DEVELOPMENT OF SUPPLY CHAIN MANAGEMENT INFORMATION SYSTEM AT CV. MEDIA CENDEKIA MUSLIM

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ABSTRACT

CV. Media Cendekia Muslim is a book publishing companies are focusing on distributing a book with seven kinds of books that aqidah, dakwah, hadist / tafsir, Motivasi islam, psikologi islam, kesehatan, dan parenting with ekslampar unit. The process that occurs is the process of book storage warehouse section that often times the company experienced problems unsold products resulting buildup and books be damaged if too long or stored in warehouse which is caused by the uncertainty the number of booking transactions made by consumers. This makes the warehouse had difficulty in determining the number of submissions to the purchasing of books that require a waiting period of about three days, so it can hinder the process of distribution of the books.

Based on the problems that exist at the moment at CV. Media Cendekia Muslim, it takes a book distribution system using the approach of supply chain management. The development objective is to facilitate the distribution system in the determination of the number of submissions to the purchasing of books and simplify the scheduling distribution of the books to consumers. The method used for forecasting the raw material is Single Moving Average and use predictive availability of books in a warehouse using safety stock calculations.

Based on the results of research and testing can be concluded that a system built to facilitate the warehouse in determining the number of submissions to purchasing books, and allows drivers to penjadwalkan distribution.

Keywords: Supply Chain Management, Single Moving Average, Safety Stock

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1. INTRODUCTION

CV. Media Cendekia Muslim is one of the companies engaged in book publishing and magazine established in 2014 ago. The company produces seven kinds of books and plays as a distributor of books, the process of delivery to the consumer there are two stages, the first one in cash, and the second is by consignment.

Based on interviews with purchasing part at CV. Media Cendekia Muslim with Mr. Rizal, CV. Media Cendekia Muslim if going shopping for the needs of the stock, they always order book amounted to 3,000 ekslampar each title. How to order the book as it is very inefficient because if ordered every book 3000 ekslampar then book warehouse finished materials will be congested, because the book is a different product with food every day is consumed and sold out the stock in warehouse material so it will be piling up because the book is a bit sold, and will result in a book to be damaged and will not be sold to be sold again.

In interviews with the Distribution section at CV. Media Cendekia Muslim with Mr. Enjang, CV. Media Cendekia Muslim always preoccupied with the distribution of the books to stores with a distance of stores are far apart and the number of bookings are uncertain it will be difficult to carry out the distribution due to schedule reservations are uncertain of the consumer, because the distribution is done if there is order, the number of books that can be taken due to power transport vehicle limited to using a car with a carrying capacity of 100kg as a conveyance or in units of packing in boxes, usually can only carry at most 47 boxes with each box contains 20 to 25 ekslampar book.

Pursuant to the problems that exist at CV. Media Cendekia Muslim, Companies need a system to handle the existing problems at CV Media Cendekia Muslim ranging from procurement of books, the process of forecasting the number of books to be booked for the next month, up to the distribution of the books. Because of these problems, the authors suggest building information systems Supply Chain Management, as a function of the Supply Chain Management (SCM) is to integrate suppliers, manufacturers, warehouses, and distribution. Thus it is necessary to build the information system strategy approach to Supply Chain Management at CV. Media Cendekia Muslim.

While the goal will be achieved:

a. assist parts Warehouse in determining the amount of books that will be submitted to parts purchasing to meet the needs of book stock in warehouse.

b. eases Distributor the process of distribution of the books to consumers with a scheduling system that includes time, driver, type of vehicle, the number of books transported in time.

2. CONTENTS OF RESEARCH

2.1 Information Systems

System elements are interconnected and work together to fulfill a process with a specific purpose. The definition of information in general is a collection of data that has been processed into something that can be understood so that the collection of such data could be useful for anyone who needs it. The information system is a set of information components that contain certain data according to user needs the data which are interconnected with each other data to achieve a certain goal.

The information system is a regular combination of people, hardware (hardware), software (software), communications networks, and data resources that collect, transform, and distribute information within an organization. Field of information across a lot of complex technology, the concept of behavioral (behavioral concept), and specialized applications in the areas of business and non-business are countless.

Information system framework focuses on five areas of knowledge of information systems, the basic concepts, information technology, business applications, process development, and management challenges [1].

2.2 Forecasting

Forecasting is the art and science to predict future events depan.dengan take historical data and project it into the future with a form modelmatematis. Forecasting also spent a lot of cost and time to dipersiapan and supervised. Effective planning is good for the long term or short term depending on the demand forecast for the company's products.

Forecasting can be divided into three types, namely economic forecasting, technology forecasting, and demand forecasting. Forecasting is the only prediction menenai request up to the actual demand is known. Controlling demand forecasting decisions in many areas, one of which supply chain management. Good prices with suppliers, as well as competing baranng and components rely on accurate forecasting.

Here are the steps in doing the forecasting system:

1. Define your goals.
2. Select the element to be foreseen.
3. Determine the time horizon of the forecast.
4. Choose the types of forecasting models.
5. Collect the data needed to conduct forecasting.
6. Make forecasting
7. Validate and apply forecasting results. [7]

Various Forecasting

There are several types of forecasting used. Forecasting the type used are as follows [11]:

Times Series Model

Method of time series forecasting methods quantitatively using the time as the basis for forecasting.

Casual Model

Forecasting method using a causal connection as an assumption, namely that what happened in the past will be repeated at this time.

Judgemental Model

When the time series and causal models rely on quantitative, on a judgmental covers to incorporate quantitative factors / subjective into forecasting methods. In particular useful when subjective factors are expected to be very important when accurate quantitative data have been obtained [11].

Factors Influencing Selection of Forecasting Techniques

Forecasting is actually an attempt to minimize the risks arising from the decision-making in the planning of production. The greater the effort spent is certainly a risk that can be avoided greater. But efforts to minimize these risks are limited by the costs incurred as a result of working on it [11].

Factors that should be considered as follows:

Horizon Forecasting

Ada dua aspek dari horizon waktu yang berhubungan dengan masing-masing metode peramalan yaitu:

Coverage of time in the future

To which the difference of the forecasting methods used should be adjusted

The number of periods for which forecasts the desired

Some of the techniques and methods can only be adjusted for forecasting one or two periods in advance, while engineering and other methods can be used for forecasting future periods.

level Accuracy

The level of accuracy required is very closely related to the level of detail required in a forecast. For some decisions expected variations or irregularities on forecasts conducted between 10% to 15%, while for the case or other cases may assume that the variation or deviation above the forecast of 5% is quite dangerous.

Availability of Data

The method used is very beneficial, if it is linked to the circumstances or the information or data held. If the data from the last known of the seasonal pattern, then for forecasting the next year should be used method of seasonal variations. Whereas if the data from the known pattern of relationships between variables - variables that influence each other, it should be used a method of Cause and Effect (causal) or correlation.

Forms Data Patterns

The main basis of the forecasting method is the assumption that the kinds of patterns that are found in the data that is predicted to be sustainable. According Makridakis, Wheelwright and McGee

data pattern can be divided into four types of cycles and trends, namely:

Horizontal pattern (H)

Horizontal pattern occurs when a data value fluctuates around a constant mean value. Such series are stationary against its average value, the data pattern can be seen in Figure 1

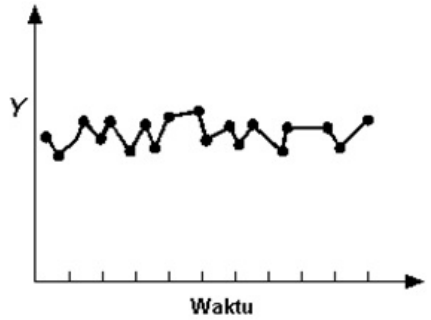


Figure 1 Pattern Horizontal

Seasonal Pattern (S)

Seasonal patterns occur when a row is affected by seasonal factors, such as certain quarter of the year, month, or day certain days in the week. Data pattern can be seen in Figure 2

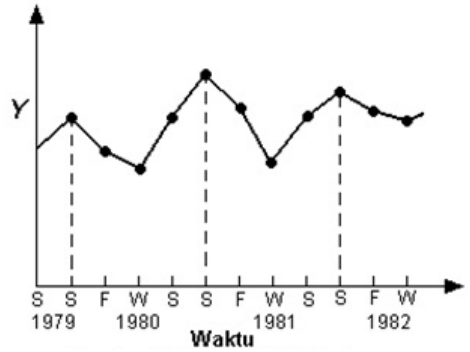


Figure 2 Seasonal Pattern

The pattern of cycles (C)

Cyclical pattern occurs when the data is affected by long-term economic fluctuations as related to the business cycle. Data pattern can be seen in Figure 3

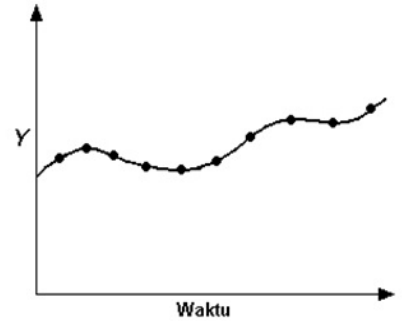


Figure 3 Pattern Cycle

Patterns Trend (T)

The pattern of trend occurs when there is an increase or decrease in the long-term secular data. Data pattern can be seen in Figure 4.

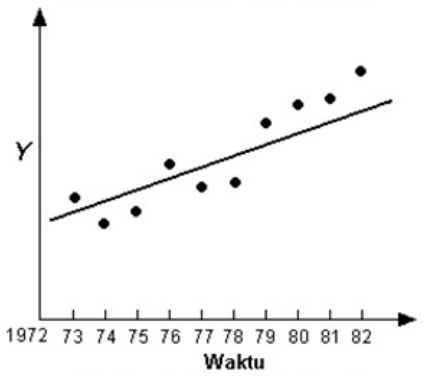


Figure 4 Trend Pattern

Cost

Generally there are four elements of the costs involved in the use of a prediction procedure, namely the costs of development, storage (storage) of data, operations execution and opportunities the use of techniques and other methods. Significant difference in the total cost, have an influence on whether or not the use to attract particular method for a state facing.

Type of Capital

In addition to note the assumption some important basic patterns in the data. Many methods have been forecasting models assume the existence of some of the circumstances foreseen. These models are a series where time is described as an important element to determine changes in the pattern, which may systematically be explained by the regression or correlation analysis.

Ease of use and its application

One general principle in the use of scientific methods of forecasting for management and analysis are methods that can be understood and easily applied to be used in decision-making and analysis. This principle is based on the premise that, if a manager or responsible for the analysis of its decision or the result of the analysis, then he is certainly not using the base does not know or do not believe. So, as an additional characteristic of the techniques and methods of forecasting is that required to meet the needs of the state is forecasting techniques and methods that can be tailored to the abilities of the manager or the analysis that will be using the prediction method.

Single Moving Average

The following function equation forecasting methods SMA contained in equation 1:

$$Ft+1=(Xt - N+1)/N+\cdots+Xt+1\ Xt \qquad (1)$$

Information:

Xt = the sales data already existing period
N = number of time series used
Ft = forecasting results in the period that will count
t = month to t

Simple Moving Average

Simple Moving Average is calculated by adding the price will be calculated and then divided by a long

period of time. The price quoted is usually price Close. But it could also prices High, Low, or the average of the three.

Here is a function equations of Simple Moving Average (2) :

$Ym = 1/x(Yn + Yn')$ (2)

Information:

m = the sales data for the month will be calculated
Y = forecasting results
n = the data forecasting results in the previous month
n ' = the actual data from the previous month
X = the order of months to be counted

Single Exponential Smoothing Forecasting Method

Single Exponential Smoothing Methods used in conditions where the weight of the data in the period differs from the data in the previous period and form the exponential function. This method greatly reduced the data storage problems because they do not need to store historical data. The influence of the size of α in the opposite direction to the effect of entering the number of observations. This method always follow every trend in the data is actually because he can do no more than regulate the upcoming forecast by a percentage of the last error. A determines the optimal approach requires several trials [8].

If a historical data series XT for T = 1,2,3, ..., N then the exponential forecast data for time data T is FT. Simple exponential smoothing method that was developed from the moving average method. If data from T observations eat predictive value at time T + 1 can be calculated using equation (3) and (4) while for exponential calculations for N can be seen in equation (5).

Exponential methods for N observations are as follows:

$F_(T+2)= F_(T+1) (X_t/N-(X_t-N)/N)$ (5)

Suppose the old observations x_ (t-N) is not available and should be replaced with a value approach (approximation). One possible replacement is the forecast value of the previous period F_t so it can be calculated by equation (6) and (7).

$F_(t+1)= F_t+(X_t/N-F_t/N)$ (6)

$F_(t+1)=(1/N) X_t+(1-1/N) F_t$ (7)

So the forecast value at time t + 1 depends on the weighting of the value of the observation time t, ie 1 / N and the weighting value forecast is 1-1 / N value between 0 and 1. When the 1 / N = a, it can be calculated by equation (8).

$F_(t+1)= 〖aX〗_t+(1-a) F_t$ (8)

Information

F_ (t + 1) = Result forecast for period t + 1
a = smoothing constant
X_t = actual demand data for the period t
F_t = Forecast in period t
t = month to t

Data exponential smoothing method a value can be determined freely, meaning there is no sure way to get a optimum value. The selection of a value done by trial and error. The magnitude of a lie between 0 and 1.

Measurement Errors Forecasting

Calculating the forecasting error used separately determine the accuracy of forecasting results that have been made to the actual data. There are many models for calculating the forecast error. The method used to calculate the forecasting error is using the Mean Squared Error (MSE). MSE meruakan average of the difference of squares of the value predicted by the observed [8]. Before calculating the MSE, first seek Mean Absolute Error (MAE), Mean Absolute Deviation (MAD). Here are the rums of a calculation error:

Mean Absolute Error (MAE)

Mean Absolute Error (MAE) which is the average absolute error of error foresee (positive and negative values not seen) can be seen in equation (9).

$MAE= (∑= 〖|x_t-F_t |〗)/n$ (9)

Mean Absolute Deviation (MAD)

Mean Absolute Deviation (MAD) to measure forecast accuracy by averaging the alleged error (absolute value of each error). MAD useful when measuring forecast error in the same units as the original series. MAD value can be seen in equation (10).

$MAD=(∑= 〖(Absolut dari Forecast Error)〗)/n$ (10)

Mean Squares Error (MSE)

Mean Squared Error (MSE) which is the average of the squared forecasting error and can be seen in equation (11).

$MSE= (∑=(X_t- F_t)2)/n$ (11)

Information

X_t = The actual data in period t
F_t = Data predictions of the model used in period t
n = Lots of data forecast results
t = period to t

2.3 Supply Chain Management

Supplier Management (Supply Chain Management) is defined as a set of approaches used to efficiently integrate suppliers, manufacturers, as well as warehouse integrated with shops, so that the goods produced can be distributed to the right location, the right time, to minimize the time is right , as well as the range of the system with the appropriate fee level requirements pelaanan [2].

On Supply Chain Management usually there are three basic concepts, namely supervision materials, information and financial flows as a

movement in a process from supplier to manufacturer to wholesaler to retailer to konsmen. The final goal in any supply chain management system is to reduce inventory assuming that products are available when needed. The first is the flow of goods flowing from upstream to downstream. The second is the flow of money and the like that flow from downstream to upstream or vice versa. The third is the information about the materials that still exist in each store is generally required by the distributor, and also the manufacturer. Information about the availability of production capacity is also often required by the plant. information about the status of the delivery of materials is often required by companies that send and receive goods, as can be seen in Figure 5.

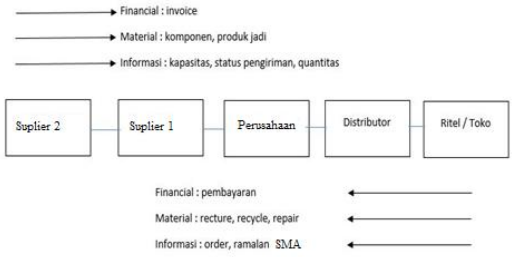


Figure 5 Model Supply Chain and three kinds of flow-run

2.3 distribution

distribution is to deliver products of the location where the product is produced to where they will be used. Transportation management and distribution includes both physical activity by naked eyes we can see, such as storing and shipping the product, as well as non-physical function in the form of information processing activities and services to customers [10].

2.4 Database

Database can be envisioned as a filing cabinet placed in sequence to facilitate the retrieval of data. Database shows a data set that is used in a corporate environment or agencies. Implementation of database in the information system called the database system. The term database many different interpretations.

Anthoni J. Fabbri and A. Robert Schwab, define the database as follows: "The database is an integrated file system that is designed primarily to minimize repetition of data" According to George Chou Tsu-der, the database can be defined as follows: "The database as a collection helpful information organized into specific procedures ".

The database is intended to address the problem on a system that uses file-based approach. Database system is a system design and manage records using a computer to store or record and maintain complete operational data is an organization / company so as to provide optimal information required the user to process a decision. To manage the databases necessary software called DBMS. DBMS is a software system that enables users to create, maintain, control, and access a database with a practical and efficient manner [4].

Why needed database to manage data so that the data are arranged neatly: 1. One of the important components in the information system, because it is the basis for providing information.

2. Define the quality of information: accurate, timely and relevant.

3. Information may be said to be worth more effective if its benefits compared to the cost mendapatkanya.

4. Reduce duplication of data (data redundancy).

5. Relationship data can be improved.

6. Reducing wastage of external storage space

2.5 Data Flow Diagram

Data Flow Diagrams (DFD) is often used to describe an existing system or the new system will be developed logically without considering the physical environment in which the data flows (eg by telephone, letter, etc.) or the physical environment in which the data is stored (eg flash, hard drive, floppy disk, tape, magnetic tape, etc.). Data Flow Diagrams (DFD) is a tool used in a structured system development methodologies (structured analysis and design). Data Flow Diagrams (DFD) is divided into several levels levels:

1. Data Flow Diagrams (DFD) Level 0 is often called Context diagram is the highest level of a Data Flow Diagrams (DFD).
2. Data Flow Diagrams (DFD) Level 1 is the result of the decomposition of Data Flow Diagrams (DFD) Level 0.
3. Data Flow Diagrams (DFD) Level 2 is the result of the decomposition of the processes that exist in the Data Flow Diagrams (DFD) Level 1.
4. And so on.

At one level there should be no more than seven pieces of the process and a maximum of 9, when more then it should be done decomposition. Decomposition is a way to break the process into a more detailed process, resulting in accurate detail for a system that will be made later. Keep in mind that for each Data Flow Diagrams (DFD) of a system has a number of levels of different levels. [5]

2.6 ERD

ERD is one model used to design the database with the aim of describing the data that relate to a database. Generally, after the design is completed next ERD is a physical database design that is making a table, index while considering performance. Then, after the database is completed followed by designing applications that involve database. Components of the ERD is as follows:

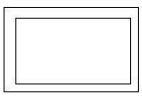
Simbol	Keterangan
	Data Entitas Segala sesuatu baik yang nyata maupun abstrak yang datanya akan direkam
	Relasi Menunjukkan adanya hubungan antar sejumlah entitas yang berasal dari himpunan entitas berbeda.
	Aliran Data Menyatakan penghubung antar relasi dengan data entitas dan data entitas dengan atribut.
	Atribut Data Atribut data yang dimiliki oleh tiap entitas yang nantinya akan menjadi *field* data.
	Entitas Lemah Menunjukkan himpunan entitas lemah
	Relasi Entitas Lemah Menunjukkan himpunan relasi untuk entitas lemah dan entitas lemah lainnya.

Figure 6 ERD components

Model ERD contains the components of the entity set and relationship set, each equipped with attributes that represent all of the facts of the real world that we review. ERD has notations are as follows:

1. Entities

No entity is an object that can be identified in the user environment or actors in sistme to be made.

2. Attributes

Entities have an element called attributes and describe the function of character entities. For example, the name attribute of the entity labor workers.

3. Relationship

Showed a correlation / relationship between the number of entities that come from a different set of entities.

Relationships between entities have degrees to show the maximum number of entities that can relate to the other entity, the following are the types of degrees in ERD: [6]

a. One to one (one to one)

Each entity in the entity set A associated with at most one entity in the entity set B, and vice versa every entity in the entity set B relating to the most with one entity in the entity set A.

b. One to many (one to many)

Each entity in the entity set A can relate with many entities in entity set B, but not vice versa, where each entity in the set B associated with at most with one entity in the entity set A.

c. Many to one (many to one)

Each entity in the entity set A associated with at most by one entity on the set B, but not vice versa, where each entity in the entity set A associated with at most one entity on the set B.

d. Many to many (many to many)

Each entity in the set A can relate a lot with many entities in entity set B and vice versa, where each entity in the entity set B can be associated with many entities in the entity set A.

2.7 Analysis Database

Analysis of the data base on the distribution system will be built using Entity Relationship Diagram (ERD). ERD was largely one way to process the database so that the data can know the relationship between files. This data is used to solve the data redundancy or the like. Here Entity Relationship Diagram (ERD) of the distribution system to be built.

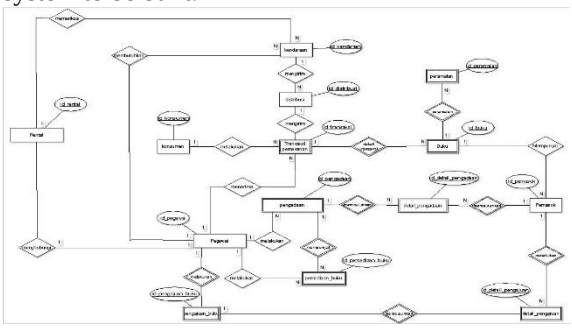


Figure 7 Entity Relationship Diagram (ERD) Book Distribution Systems CV. Media Cendekia Muslim Pendekata Using Supply Chain Management

2.8 Diagram Context

Diagram context is a global model to explain how the data is used and implemented to process or describe the incoming data stream to a system and out of the system. Diagram context of the book distribution system in CV. Muslim Scholar Media can be seen in Figure 8

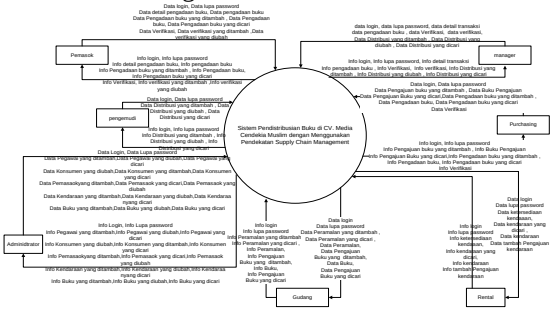


Figure 8 Diagram Context Books Distribution Systems

2.9 DFD Level 1

DFD Level 1 explains that the system can access the distribution system by selecting the menu available in the system as Manager, Purchasing, Warehouse, Driver and Suppliers. Each user of the system has a menu that varies according to each user access rights. The DFD Level 1 Book distribution system in CV. Muslim Scholar Media can be seen in Figure 9

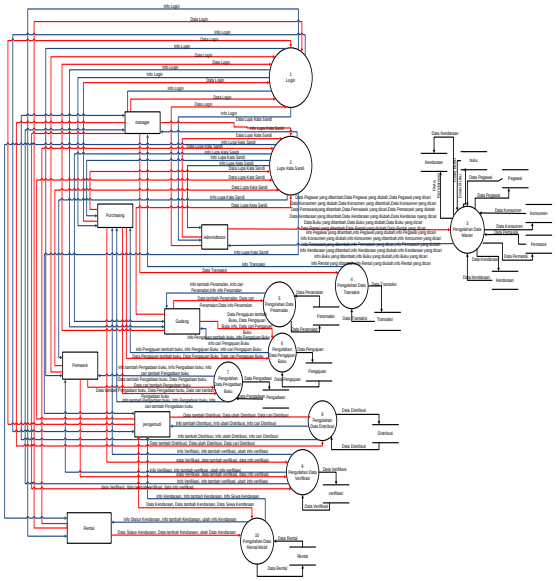


Figure 3. 9 DFD Level 1 Distribution Systems Books at CV. Media Cendekia Muslim

2.10 table Relationships

Table relationships describe the relationship between the data tables with other tables of data to form a relationship that serves to regulate the operation of databases. Table relationships can be seen in Figure 10

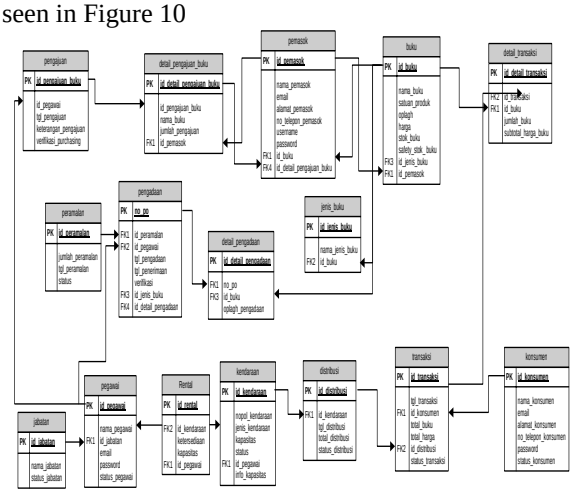


Figure 10 Table Relationships Books Distribution Systems CV.MediaCendekia Muslim

2.11 Design Interface

Interface design (mockup) is required as initial plans to build applications that will be poured into the program. The design of the interface in the system of distribution of the books in the CV. Media Scholar Muslim approach to supply chain management as follows:

T01 display a login page administrator, manager, purchasing, warehouse, suppliers, and the driver. T01 display can be seen in Figure 11

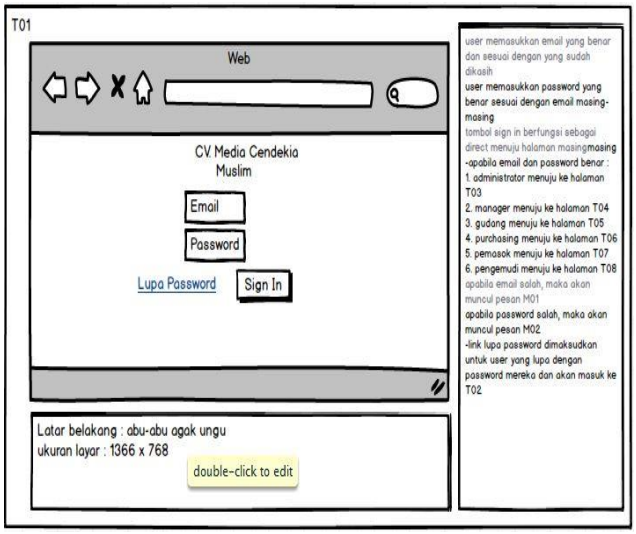


Figure 11 Designing Interfaces Login

2.12 Conclusion Blackbox Testing

Based on test results with sample test cases that have been done to the conclusion that the process is correct. Filtering processing errors in the form of landing page display messages is fairly maximum. Functional system can already produce the expected output.

2.11 Conclusion Beta Testing

1. The system is built can already be able to facilitate the warehouse in determining the number of books that will be submitted to purchasing.
2. The system is built can facilitate Manager in scheduling the distribution of books to customers who have an order book

3. CLOSING

3.1 Conclusion

Based on the results obtained in this thesis penulisaan, it can be concluded as follows:

1. The system is built can already be able to facilitate the warehouse in determining the amount of raw materials to be submitted to purchasing to meet the needs of book stock in warehouse.

2. Distribution Systems, which built this can facilitate Manager in scheduling the distribution of books to customers who have an order book.

3.2 Suggestion

The suggestions for the development of distribution systems with supply chain management approach are as follows:

1. The system is need for the development of such views make it more attractive and easy to use.

2. The system if necessary later held the addition of a function to be able to directly interact with consumers

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