Implementation Of Sales Forecasting Method In Production Planning In Cv Tirta Alam Jaya Merauke

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A B S T R A K

Masalah yang akan diteliti adalah bagaimana metode peramalan penjualan diterapkan di perusahaan dan variabel apa yang mempengaruhi peramalan penjualan. Dengan tujuan, agar perusahaan dapat menerapkan metode peramalan penjualan yang optimal untuk kelangsungan hidup perusahaan dan mengetahui variabel-variabel yang mempengaruhi peramalan penjualan. Dalam penelitian ini data yang diperoleh kemudian diuji dengan metode berikut: (1) Metode Analisis Tren Linier, Bentuk persamaan umum (Sofyan Assauri, 1984, hlm. 53-56): $Y = a + bt$, (2) Metode Exponental Trends (b) Linear, dengan metode logaritmik, $Y = a + b \log t$ Fungsi metode ini adalah: fungsi peramalan: $Y\_t = a + bt$ dan (4) Metode Dekomposisi. Hasil penelitian Metode peramalan terbaik untuk memprediksi penjualan air minum dalam kemasan di CV Tirta Alam Jaya Merauke pada periode berikutnya, adalah metode Exponental Trend. Metode ini dipilih karena memiliki nilai error rate terendah bila dibandingkan dengan metode peramalan lainnya, yaitu untuk peramalan penjualan air minum dalam kemasan diperoleh nilai MAD sebesar 932,65, MSE sebesar 20,581,918.63 dan MAPE sebesar 34,94%. Hasil peramalan penjualan Air minum dalam kemasan dengan menggunakan metode perhitungan eksponensial adalah 14.104 Karton pada bulan Januari 2016.

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A B S T R A C T

The problem to be studied is how the sales forecasting method is applied in the company and what variables influence sales forecasting. with the aim, for the company can apply optimal sales forecasting method for the survival of the company and know the variables that affect sales forecasting. In this study the data obtained then tested by the following methods: (1) Linear Trend Analysis Method, General equation form (Sofyan Assauri, 1984, pp. 53-56): $Y = a + bt$, (2) Method of Exponential Trends (a) Constant, with forecasting function: (b) Linear, with the logarithmic method, $Y = a + b \log t$ The function of this method is: forecasting function: $Y\_t = a + bt$ and (4) Decomposition Method. Result of research The best forecasting method to predict the sales of bottled drinking water in CV Tirta Alam Jaya Merauke in the next period, is the method of Exponental Trend. This method is chosen because it has the lowest error rate value when compared with other forecasting method, that is for forecasting sales Bottled drinking water obtained MAD value of 932.65, MSE of 20,581,918.63 and MAPE of 34.94%. Sales forecasting results Bottled drinking water using Exponental trend method calculation is 14,104 Carton in January 2016.

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1. Introduction

The development of people's consumption of a product from year to year is increasing in this case the need for drinking water. In recent years there has been a shift in people's thinking and behavior, so that formerly they used well water, river water as drinking water, they now prefer bottled drinking water as daily drinking water needs, especially middle- and upper-income people. Even the lower-middle-income group showed a tendency to consume bottled water.

Considering the development of bottled drinking water market in Indonesia, especially in Merauke-Papua regency there are several things to note, namely: (1) consumption of bottled drinking water has a correlation with level of society income. (2) the increase of bottled water consumption is also inseparable from public awareness on health. (3) the promotional activities were undertaken by the producers members contributed to the development of the market.

Therefore to make the market demand forecasting or sale of bottled water overall, these three factors should be considered, especially in long-term forecasting, then for a specific sales product or a particular brand, in addition to the above factors, there are also other factors that must be considered, for example: the selling price of the product, the selling price of competitors, promotion and distribution network.

The benefit of sales forecasting is to be able to forecast the sales exactly from time to time so that a production plan can be made that matches to the sales forecast. This is very important because if a production plan arranged without consider to sales forecasts can lead to inefficiency or loss of opportunities to gain a greater profit.

CV. Tirta Alam Jaya is one of the bottled drinking water company in Merauke-Papua. During this business is operating, the company has not used yet sales the forecasting methods. Therefore it is very important to apply sales forecasting methods in the company to minimize errors that occur during the planning and to know what variables which affect the sales forecasting.

The Research Purposes

Specific purposes of this research are: 1). The using of forecasting method optimally for the survival of the company.2). Knowing the variables that affect the sales forecasting.

The Benefits of the Research

The benefits of this research are: 1). To give a representationof to what extent of this sales forecasting method can be applied asa basis for decision making in production planning. 2).Used as a reference additional to lectures and further studies. 3). Material of scientific publications Journal of Economics and Social Faculty of Economics, Musamus University.

Literature review

The sales forecasting is an activity that is important and as a factor that must be considered in business planning. Sales forecast is not only an estimate of the sale but also is an act of adjustment of opportunity that is the actual and potential demand with the necessary marketing efforts, so that the purpose can be obtained a benefit from it.

According to Winardi (1991.220) Sales Forecast is an estimate of sales over a period of future, which specified where the estimate is associated with a proposed marketing plan, and which contains a number of uncontrolled forces as well as competitive forces.

The purpose of Forecasting

The purposes of forecasting are viewed with time: a) Short Term To determine the quantity and time of item being made into production. Usually daily or weekly and determined by Low Management. B) Medium-term To determine the quality and timing of production capacity. Usually monthly or quarterly and deternined by Middle Management. C) Long-term To plann the quantity and timing of production facilities.Usuallyannual, 5 years, 10 years, or 20 years and determined by Top Management.

The characteristics of Forecasting

Good forecasting has several important criteria, including accuracy, cost, and convenience. The explanations of these criterias as follows: a). Accuracy The accuracy of a forecasting result is measured by the result of habits and consistency of the forecast. The results of forecasting will says bias when the forecast is too high or too low compared to the actual reality occurred. The forecasting results are said to be consistent if the forecast errors are relatively small. Forecasts that are too low will result in a shortage of inventory, so that the costumers demand can not be granted immediately, as a result consequently the company may lose customers and lose sales profits. Forecasting is too high will result in the accumulation of inventory, so that much capital is absorbed in vain. The accuracy of these forecasts plays a role in balancing the ideal stock.b). Cost

The cost involved in making a forecast is depend on the number of items forecast, the length of the forecast period, and the forecasting method used. The three cost factors will affect how much data

is needed, how the data is processed (manual or computerized), how the data is stored and who the experts are seconded. The selection of forecasting methods should be costumized with the available funds and the level of accuracy to be obtained, for example the essential items will be forecasted with a cheap and simple method. This principle is adopted from Pareto law (ABC Analysis).c). ConvenienceThe using of a simple forecasting method, easy-to-make and easy-to-apply forecasting methods will benefit the companies. It is useless to use sophisticated methods, but can not be applied to the company system because of the limitations systems, human resources, and technological tools.

The Characteristics of Forecasting

In making forecasting or applying a forecasting, means there are some things to be considered, namely: 1). Forecasting must contain errors, means that forecasting can only reduce the uncertainty that will occur, but can not eliminate the certainty.2).Forecasting should provide information about some error sizes, means that because the forecasting must contain errors, so it is important for the forecaster to inform how big possible errors might happen.3) Short-term forecasting is more accurate than long-term forecasting. This is because in short-term forecasting, the factors that influence the relative demand still constant while forecasting stillin a long period, then the greater possibility of changes in factors that affect demand

The Factors that Affecting the Selection of Forecasting Techniques

Forecasting is actually an attempt to minimize the risks arising from decision making in a production plan. The greater effort has been spent of course the risk that can be avoided is greater. However, the effort to minimize the risk is limited by the cost incurred by the effort.

Factors that must be considered are: 1). Horizon ForecastingThere are two aspects of the time horizon associated with each method of forecasting: a).Scope of time in the futureFor which the difference of the forecasting method used should be adjusted. B).The number of periods for which the forecast is desired Some techniques and methods can only be adjusted for forecasting one or two infront periods, whereas other techniques and methods can be used for forecasting some future periods. 2). Level of Accuracy The level of accuracy which required is closely related to the level of detail required in a forecast. For some decision-makers expect variations or deviations on forecasts made between 10 percent and 15 percent for the intentions they expected, whereas for other cases it may be assumed that any variation or deviation from forecast of 5 percent is quite dangerous. 3). Data Availability The method used is very useful, when associated with the condition or existing information or the data it owns. If from the previous data is known the seasonal pattern, then for forecasting one year ahead should be used method of seasonal variation. Whereas if from the previous data is known a relationship pattern between variables that influence each other, so it is better to use causal method or correlation. 4). Forms of Data Patterns The main basic of forecasting methods is that the kinds of patterns found in predicted data will be sustainable. For example, several series illustrate a seasonal pattern, as well as with a trend pattern. Other forecasting methods may be simpler, consisting of an average value, with random fluctuations or random contained. Due to the differences in the ability of forecasting methods to identify patterns of data, it is necessary to establish an adjustment between predetermined data patterns with the techniques and methods of forecasting that will be used. 5). Cost Generally there are four cost elements covered in the use of a forecast procedure, they are development costs, data storage, operation execution and the use of other techniques and methods. The existence of a significant difference in the amount of costs, has an influence on whether or not the use of a particular method can be used in a certainty situation. 6). Type Of Capital In addition, it is important to note the assumptions of some important archetypes in the data.

Many forecasting methods have considered some models of predicted situations. These models are a series where time is described as an important element that determines changes in patterns, which may be systematically explained by regression or correlation analysis. Another model is the causal model, which illustrates that the prediction made depends on the occurrence of a number of other events, or the characteristic of which is a mixture of the models mentioned above. The models are very important to note, because each model has different abilities in the analysis of situations to make decisions. 7). Easy Usage And Its Application A general principle in the use of scientific methods of forecasting for management and analysis are the understandable and easy-to-apply methods that will be used in decision making and analysis. This principle is based on the reason that, when a manager or analysis is responsible for the decisions he or she is taking, he or she certainly does not use the unknown or unconfirmed grounds. Thus, as an additional feature of the techniques and forecasting methods is that what is needed to meet the needs of the situations is the techniques and methods of forecasting which can be adapted to the ability of the manager or analysis to use that forecasting method.

2. Methods

In this research the data obtained then tested with the following methods: (1) Linear Trend Analysis Method, Common equation form (Sofyan Assauri, 1984, pp. 53-56): Y = a + bt, (2) Exponental Trends Method or Growing, common equation form : $Y=ae^{bt}$, (3) Logarithmic Method, Y= a+blog t the function of this method is: (a) Constant, with forecasting function: (b) Linear, with the logarithmic method, Y = a + b log t and the Decomposition Method.
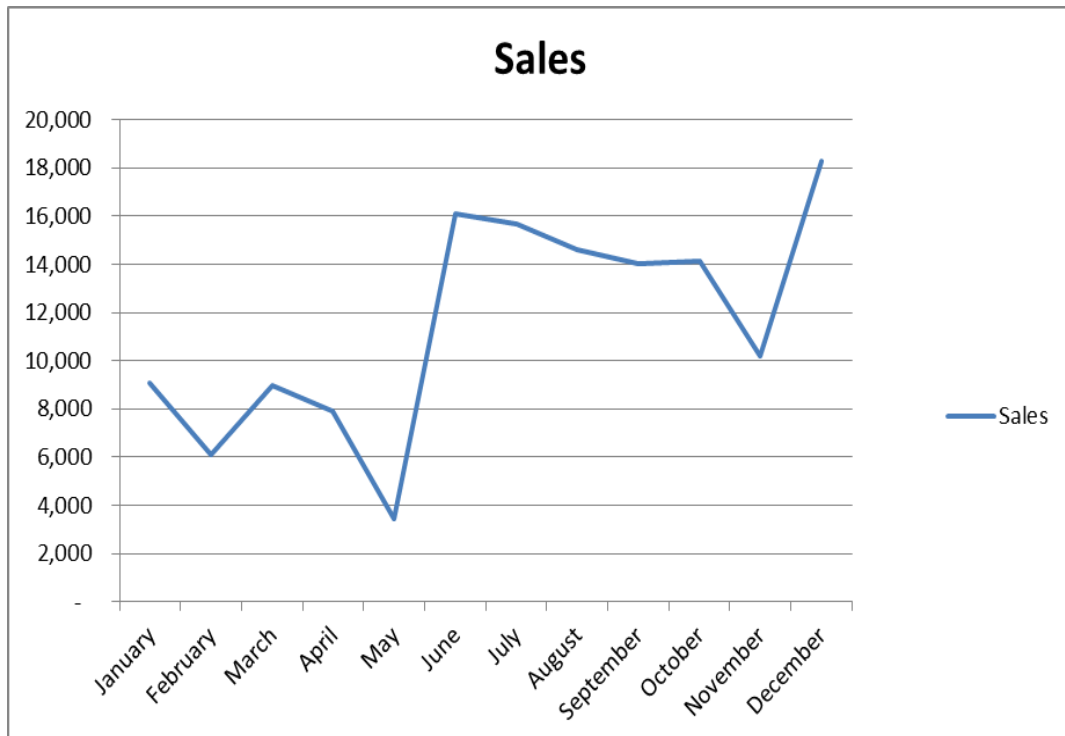
Sales Data

Based on the data provided by the management of Drinking Bottled Water Company AQLAA then obtained sales data during period of January - December 2015 (Table 5.1). The sales data of the previous period is used as a reference to be able to perform the forecasting method.

Table 1. Data Sales Bottled Drinking Water CV Tirta Alam Jaya

Data Sales Bottled Drinking Water CV Tirta Alam Jaya

Period	Month	Total Sales (carton)
	January	9081
	February	6121
	March	8994
	April	7898
	May	3462
	June	16075
2015	July	15647
	August	14625
	September	14007
	October	14114
	November	10210
	December	18280

source: CV Tirta Alam Jaya

Sales data pattern is useful to see the stationary data. Sales data pattern Bottled drinking water for the period of January - December 2015 can be seen in Figure 5.2.

Picture 1. Data Pattern of Sales of Bottled Drinking Water

According to Raharja et al. (2010), stationary data patterns occur when there is data fluctuating around a constant mean value. Based on the result of data pattern test, it is known that sales data of Bottled Drinking Water is not stationary, it can be seen from the movement of data that is not between the constant average line, but more indicate the existence of trend element. The trend element seen in fluctuation of movement of the data from left to the right that intent to increase. Trend pattern data occurs when there is a long-term increase or decrease over the time period observed (Ajeng, 2011).

The Selection of Best Forecasting Method

Based on the calculation of each method of forecasting known the error value that obtained. The selection of forecasting method is done by comparing the error value, where the forecasting method with the smallest error value is chosen as the best forecasting method for predicting bottled drinking water at CV Tirta Alam Jaya Merauke Company. The comparison of error values Bottled drinking water with forecasting method at CV Tirta Alam Jaya Merauke Company can be seen in Table 5.2.

Table 2. Recapitulation the value of Drinking Water Error in the package

Number	Method	MAD	MSE	MAPE (%)
1	Linear Trend	1,081.55	24,237,441.14	36.69
2	Exponential Trend	932.65	23,581,918.63	34.94
3	Logarithm Trend	713,008.92	21,479,374.55	1,127.71
4	Decomposition	1,975.72	22,321,876.22	38.27

Table 2. shows that the results of the recapitulation of bottled drinking water error values with the exponential trend forecasting method obtained the lowest error value when compared with other time series forecasting methods. The method of forecasting the exponental trend is chosen as the best forecasting method because it has the lowest error value that is, MAD (Mean Absolute Deviation) is 932.65, MSE (Mean Square Error) is 20,581,918.63 and MAPE (Mean Absolute Percentaage Error) is 34.94%.

4.Conclusions Recommendation

1.The best forecasting method to forecast sales of bottled drinking water in CV Tirta Alam Jaya Merauke in the next period, is the method of Exponental Trend. This method is chosen because it has the lowest error rate value when compared with other forecasting method, that is for forecasting sales Bottled drinking water obtained the value of MAD is 932.65, MSE is 20,581,918.63 and MAPE is 34.94%.

    2. Sales forecasting results Bottled drinking water using Exponental trend method calculation is 14,104 Carton in January 2016,

CV Tirta Alam Jaya Merauke should apply the exponential trend forecasting method to predict the selling rate of bottled drinking water in the coming period because this method has the lowest error rate compared with forecasting method of Linear Trend, Logarithmic Trend, and Decomposition trend. Forecasting method can be used as the basic of production planning to prevent over production that can harm the company in the form of storage costs.

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