INFORMATION SYSTEM OF UMBRELLA DISTRIBUTION MANAGEMENT IN CV. CAHAYA GEMILANG

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ABSTRACT

CV. Cahaya Gemilang is a distributor of umbrella who cooperate with the Susino Umbrella co ltd company from China who have status as a main supplier. This company does distribution of goods to several big supermarket in Indonesia such as Carrefour, Trans Mart, Giant, Yogya group. The problem who was facing in this company were shipping department felt difficulty to made delivery process scheduling in order to satisfied customer orders. Beside that, head of warehouse was difficulty to decided total of umbrella who will be ordered to supplier.

According to the problem that happened in CV Cahaya Gemilang, there were a solution how to build system information management distribution of umbrella for solving problem of delivery scheduling that caused difficulty on decided when delivery of goods can be did and for solving problem on decided total goods who were ordered according calculation of single moving average and used distribution requirement planning method.

According to the test result can be conclusion that this system can helped head of warehouse and shipping section at CV Cahaya Gemilang on found solution for solve procurement problem and delivery goods scheduling.

Kata Kunci : *Distribution, Distribution Requirement Planning, Single Moving Average*

1 PENDAHULUAN

CV Cahaya Gemilang is an umbrella distributor that cooperates with Susino Umbrella co ltd from China which is a main supplier. CV Cahaya Gemilang has two types of umbrellas including Folded Umbrella and Straight Umbrella, with various models that exist in both types of umbrellas. CV Cahaya Gemilang is distributing goods to some big Supermarket in Indonesia such as Carrefour, Trans Mart, Giant, Yogya Group, and others. Distribution activities carried out by the delivery, to date CV Cahaya Gemilang has had more than 200 customers spread across various regions of Indonesia namely Cimahi, Bandung, Bogor, Depok, Bekasi, Jakarta, and Tanggerang.

Interviews conducted with Mr. Uus as the head of the warehouse at CV Cahaya Gemilang he stated that in the procurement of goods to the supplier is done based on intuition, the procurement is done in a period of two weeks in one month. The quantity of goods ordered by the customer is not always uncertain, sometimes the ordering of goods that cause too little goods left, so the goods become damaged and unsold, it affects the company losers. Based on customer sales data in June - December 2016 there has been a 30% reduction in customer bookings, accounting for about 300 unsold umbrellas and leftovers.

According to the interview with Mr. Sandi as Section of Shipping, he explained that CV.Cahaya Gemilang does not have a good delivery schedule, the process of delivery of goods to customers is done every working day ie Monday-Saturday before 16.00. The delivery process does not always run smoothly, the lack of management information regarding scheduling delivery leads to difficulties in determining when delivery of goods can be made and also difficulty in determining the delivery date of goods to customers who have made the order. A very inadequate vehicle becomes a problem where the company only has four different types of vehicles, a box car with a capacity of 1800 umbrellas, a Pick Up with a capacity of 1560 umbrellas, and two motorcycles with a carrying capacity of 240 umbrellas. If in one day there are 5 shipping transactions to different locations with the number of orders around 2000 while the maximum transport capacity of only 1800, then the rest of the goods that have not been distributed will be re-shipping, it certainly affects the level of confidence of the customer to the company.

By looking at the conditions and problems on the CV. Cahaya Gemilang need to be built distribution yan expected to be a solution to the problems being faced is a system that can determine the inventory of warehouses and schedule the delivery of goods in order to meet customer orders.

RESEARCH CONTENTS

2.1 Research Methodology

The paradigm used in this research is Post Positivism paradigm, which is a basic belief based on careful observation and objective measurement of reality. Based on the paradigm Post Positivism research strategy using quantitative research. Quantitative research is a research that departs from the data and utilize existing theory as the explanatory material. Quantitative research includes survey research, descriptive causal comparative, retrospective, and complex experiments with many variables. Descriptive research is a research conducted to provide a systematic description of the object of research.

Stages of research method can be seen in Figure 1:



Figure 1 Metode Penelitian

2.2 Theoretical Basis

Theoretical basis is a collection of theories that become the basis of development of Distribution Management Information System Payung On CV.Cahaya Gemilang

2.2.1 Definition of Management Information Systems

Management Information System can be defined as a collection of subsystems that interconnected, gather together and form a unity, interact and cooperate between one part with another in a way to perform data processing functions, receive input (input) in the form of data , Then processing them, and producing outputs of information as a basis for making decisions that are useful and having real value that can be felt as a result either on the spot or in the future, supporting operational activities, managerial and organizational strategies, by utilizing Various sources of data available and available for the purpose of achieving the goal.

2.2.2 Distribution

Distribution is an activity related to the business of distributing goods and services from the hands of producers to consumers. Consumers play an important role in distribution activities because they are the main purpose in business.

2.2.3 *Distribution Requirement Planning*

Distribution Requirement Planning is a method for handling the procurement of inventory in a multi echelon distribution network. Distribution requirement planning emphasizes booking activity and distribution activities rather than scheduling activities. DRP anticipates future needs with planning at every level of the distribution network. This method can predict the problem before the problems occur giving the point of view of the distribution network.

A. The basic logic of DRP is as follows:

1. Gross Requirement / Forecast Demand obtained from forecasting results.
2. From the local distribution forecasting result, calculate Time Phased Net Requirement. The Net Requirement identifies when the inventory level (Scheduled Receipt - Projected On Hand Period earlier) is met by the Gross Requirement for a period.
   Net Requirement = (Gross Requirement + Safety Stock) - (Schedule Receipt + Projected On Hand Previous Period)
   The recorded Net Requirement value is a positive value.
3. After that is generated a Planned Order Receipt a number of Net Requirement (certain lot size) in that period.
4. Specified the day where to make the order (Planned Order Release) by reducing the scheduled day Planned Order Receipt with Lead Time.
5. In Projected On Hand calculated in that period, with the equation:
   Projected On Hand = (On Hand Previous Period + Schedule Receipt + Planned Order Receipt) - (Gross Requirement)
6. The amount of Planned Order Release becomes Gross Requirement in the same period for the next level of the distribution network

B. Process stages in the method of Distribution Requirement Planning (DRP)

Analytical Method of Distribution Requirement Planning is performed as a method to help know the amount of procurement that must be done. This method will result in recommendation of the procurement amount for the inventory of umbrellas in the warehouse which is expected to help the Warehouse Chief to make a decision. At this stage the method of Distribution Requirement Planning is done in accordance with the previously planned degan stages

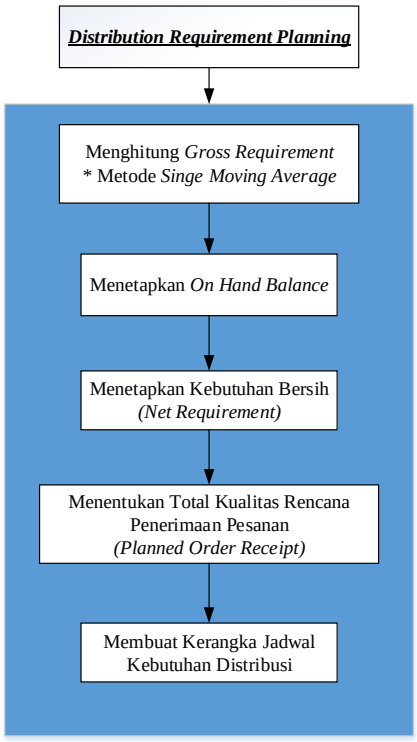


Figure 1 Tahapan DRP

2.2.4 Single Moving Average Forecasting Method

Single moving average method uses a number of actual data of new requests to generate predictive value for future demand. This method will be effectively applied if we can assume that the market demand for the product will remain stable over time. This method has two special properties that is to make forecasts require data.

Historically over a period of time, the longer moving averages will result in a smoother moving average, a systematic moving average can be calculated by the following equation.

$$S_{t+1} = \frac{xt+xt-1+\cdots+xt-n+1}{n}$$

Information:
St + 1 = Forecast for period t + 1.
Xt = Data in period t.
N = Time Moving Averages

2.2.5 Safety Stock

Security inventory or Safety stock serves to protect errors in predicting demand during Lead Time. Lead Time is the time required between raw materials ordered to arrive at the company. The amount of Safety stock value depends on supply and demand uncertainty. Here is the formula in determining Safety stock can be seen in the following equation.

SS = Z * sdl

Information:
Z = Service Level
D = Average order within 1 month
Sl = standard deviation from lead time
L = lead time
Sd = standard deviation of the number of forecasting

2.2.6 Determination of Delivery Schedule

Determination of delivery schedule of goods used to calculate when goods can be sent to customers. The calculation formula can be seen in equation (2.13)

Tsend= TTP + Lprocess (2.13)

Information : Submit = date of delivery of goods Tsend = date of ordering of goods Tproses = long waiting process of goods (2 days)

2.2.7 Analytical Method of *Distribution Requirement Planning*

Analytical Method of Distribution Requirement Planning is performed as a method to help know the amount of procurement that must be done. This method will result in recommendation of the procurement amount for the inventory of umbrellas in the warehouse which is expected to help the Warehouse Chief to make a decision.

A. ***Determining gross requirement***

The process of calculating the gross requirement (gross) The gross requirement is done by using the forecasting method In determining the forecasting method that will be used in the system to be built, firstly tested the sales data for each product that is sampled Using several different forecasting methods to get the smallest error rate.

Based on the results of the comparison can be concluded that forecasting with 3-month Moving Average forecasting method that will be used as the basis for forecasting in determining the raw material of coconut. Due to the smallest MSE error value found in 3 month Moving Average forecasting method, the result of Gross Requirement by forecasting with Single Moving Average method is 335 umbrellas.

Calculating Safety

Stock Safety stock or security stock serves to protect errors in predicting demand during lead time. Here is the calculation of safety stock for P2U Folded Umbrella 3017: Information :

Forecasting amount in March 2016 = 335

The number of working days in a month = 26 days
Lead time procurement to supplier (l) = 12 days
Average order in one month (d) = 335/26 = 12.88
Standard deviation of March 2016 forecasting amount (sd) = 13/10 = 1.3
Standard deviation from lead time (sl) = 12/10 = 1,2
Sevice level (Z) = 1.6449 Sdl = Demand **Deviation Standard Resolution:**
Safety Stock = Z x Sdl

$$Sdl = \sqrt{(d^2 x\ Sl^2) + (l\ x\ Sd^2)}$$
$$Sdl = \sqrt{(12{,}88^2 x\ 1{,}2^2) + (12\ x\ 1{,}3^2)}$$
$$Sdl = \sqrt{(165{,}89x\ 1{,}44) + (12\ x\ 1{,}69)}$$
$$Sdl = \sqrt{(238{,}88) + (20{,}28)}$$
$$Sdl = \sqrt{259.16}$$
$$Sdl = 16{,}1$$

Safety Stock = Z x Sdl
Safety Stock = 1,6449 x 16,1
Safety Stock = 26,48 => 27 (rounding result)

Based on the calculation of safety stock, then CV.Cahaya Gemilang must provide safety stock for Forecasting P2U Folded Umbrella 3017 is a number of 27 umbrella

A. Determine the inventory held at the beginning of the period (On Hand Balance) ie period 6 (Month of February).

On Hand Balance is the total supply held at the beginning of a certain period that will be used in the next period, in this case example, which will be calculated procurement process is March, then On Hand Balance used in the previous period or March.

Tabel 1 On Hand Balance

No	Periode	On Hand Balanced (Sisa Persediaan) P2U Folde Umbrella 3017
1	Maret 2016	40
2	April 2016	45
3	Mei 2016	35
4	Juni 2016	40
5	Juli 2016	42
6	Agustus 2016	38
7	September 2016	40
8	Oktober 2016	46
9	November 2016	37
10	Desember 2016	48
11	Januari 2017	44
12	Februari 2017	50

In the sample data. That is march has 50 umbrella of P2U Folded Umbrella 3017. The this result will be used for next step, that is to for next step, that is to calculate Net Reqiremens.

A. Determining Net Requirements (Net Requirements)

Requirements indicates of P2U Folded Umbrella 3017 required by the company in order to be able to meet the demand in that period. The data required to calculate the net requirements is the data Gross Requirement and Project On Hand fata for period 6 from the previous stage.

Net Requirement = (335+ 10) – (0 + 50)
= **295 payung**

In the calculation of net requirements (Net Requirements) for the case of P2U Folded Umbrella 3017 obtained by 295 umbrella

B. Determining the total quantity of order receipt plan (Planned Order Receipt)

Planned Order Receipts are the number of refill orders (purchase orders) that have been planned to be received for a certain period to meet net requirements.
Planned Order Receipts = Gross Requirement + Project On Hand (sebelumnya)
= 335 + 50
= 385 umbrellas

In the calculation Determine the total quantity of the order receiving plan (Planned Order Receipt) for the case of P2U Folded Umbrella 3017 Obtained by 385 umbrellas

C. Calculating *Project On Hand*

Project On-Hand is the quantity that is expected to exist in the inventory at the end of the period and is available for ordering in the next period. In this phase, the project on hand will be calculated for March 2017, with equation (2.2)
Projected On Hand = (*On Hand Periode* previous + *Schedule Receipt* + *Planned Order Receipt*) - (*Gross Requirement*)
Projected On Hand = (50+ *0* + 385) - (335)
= (435) - (335)
= 100 payung

D. Create table scheduling distribution needs

The Final step is to create a schedule of distribution needs based on the steps that have been done. The schedule of distribution requirement for P2U Folded Umbrella 3017 is as follows:

Tabel 2 scheduling distribution needs

Safety stock : 27 Lot size : - Lead time : 12 hari	Past due	Maret 2016 – Februari 2017	
		Jan	Feb
Gross Requirement			335
Schedule Receipts			
Project On Hand			100
Net Requirement			295
Planned Order Receipt			**385**

2.2.8 Process Delivery Scheduling

Schedulling Process of delivery of goals manajement informasi system distribution of umbrellas on CV.Cahaya Gemilang

A. Calculate the date of delivery schedule of goods

At this stage calculations are made on the date of deliveryof goods. The calculation to determine the delivery date can directly use the equation formula (2.13). Here's an example of calculating the date of delivery based on June sales data, Carrefour Samudera Cimahi make an order on June 3, 2016 with the amount of goods in the message is 250, then the calculation:

Tsend = Tmessage + Lprocess
= 3 June 2016 + 2 days
= 5 June 2016

Table 3 Delivery of Goods

Kepada	Tujuan	Kendaraan	Status
Giant Bandung Hyper Point	Bandung	D 7675 UD	Sedang Dikirim
Kagum Cheap Outlet	Bandung	D 7675 UD	Sedang Dikirim
Kagum Jessy Jems	Bandung	D 7675 UD	Sedang Dikirim
Carrefour Samudra Cimahi	Bandung	D 7675 UD	Sedang Dikirim
Foodhall Summarecon Mall Bekasi	Bekasi	D 523 BJ	Sedang Dikirim
Giant Bekasi Harapan Indah	Bekasi	D 523 BJ	Sedang Dikirim
Carrefour Bekasi Harapan	Bekasi	D 523 BJ	Sedang Dikirim
Carrefour Bekasi Square	Bekasi	D 523 BJ	Sedang Dikirim
Giant Bogor Taman Yasmin	Bogor	D 523 BJ	Sedang Dikirim
Carrefour Medan Fair	Bogor	D 523 BJ	Sedang Dikirim
Carrefour Opi Mall	Bogor	D 523 BJ	Sedang Dikirim
Ramayana Cibitung	Bogor	D 523 BJ	Sedang Dikirim
Ramayana Tanjung Priok	Jakarta Barat	D 464 NG	Sedang Dikirim
Carrefour Pluit Mega Mall	Jakarta Barat	D 464 NG	Sedang Dikirim
Carrefour Puri Indah	Jakarta Barat	D 464 NG	Sedang Dikirim
Giant Poins Square	Jakarta Selatan	D 464 NG	Sedang Dikirim
Ramayana Pasar Minggu	Jakarta Selatan	D 464 NG	Sedang Dikirim
Giant Hyper Alam Sutera	Tangerang	D 464 NG	Sedang Dikirim
Ramayana Serang	Tangerang	D 464 NG	Sedang Dikirim
Carrefour Bintaro	Tangerang	D 464 NG	Sedang Dikirim
Giant Villa Melati Mas	Tangerang	D 464 NG	Sedang Dikirim

2.2.9 NonFunctional Needs Analysis

Non functional requirement analysis is done to know the system requirement specification in order to run well. The analysis performed is user analysis, software analysis and hardware analysis

2.2.9.1 User Analysis

User Information System is intended for Head Warehouse, Delivery Section, Admin Support, Marketing and Customer.

2.2.9.2 Hardware Requirement Analysis

The minimum hardware requirement analysis needed in supporting management information system of umbrella distribution at CV.Cahaya Gemilang can be seen in the following table:

Table 4 Hardware analysis

No.	Perangkat	Spesifikasi
1	Prosesor	Speed 2,26 Ghz
2	Memory	1 GB
3	VGA Card	256 MB
4	Harddisk	80GB
5	Monitor	Monitor 14", Resolusi 800x600
6	Mouse & Keyboard	Standar

2.2.9.3 Software Reuirement Analyis

The minimum requirement analysis of the software needed to support management information system of umbrella distribution on CV.Cahaya Gemilang can be seen in the following table:

Table 3 Software Requirement Analysis

No	Perangkat Keras	Spesifikasi
1	Sistem Operasi	Windows XP, Ubuntu
2	Web Browser	Mozilla firefox, Google Chrome dan Internet Explorer

2.2.10 Functionsl Needs Analysis

Functional Needs Analysis is an analysis that describes the flow of data or information that includes the drawing, planning, and sketching or arrangement of several separate elements into a unified whole and functioning in the process of making software to be built.

2.2.10.1 Database Analysis

Data analysis aims to analyze the data to be applied in the system and explain the data required for the system to run properly in accordance with the needs of its use.

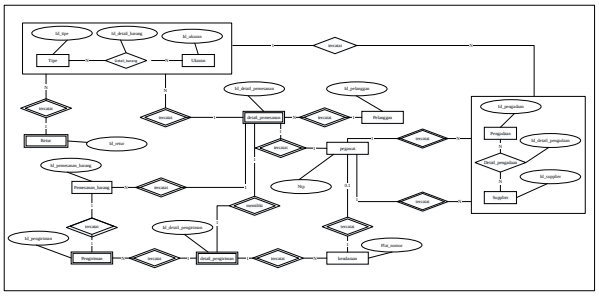


Figure 2 Erd Distributon Management Information System

2.2.10.2 Context Diagram

Context diagram is the highest level diagram of the DFD that describes the relationship in the system with the user. There are seven users who play a role in this system namely Admin Support, Marketing, Warehouse Chief, Section Pengirima and Customer where each actor has the right info and different data that can be seen in Figure 4

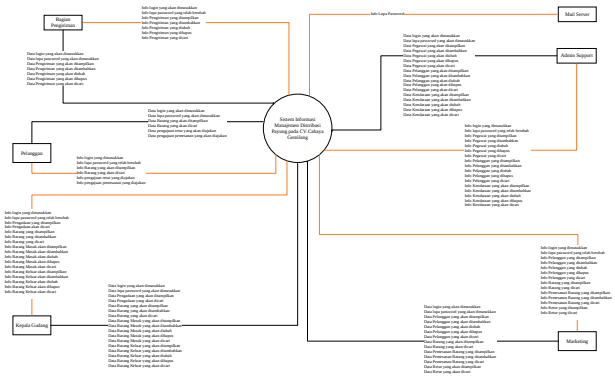


Figure 3 Contect Diagram Distributon Management Information System

2.2.10.3 DFD Level 1

DFD level 1 Management Information System

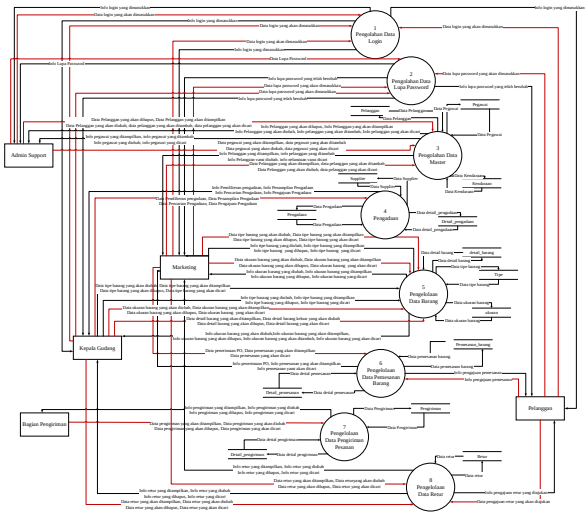
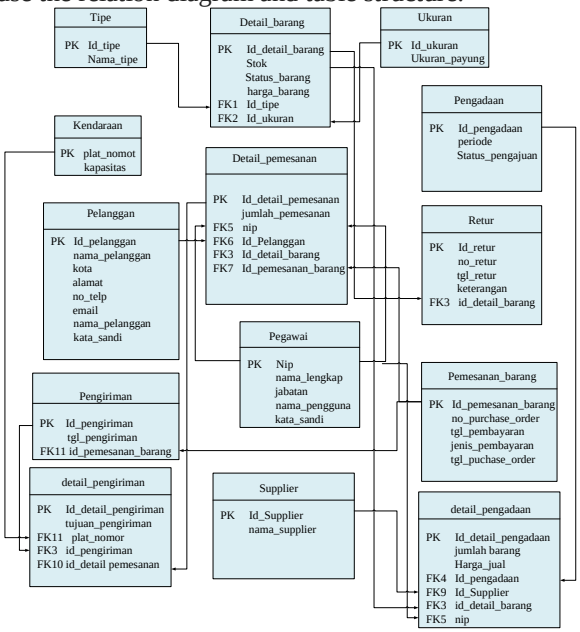


Figure 4 DFD Level 1 Distributon Management Information System

2.2.10.4 Database Design

Database design is to create or design data that is connected and stored together. To illustrate it can use the relation diagram and table structure.



Gambar 5 Tble relation Distributon Management Information System

2.8.9 System Implementation and Testing

2.8.9.1 BlackBox Testing

Blackbox testing is a test performed by simply observing the results of execution through test data and functional checking of the system. Black box testing is a test program based on the function of the program. The purpose of this black box method is to find fault function on the program. Black box testing is done by giving a number of inputs to the application program which is then processed in accordance with the functional requirements to see if the application program produces the desired output and in accordance with the function of the program.

Here is Blackbox testing for Distribution Management Information System Payung on CV.Cahaya Gemilang are as follows.

Table 4 Blackbox Testing

Kelas Uji	Detail Pengujian	Jenis Pengujian	Kesimpulan
Login	Verifikasi *login*	Black box	Diterima
Lupa Kata Sandi	Lupa kata sandi pengguna	Black box	Diterima
Pengolahan data Karyawan & Pengguna	Tambah data pengguna	Black box	Diterima
	Ubah data pengguna	Black box	Diterima
Pengolahan Barang	Tambah data Barang	Black box	Diterima
	Ubah data Barang	Black box	Diterima
	Pencarian data	Black box	Diterima
Pengolahan Kendaraan	Tambah data kendaraan	Black box	Diterima
	Ubah data kendaraan	Black box	Diterima
Pengolahan pengadaan	Tambah pengadaan	Black box	Diterima
Pengolahan Pemesanan	Tambah data penjualan	Black box	Diterima
	Pencarian data penjualan	Black box	Diterima
Pengolahan Pengiriman	Penampilan data pengiriman	Black box	Diterima
	pencarian data pengiriman	Black box	Diterima
Pengolahan Retur	Tambah pengajuan data retur	Black box	Diterima
	Pencarian data retur	Black box	Diterima

2.8.9.2 Pengujian UAT (User Acceptance Test)

UAT Testing (User Acceptance Test) is done as a condition that the built application has been accepted by the user. The new app testing process involves potential users / users.

Based on the results of User Accentance Test testing that has been done on the system built, it can be concluded that the system can be received by each user CV.Cahaya Gemilang.

2.8.9.3 Beta Testing

Beta testing is a direct test of the real environment. Users make an assessment of the software using interview methods. From the results of these interviews it can be concluded whether the software built in accordance with the purpose or not. Interview conducted for system users at CV.Cahaya Gemilang consisting of admn Support, Warehouse Chief, General Manager, Main Director, Finance Division, Shipping and Customer Section. This test is done in CV.Cahaya Gemilang in order to know the extent to which the system built can be a solution and solving problems that have been described System.

Based on beta testing that has been done before, it can be concluded that the system in terms of functionality already meet the needs of employees and customers based on research objectives. The overall look of the system is good.

2.8.10 Conclusion

Based on the description of the analysis that has been done, it can be drawn conclusions on Distribution Management Information System Umbrella On CV.Cahaya Gemilang as follows:

1. Distribution Management Information System Umbrella On CV.Cahaya Gemilang is enough to help the Head Warehouse in planning an umbrella that must be in the message for the coming period to support the distribution process.
2. Distribution Management Information System Payung On CV.Cahaya Gemilang can facilitate the delivery in the determination of delivery schedules to customers.
3. Distribution Management Information System Payung On CV.Cahaya Gemilang facilitate the President Director and General Manager in viewing reports relating to existing activities in the company.
4. Management Information System Distribution Umbrella On CV.Cahaya Gemilang facilitate the financial section in checking payment ordering goods from customers.
5. Management Information System Distribution Umbrella On CV.Cahaya Gemilang facilitate Marketing in checking the data of goods available and ordering and return goods from customers
6. Management Information System Distribution Umbrella On CV.Cahaya Gemilang is enough to help customers in ordering and return goods to the company.

2.8.11 Suggestion

Based on the results that have been achieved in building management information system of umbrella distribution at CV.Cahaya Gemilang, things that are expected in the future can be developed more widely include:

1. The distribution system needs to be developed by showing the delivery location, calculating the delivery distance and selecting the sending route for each order sent on the same day.
2. Further development of this application system is required in terms of back-up automatically, so as to reduce the likelihood of occurrence of things that are desired such as data loss due to damage to computers and so forth.

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