INVENTORY MONITORING SISTEM IN BRANCH OFFICE SERVICES OF DINAS PENDAPATAN DAERAH (DISPENDA) REGION PROVINCE DISTRICT BANDUNG I RANCAEKEK

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ABSTRACT

Provincial Services Branch Office of the Regency Bandung DISPENDA I Rancaekek is a government agency engaged in the administration of taxation and revenue. Barangsaat transactions in and out of this only item recorded on the card, so the calculation is less reliable inventory data were correct except that the card is often damaged and missing items. Other constraint is the Executive Vice Goods difficulty in determining the amount of goods one period to the next because of the amount of goods are considered less efficient.

Monitoring systems used in the development of customized systems with corporate issues especially on the part of the board auxiliary goods, for procurement planning process used a simple method of forecasting the moving averages. The process of building this inventory control system using the waterfall software development, and system data flow method using the DFD and ERD describes the functional model to describe the data model.

After testing the system then dihasilkankesimpulan from the inventory control system which can facilitate the Board in obtaining Goods Maid inventory information quickly and accurately as well as the veracity of the information shows that the forecasting method can facilitate simplemoving averages Goods Management Assistant in the procurement plan for the period forward.

***Keywords**: Monitoring, Forecasting, Simple moving averages*

1. INTRODUCTION

Branch office of the Department of Revenue Services (DISPENDA) Province Region I Ranchi is Bandung regency government agencies engaged in the field of taxation and revenue administration. The office is located at Jl. K.H. Ahmad Syadili No. 66 Ranchi Bandung regency. Provincial Services *Branch Office DISPENDA Ranchi district of Bandung regency I need stuff to support the operations of the office work such as printing tools (ACK), stationery (ATK), pharmaceuticals and electrical appliances. Goods are managed by the Board of Administration staff Goods maid servant and storage of goods. Good inventory is needed by the Provinces DISPENDA Services Branch Office Bandung Regency region because every day I Ranchi office is to serve the public (taxpayers) in Bandung district tax payments so that if the stock is available with both the operational services to the community will be run by smoothly and optimally.*

Items in DISPENDA Provincial Services Branch Office Bandung Regency region I Ranchi sent by a supplier in a period of 3 months. Based on interviews with the Executive Board in the Office Goods Services Branch Assistant Provincial DISPENDA I Ranchi district of Bandung regency, that the Goods Storage Helpers currently only record the transactions of goods in and out on cardstock only, so that the inventory data calculations were correct but it is not guaranteed card goods are often damaged and lost. This resulted in the Printed Board Vice difficulty in monitoring transactions out of the goods and the difficulty of obtaining information inventory data.

According to the Executive Assistant for the goods to determine the amount of goods ordered simply calculated by looking at the number of employees there are so inefficient because of the amount of goods ordered does not fit the facts of the needs of employees. This can be seen in the inventory report in 2012, there are some items that are not efficient because the goods are piled with sizeable balances and visible vacuum inventory, inventory report can be seen wasting substantial funds.

Based on the problems studied, the purpose of this research is to build a system of inventory control in the Branch Office Services Revenue Office

(DISPENDA) Province of Regency Bandung I Ranchi.
The objectives of inventory control system development in the Office of the Department of Revenue Services Branch (DISPENDA) Province Region I Ranchi Bandung regency as follows:

1. *The Executive Assistant facilitates Goods to get an accurate inventory information.*
2. *The Executive Assistant facilitates Goods for a period of procurement plan ahead.*

1.2 Information Systems

The system is a network of procedures that are interconnected, gathered together to perform an activity or completing a particular target. Information is a data set that is processed into a form that is more useful and more meaningful bagiyang receive. From the second definition above it can be concluded that the information system is a collection of hardware and computer software as well as the man who will process the data using hardware and software [5].

1.3 Monitoring

Supervision is an activity in order to pursue the implementation of the works in accordance with established plans or results dikehendaki.Pengawasan intended to prevent and to correct errors, irregularities, discrepancies, and other abuses that are not appropriate duties and responsibilities specified.

1.4 Inventory

Company has inventory in order to maintain the smooth usahanya.Bagi companies, allowing inventory to meet demand. On the one hand the high inventory allows the company to meet the sudden demand, but, on the other hand the high inventory caused firms require working capital greater. That requires management to inventory management is persediaan.Tujuan turnover (turnover) of inventory, ie turnover as quickly as possible without losing sales as a result of running out of inventory [3].

1.5 *Forecasting*

An analysis of economic and business activities that menitiberatkan on, emgkaji circumstances prevailing current and past, and see the impact on the situation and conditions in the future will come, requires a technical and analytical methods of forecasting. Forecasting is activity to predict what will happen in the future [4].

Forecasting is important because the circumstances relating to the economic and business activities are exposed to,

1. *The increasing complexity of the organization*
2. *Increased measures of organizational success*
3. *Rapid environmental change*

Usefulness of forecasting is to assist in making decisions. Good decision-making is based on the consideration of what is happening at the time the decision was implemented. If the prediction is made less precise, the decision we make is not good, so it requires an ability to master the techniques and methods correctly. Accuracy in forecasting will support planning is applied [4].

1.5.1 Type - type of Forecasting

Based on the nature of forecasting penyusunanya divided into two kinds, namely [1]:
1. Qualitative forecasting
Qualitative forecasting is subjective and based on feeling or intuition of the people who put them together. In this case the view or judgment of the people who put them determine whether or not the results of the forecast.
2. Quantitative forecasting
Quantitative forecasting based on historical data which is relevant in the past, following the formal statistical approach and a systematic approach that minimizes the error (error) forecasting
In quantitative forecasting, requires three conditions, namely:

a. *The existence of past information*
b. *Such information can be quantified*
c. *It can be assumed that the patterns of the past can be sustained in the future.*

1.5.2 Data Pattern Type

Types of data patterns can be seen in the following figure:

1. Data Pattern Horizontal
Horizontal Data pattern is a pattern of data that shows that the value of the data fluctuates around value - average (stationary against the average value - ratanya).

2. Seasonal patterns of data
Seasonal patterns of the data is the data pattern that looks fluctuates, but the fluctuations will be seen over and over in a given time interval. Called seasonal pattern because this demand is influenced by the season so bisaanya bisaanya recurrence interval for this data is the seasonal tahun.pola have a fixed wavelength and occur at regular intervals. The method according to the seasonal pattern is
a. Winter method
b. Simple moving average or
c. Weight moving average

3. Data patterns Cycle
Cyclical pattern is a cyclical pattern similar to the seasonal pattern of the data. On seasonal patterns do not have to form a wave pattern, shape can be varied, but the timing will be repeated every year. Cyclical pattern shape is always similar seasonal pattern sinusoid.Pada waves span of one year can be used as guidelines, the time span of data tentu.pola not cyclical iteration cycle has a duration longer than the pattern of the data and varies seasonally. The method according to the cyclical pattern is:
a. Simple moving average
b. Weight moving average and
c. exponential smoothing

4. Pattern Trend Data
Trend pattern is when the demand data shows the trend movement patterns or increase the long-term decline. The data seems to fluctuate, when seen in a long time span will be drawn the virtual line. The dotted line is what is called a trend line. When data is patterned trend, then the appropriate forecasting method is
a. Linear Regression Methods
b. Exponential Smoothing or
c. Double Exponential Smoothing
draftsman data pattern can be seen in Figure 1

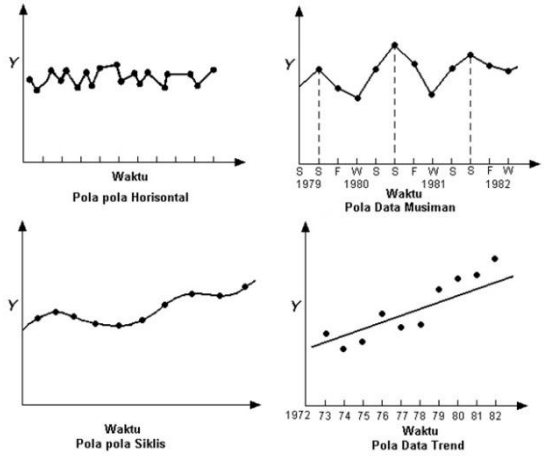


Figure 1. Data Pattern

1.4.3 Model and Forecasting Fundamentals

Quantitative forecasting models are models of the time series of data / time series. Approach to time series models that do not address causality or in other words, just pay attention to the tendency forecasting results of the data available in the past.

The method begins by plotting the time series data on a time scale, studying the plot and eventually form a consistent pattern over the data. In pengembanganya serial data processing time can be done with basic methods namely:

a. Naif approach
Forecasting technique that assumes that the demand in the coming period equal to the current demand.

b. Simple moving average
Forecasting technique that uses an average of the number (n) current data to forecast future periods.
Formula=
$$\frac{\sum permintaan\ n\ periode\ sebelumnya}{N} \quad (1)$$

c. Weight moving average
Formula=
$$\frac{\sum(bobot\ pada\ periode\ n)}{\frac{(permintaan\ pd\ periode\ n)}{\sum bobot}} \quad (2)$$

d. Exponensial Smoothing
Forecasting techniques with the moving average weighting in which the data were weighted by an exponential function.
Formula: $Ft = Ft - 1 + \alpha(At - 1 - Ft - 1)$ *(3)*
Ket : Ft = New Forecast
Ft-1 = Last Forecast
α = Konstanta exponensial
At-1 = Actual demand for the period

e. Trend Projection
Time series forecasting method that adjusts a trend line on a set of past data, and then projected in the line to predict the future.
Formula : $Y = a + bx$ (4)

f. eksplanantoris/regresi
Approach that takes into account causal relationships or approach a situation by a particular causal. In other words, the causal relationship is not deterministic but rather occurs stokastic relationship.
This method combines the variables or factors that may affect kuantitasyang are foreseen
Formula : $Y = a + bx$(5)
a = y-axis intersection
b = the slope of the regression line
x = free variable

Both models have advantages in basically tertentu.Model condition time series can often be used easily to predict whereas causal models can be used with greater success in decision making [1].

1.4.4 Forecasting Error Calculation

Average error or mean absolute differentiation absolute percent error (MAPE) is calculated as the average of the absolute differentiation between forecast and actual value, expressed as a percentage of the actual value so that if the value is calculated in units of thousands, then the result will remain as a percentage. If we had predicted and actual values for n periods, MAPE is calculated as follows:

$$MAPE = \frac{100 \sum_{i=1}^{n} |actual_i - forecasting_i| / actual_i}{n} \quad (6)$$

MAPE calculation example can be seen in Table 1.
Table 1. MAPE Calculation Table

No	*Period*	*SKPD PKB coming out*	*Forecasting*	*Mape(error/Actual)*
1	Jan – Mar 2012	44.000	41.873	100 × (2127/44.000) = 4.83%
2	Apr – Jun 2012	46.000	42.298	100 × (3702/46.000) = 8.04%
3	Jul – Sep 2012	42.000	42.915	100 × (915/42.000) = 2.17%
4	Okt – Des 2012	37.335	42.784	100 × (5449/37.335) = 14.59%
MAPE = 7.40%				

1.4.5 Safety Stock

Minimal safety stock is a stock item that must exist when companies are faced with the uncertainty of demand for goods, so there is the possibility of running out of stock, it is necessary for the calculation of safety stock to keep the out of stock items [1]. Safety stock can be calculated from the average MAPE with the formula:
Formula = The average MAPE × Forecasting(7)

2. CONTENT RESEARCH

2.1 Analysis Forecasting Method

Forecasting is the process of predicting the unknown circumstances. service branches Dipenda (DISPENDA) province Ranchi district bandung bisaanya I only use the data card and guessing goods as a determinant of procurement. If stocks run out the warehouse clerk will contact the treasurer to do the filing bisaanya procurement of goods and the large number of goods ordered only by intuition of the owner or suggestions from the inventory so that sometimes frequent purchases excess or lack of necessity.

The data used for forecasting is the data from the item out. To predict the amount of disposable consumables procurement in future periods used similarities in method of moving averages and Weight Simple moving average for the data to be diramalakan based on historical data and has a seasonal pattern of the data. Samples of goods that will be used for the calculation is on education PKB Jabar. pattern of the data items that came out on education CLA in 2011-2012 can be seen in Figure2.

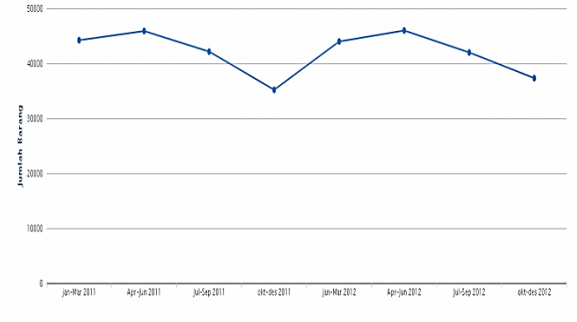


Figure 2. Data Pattern SKPD coming out 2011-2012

Here is the prediction by the method of moving averages and Weight Simple moving average.

a. Simple moving averages method

Referring to the equation II.1 then the identification of the variables that exist in the current system. Σ n previous period demand will be filled with the following data:
Data on education stuff out goods SKPD PKB Jabar in 2011 can be seen Table 2.

Table 2. SKPD PKB Jabar coming out 2011 and 2012

No	*Period*	*(SKPD PKB Jabar) coming out*
1	jan - Maret 2011	44.240
2	Apr - Juni 2011	45.900
3	Juli - Sep 2011	42.150
4	okt – des 2011	35.200
5	Jan – Mar 2012	44.000
6	Apr – Jun 2012	46.000
7	Jul – Sep 2012	42.000
8	Okt – Des 2012	37.335

Procurement of goods for the year 2012 based on forecasting by using simple moving averages = period average stuff out before known. Based persamaan1 forecasting calculations can be performed in Table3.

Table 3. Simple moving averages forecasting SKPD PKB Jabar

No	*Period*	*Item coming out*	*Forecasting (SKPD PKB Jabar)*
1	jan - Maret 2012	44.000	$= \frac{44.240 + 45.900 + 42.150 + 35.200}{4}$ = 41.873
2	Apr - Juni 2012	46.000	$= \frac{44.240 + 45.900 + 42.150 + 35.200 + 44.000}{5}$ = 42.298
3	Juli - Sep 2012	42.000	$= \frac{44.240+45.900+42.150+35.200+44.000+46.000}{6}$ = 42.915

No	Period	Item coming out	Forecasting (SKPD PKB Jabar)
4	okt – des 2012	37.335	$= \frac{44.240+45.900+42.150+35.200+44.000+46.000+42.000}{7}$ $= 42.784$

a. *Weight moving averages Method*

Forecasting procurement by using the method of moving averages Weight = average 3 out prior period items and put their weight to the most recent data priorities with the greatest weight. Based on the equation II.2 can be performed for the prediction of the Table.

Table 4. Weight moving averages Forecasting Skpd PKB Jabar

No	Period	Item coming out	Forecasting (SKPD PKB Jabar)
1	jan - Mar 2012	44.000	$= \frac{(44.240\times1)+(45.900\times2)+(42.150\times3)+(35.200\times4)}{1+2+3+4}$ $= 40.329$
2	Apr - Juni 2012	46.000	$= \frac{(44.240\times1)+(45.900\times2)+(42.150\times3)+(35.200\times4)+(44.000\times5)}{1+2+3+4+5}$ $= 41.553$
3	Juli - Sep 2012	42.000	$= \frac{(44.240\times1)+(45.900\times2)+(42.150\times3)+(35.200\times4)+(44.000\times5)+(46.000\times6)}{1+2+3+4+5+6}$ $= 42.823$
4	okt – des 2012	37.335	$= \frac{(44.240\times1)+(45.900\times2)+(42.150\times3)+(35.200\times4)+(44.000\times5)+(46.000\times6)+(42.000\times7)}{1+2+3+4+5+6+7}$ $= 42.618$

For more details, goods out each period and forecasting with single simple method of moving Weight averages and moving averages can be seen in Table 5.

No	Period	Item coming out	Forecasting (SKPD PKB Jabar)	
			simple moving averages	Weight moving averages
1	Jan – Mar 2012	44.000	41.873	40.329
2	Apr – Jun 2012	46.000	42.298	41.553
3	Jul – Sep 2012	42.000	42.915	42.823
4	Okt – Des 2012	37.335	42.784	42.618

Table 5. Forecasting with simple moving averages method and weight moving averages

b. *Forecasting Error Calculation*

Forecasting error calculation is the method used to select the right forecasting method by calculating forecasting errors then choose the smallest value. This research will use the Mean Absolute Percent Error (MAPE) for the calculation of forecasting error MAPE as the result of the calculation is expressed as a percentage that can be used to calculate the minimum stock. MAPE Calculation results can be seen in Table 6 and Table 7 below:

Table 6 MAPE calculation of Simple moving averages method

No	Period	SKPD PKB jabar coming out	Forecasting	Mape (error/Actual)
1	Jan – Mar 2012	44.000	41.873	100 × (2127/44.000) = 4.83%
2	Apr – Jun 2012	46.000	42.298	100 × (3702/46.000) = 8.04%
3	Jul – Sep 2012	42.000	42.915	100 × (915/42.000) = 2.17%
4	Okt – Des 2012	37.335	42.784	100 × (5449/37.335) = 14.59%
MAPE = 7.40%				

Table 7 Mape calculation of Weight moving averages forecasting

No	Period	SKPD PKB jabar coming out	forecasting	MAPE (error/Actual)
1	Jan – Mar 2012	44.000	40.329	100 × (3671/44.000) = 8.34%
2	Apr – Jun 2012	46.000	41.553	100 × (4447/46.000) = 9.66%
3	Jul – Sep 2012	42.000	42.823	100 × (823/42.000) = 1.97%
4	Okt – Des 2012	37.335	42.618	100 × (5283/37.335) = 14.15%
MAPE = 8.53%				

Based on the results obtained MAPE comparison of the calculation method of the simple moving averages and the moving average Weight forecasting method chosen was simple method of moving averages because it has the smallest MAPE

c. Safety stock

Safety stock arises when companies are faced with uncertainty will demand goods, so there is the possibility of running out of stock, it is necessary for the calculation of safety stock to keep the out of stock items [4]. Average errors - resulting from forecasting average Simple Moving Averages previous measured is 7:40% then the safety stock calculations can be seen in Table 8.

Table 8 safety stock calculation

No	Period	SKPD PKB jabar forecasting	Safety stock=average MAPE x forecasting
1	Jan – Mar 2012	40.329	7.40% x 40.329 =2984
2	Apr – Jun 2012	41.553	7.40% x 41.553 =3075
3	Jul – Sep 2012	42.823	7.40% x 42.823 =3169
4	Okt – Des 2012	42.618	7.40% x 42.618 =3239

2.2 Analysis Method of Monitoring

Supervision is an activity in order to pursue the implementation of the works in accordance with established plans or desired results. Oversight is intended to prevent and to correct errors, irregularities, discrepancies, and other abuses that are not appropriate duties and powers that have been determined.

Supervision that will be used on a system that is built to control inventory. Each item will have a safety stock / minimum different so it takes pengFigurean to quickly see what items will soon run out. Stock of inventory information will be presented in the form of graphs, a list of goods that have less priority than safety stock / minimum and notification when the item is less than safety stock so that the Board and the Vice Goods Goods Storage Assistant can provide oversight and control of stocks held warehouse.

2.3 Data Analysis

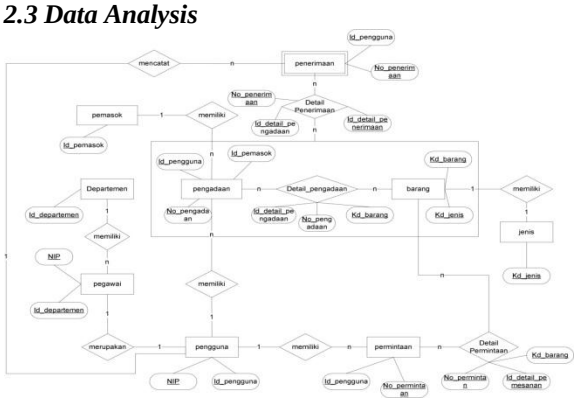


Figure 3. ERD monitoring inventory system

2.4 Functional Needs Analysis

Functional needs analysis will begin after the analysis phase of the system is completed. Analysis of functional requirements can be defined as pengFigurean, planning and making sketches or arrangement of several separate elements into a unified whole and functioning .. The tools used for general mengFigurekan system to be built that context diagrams and data flow diagrams.

2.4.1 Diagram Konteks

Essentially the system is linked with a number of entities, be it the relationship with entities outside the system as well as linkages with entities in the system. Relationship between the entities with diFigurekan system Context Diagram. Diagram Context on Inventory Control System can be seen in Figure 4.

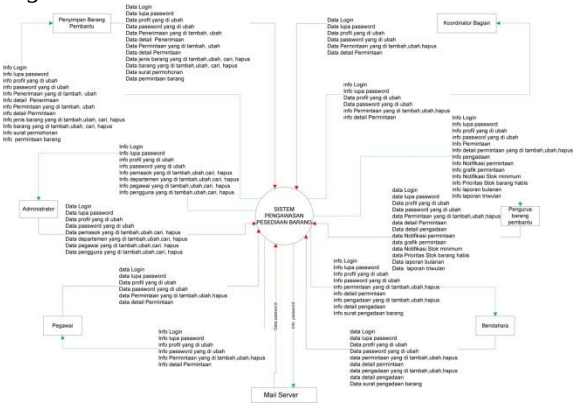


Figure 4. Inventory Monitoring System Context Diagram DISPENDA

2.5.2 DFD (Data Flow Diagram)

DFD (Data Flow Diagram) is a technique that mengFigurekan data flow and transformation of the data used as input to the trip output. DFD Context Diagram created if the there is still a process that must be explained in more detail. Here is a DFD on Inventory Control Systems:

2.5.3 DFD Level 1

DFD level 1 on system processes that are 7 login, forgot password processing, Data processing profiles, processing of master data, transaction data processing, monitoring and reporting. DFD level 1 on a system that is built can be seen in Figure 5.

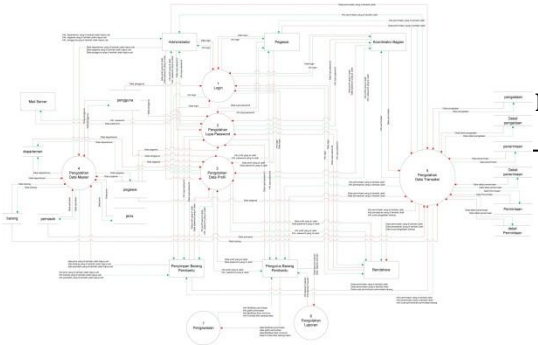


Figure 5. DFD Level 1

3. CLOSHING

3.1 Conclusion

Based on the research that has been done using blackbox techniques, where the testing is carried out by beta testing the software inventory control system at the Office of the Revenue Office Services Branch (DISPENDA) Province of Regency Bandung I Ranchi, the conclusions obtained are:

1. *The inventory control system can facilitate the Board in obtaining Goods Maid accurate inventory information.*
2. *The inventory control system can facilitate the Governing Goods Maid in the procurement plan for the period ahead.*

1.2 Suggestion

Of all the results that have been achieved at this time, of course, there are still many shortcomings to be corrected or added. The suggestions on the use of systems that have been made are as follows:

1. *Need for development and maintenance of better*
2. *The employees are given more training in order to master the application more*
3. *The development of applications in the event of changes in the prices of goods*
4. *Development of display applications for employees is not saturated*

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