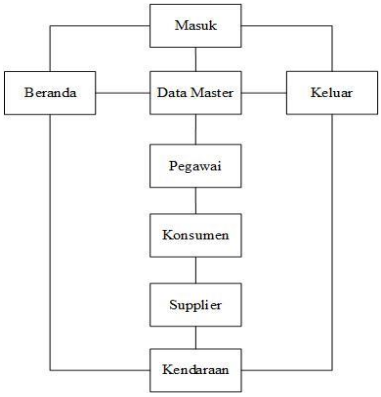


Figure 8 menu structure Design Administrator

2.16 Interface Design

The design of the interface was created to illustrate the appearance of the program that will be used by the user to interact with the system to be created. The design of the interface in the system of Supply Chain Management at Tasya baby clothes Production as follows:

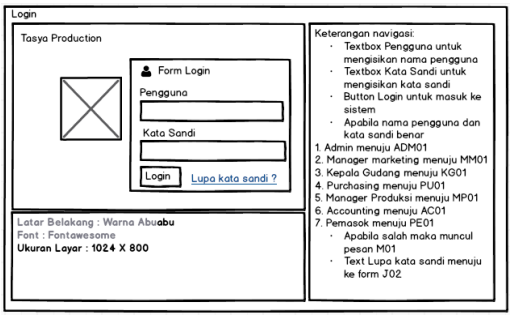


Figure 9 the Login Interface Design

2.17 Message Design

Design of a message in the system of Supply Chain Management at Tasya Productions can be seen in table 2

Table 2 Design a message

Kode Pesan	Pesan
M01	Nama Pengguna Dan Kata Sandi Anda Salah
M02	Harap Isi Bidang ini
M03	Email Tidak terdaftar
M04	Verifikasi email telah dikirimkan
M05	Perubahan data berhasil dilakukan
M06	Perubahan data gagal dilakukan
M07	Data berhasil dihapus
M08	Data gagal dihapus
M09	Data berhasil ditambahkan
M10	Data gagal ditambahkan
M11	Data Berhasil Disimpan
M12	Data gagal Disimpan
M13	Transaksi Pemesanan berhasil dilakukan
M14	Transaksi Pemesanan gagal dilakukan
M15	Status pengiriman berhasil diubah
M16	Status pengiriman gagal diubah
M17	Silahkan lakukan peramalan terlebih dahulu
M18	Data transaksi tidak mencukupi
M19	Tidak ada data yang tersedia
M20	Data tidak ditemukan
M21	Verifikasi Telah Disetujui
M22	Verifikasi Tidak Disetujui
M23	Harap isi data terlebih dahulu
M24	Minimum Jumlah Pesanan 5 lusin
M25	Jumlah Produk Melebihi Sisa Produk Yang Tersedia
M26	Sertakan '@' pada alamat email

2.18 Design of Semantic Networks

Semantic network design in Supply Chain Management at Tasya Production are as follows:

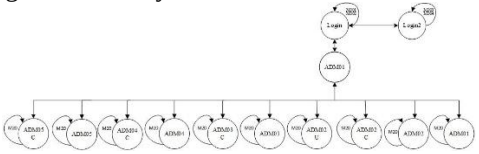


Figure 10 the design of Semantic Network Admin

2.19 Procedural Design

Procedural design transforming procedural elements of the architecture program into a procedural description of the components of the software. As for the procedural design of Supply Chain Management system in Tasya Production are as follows.

1. Procedural Login

Procedural login procedure when a user accesses a page as a particular user, the login procedure can be seen in Figure 11

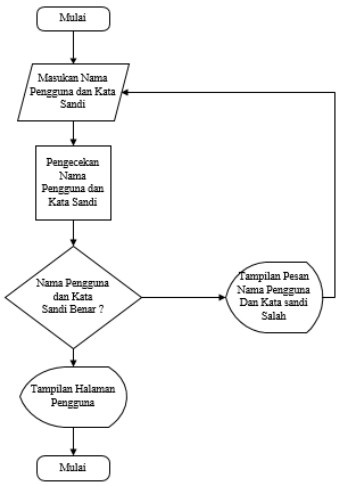


Figure 11 Flowchart Login

2.20 System Implementation

System implementation stage is the stage of translating the design based on the results of the analysis into a specific programming language as well as the application software that is built in the real environment. As for the discussion of implementation consists of the implementation of the software development,hardware development implementation, implementation and implementation of the database interface.

2.20.1 Software Implementations

Software implementation describes the software used for system implementation pendsitribusian Tasya's baby clothes Production. The software used for system implementation can be seen in table 3.

Table 3 implementation of the software as a Server

No	Perangkat Lunak	Spesifikasi
1	Sistem Operasi	Microsoft Windows 7
2	Aplikasi Perangkat Kerja	Microsoft Office 2007
3	Web Browser	Mozilla Firefox
4	Web Server	Xampp
5	DBMS	MySQL
6	Code Editor	Adobe Dreamweaver

2.20.2 Hadware Implementation

Hardware implementation describes the hardware that was used for the implementation of the system of distribution of baby clothes in Tasya productions. The hardware used for the implementation of the system can be seen in table 4.

Table 4 Hardware Implementation

No	Perangkat Keras	Spesifikasi
1	Processor	Processor dengan kecepatan 1,8 GHz
2	Video Card	Monitor dengan resolusi 1024x768
3	Memori	RAM 1 GB
4	Hardisk	250 GB
5	Piranti Pendukung	Keyboard, Mouse

2.21 Testing

Testing is used to test the new system is a black box testing methods. Black box testing is focused on testing the functional requirements for information systems. Supply Chain Management testing baby clothes at Tasya Production using test data based on data provided from some of the data that has been provided.

2.22 Black Box Testing Conclusion

Berdasarkan hasil pengujian dengan kasus *sample* uji yang telah dilakukan, didapat kesimpulan bahwa proses-proses pada sistem sudah benar. Penyaringan kesalahan proses dalam bentuk *user interface* sudah cukup maksimal. Fungsional sistem sudah dapat menghasilkan output yang diharapkan.

2.22.1 Conclussion Beta Testing

Beta testing is testing that is directly in the actual environment. The user to make assessment of the system by the method of interview. The results of the interviews can be used to meraik the conclusion whether the system has been built according to the purpose or not.

Interview conducted for the users of the system which consists of Manager, Accounting Manager, marketing Manager for production, Purchasing, warehouse, and the head of human resources. This research was conducted at Tasya Production in order to find out the extent to which the system is built can be a solution and the resolution of problems that have been described previously.

3. CLOSING

3.1 Conclusion

Based on the results obtained in the writing of this final task, then a conclusion can be drawn as follows:

1. Information systems are built it can ease the head of warehouse in determining the amount of raw material that will be submitted to purchasing to meet production needs.

2. Information systems are built it can facilitate Manager Marketing in product distribution scheduling baby clothing to consumers who have been booking the product suits.

1.1 Suggestion

Suggestions for the development of this system there are some suggestions that may be made, inter alia:

1. Addition of the management of user data it would be better if there are special systems such as human resources information systems that can manage employee data so that the user can be selected directly by the system.

2. this need for information systems development such as production scheduling so that tracked the production process.

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