TREND MOMENT METHOD IN PREDICTING THE NUMBER OF SALES OF MATIC MOTORCYCLES

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Abstract: PT. Panca Niaga Mandiri is an authorized motorcycle dealer in Sei Piring which is engaged in selling Honda motorcycles both in cash and on credit. Dealer Problems PT. Tunas Dwipa Putra at this time is that there is no definite calculation to predict the motorcycle sales target each month and the problems that occur are that sometimes there is an increase or decrease in motorcycle sales for each month because currently, business competition is very tight so that it makes business people compete with each other in their way. Many strategies have been carried out by marketing for how monthly motorcycle sales continue to increase. Therefore, it is necessary to use a forecasting method to predict sales of Honda motorcycles, especially automatic-type Honda motorcycles. The method used is the Trend Moment method. It is hoped that this method can help predict sales of automatic motorcycles for the next month.

Keywords: honda motorcycle; prediction; sales;

Abstrak: PT. Panca Niaga Mandiri merupakan dealer resmi sepeda motor yang ada di Sei Piring yang bergerak pada penjualan sepeda motor honda baik secara tunai maupun secara kredit. Permasalahan Dealer PT. Tunas Dwipa Putra pada saat ini yaitu tidak adanya perhitungan yang pasti untuk memprediksi target penjualan motor disetiap bulannya dan permasalahan yang terjadi terkadang mengalami kenaikan maupun penurunan penjualan sepeda motor untuk setiap bulannya, Karena saat ini persaingan bisnis sangat ketat sekali sehingga membuat para pelaku bisnis saling bersaing dengan cara mereka sendiri. Banyak strategi yang sudah dilakukan oleh marketing untuk bagaimana penjualan sepeda motor setiap bulanya terus meningkat. Oleh karena itu, maka diperlukan metode peramalan untuk memprediksi penjualan sepeda motor honda khususnya sepeda motor honda type matic. Metode yang digunakan yaitu metode Trend Moment diharapakan metode ini dapat membantu dalam memprediksi penjualan sepeda motor matic untuk bulan kedepannya.

Kata kunci: penjualan; prediksi; sepeda motor honda

INTRODUCTION

Transportation is a tool that makes it easier for humans to get to a place and carry out daily activities. Along with the times with increasingly sophisticated technological sophistication, making these means of transportation is a necessity for every individual, because these means of transportation have become the needs of everyone in daily activities [1]. According to the Indonesian Motorcycle Industry Association (AISI), Indonesia is the largest country in motorcycle sales in ASEAN [2]. because the motorbike is the choice for everyone because the price is affordable and can be used for a long time. In Indonesia, the most widely used motorcycle is the Honda brand motorcycle with the *automatic type.*

Motorcycles are a means of transportation that is in great demand by many people in Indonesia, especially in areas with very minimal infrastructure such as Sei Piring. Panca Niaga Mandiri Dealer is one of the Honda motorcycle dealers that provides various types of motorcycles, one of which is the automatic type. The need for the use of Honda brand motorcycles is increasingly in the interest of the community, especially young children and mothers because the use of automatic motorcycles is lighter and easier to use.

Forecasting is an art and science in predicting events in the future or the next period using previous historical data. In addition, forecasting can also be regarded as a tool for predicting sales and demand for goods. Many methods can be used to make predictions, one of which is the Trend Moment method [3]. The purpose of this prediction is to reduce uncertainty about something that will happen in the future by minimizing forecasting errors as measured MAD,MSE,and MAPE [4].

The company is experiencing increases and decreases in motorcycle sales each month. However, this company also has a problem with the supply of motorcycles that is not stable every month so it has an impact on the process of distributing motorcycle unit orders to distributors.

With an inappropriate amount of motorcycle inventory, the company can suffer losses because it cannot meet consumer demand and consumers can also switch to other competitors. In addition, problems that occur in the company, namely the inventory of goods that are still using estimates from previous sales records can result in excess goods on certain types of motorbikes.

Given these problems, we need a method that can help predict sales of the amount of inventory needed for the next period. With the above problems, the method used is the trend moment method. The trend moment method can be used to predict the number of motorcycle sales based on sales in the previous period [5].

The Trend Moment method has been widely used in several case studies of implementing the Trend Moment Method for Predicting Motorcycle Spare Part Sales Data, the results of forecasting applications using the trend moment method can be used to predict motorcycle spare parts sales data [6].

Research with the title "Forecasting Fertilizer Sales Using the Trend Moment Method" the application of this trend moment method is very suitable for forecasting fertilizer sales at UD. Aneka Tani Mandiri for the ZA fertilizer brand [7].

Research with the title "Plywood Sales Prediction in CV. Diato Wood Sejahtera Using the Web-Based Trend Moment Method, the results of this study forecasting using the Trend Moment

method can be used to predict the number of plywood sales in the future [8].

Research is entitled "Monthly Sales Forecasting Using the Trend Moment Method at the Saumzu Boutiqe Store" this method is used to forecast clothing sales from the period January 2018 to December 2019, the results of this method are known that sales in January 2020 were 39,934.97 [9].

Research entitled Decision Support in Forecasting Broiler Sales with Trend Moment and Simple Moving Average Methods on CV. Merdeka Adi Perkasa, from the results of the description of the method, the highest MAPE result is 4.08% and the lowest is 36.12%, while the simple moving average method obtains the highest MAPE 3.25% and the lowest is 23.12% [10].

The purpose of this study is to apply the Trend Moment method to predict the number of sales of Maric motorcycles at PT. Panca Niaga Mandiri in the next few months.

METHOD

Trending Moment

A trend is a movement that tends to rise or fall in the long term obtained from the average change over time and the value is quite flat or smooth (*smooth*). [11] .

The Trend Moment method is one of the methods used in forecasting sales, which will later be used as the basis for sales in the following month [12]. In the application of the Trend Moment method, this can be done by using historical or previous data from one variable. The formula used from the Trend Moment Method: $Y = a + bX$ (1)

$\sum Y = n\,a + b \sum X$ (2)

$\sum XY = a \sum X + b \sum X^2$ (3)

Information :
Y   = Forecasting Using (*trend*)
Y   = Number of periods/interval times a plus the number of values x times b
XY = Times the number of values of x plus b times the number of values of x^2
N   = Number of data.

Prediction Determination Value

In this study, the determination of the predictive value was calculated by calculating the mean squared error (MSE) and the average absolute percent error (Mean Absolute Percentage Error - MAPE).

Mean Absolute Deviation (MAD)

The method for evaluating the forecasting method used the number of absolute errors by measuring the accuracy of the forecast with the average error. [13].

$$MAD = \sum \left(\frac{Actual - Forecast}{} \right)   (4)$$

Information:
Actual: Actual Value Data
Forecast: Forecast
n: Amount of data

Mean Squared Error (MSE)

MSE is the second way to measure the overall forecasting error. The disadvantage of MSE is that MSE tends to show large deviations due to squared. Formula to calculate MSE:

$$MSE = \frac{\sum \left| x_t - f \right|^2}{n}   (5)$$

Information:
x_t: Actual Value Data
F_t: Forecasting
N: A lot of forecast data

Mean Absolute Percentage (MAPE)

MAPE is an error measurement that cal-

culates the size of the percentage deviation between the actual data and the forecasted data. The MAPE value can be calculated equation:

$$\text{MAPE} = \left(\frac{100\%}{n}\right)\sum_{t-1}^{n}\left|\frac{x_t - f_t}{x_t}\right| \qquad (6)$$

RESULTS AND DISCUSSION

This study uses quantitative methods used in predicting or predicting automatic motorcycles. The sales data for automatic motorcycles from 2021 to 2022 in table 1.

Table 1. Matic Motorcycle Sales Data for 2021-2022

No	Month	Beat	Vario	Scoopy
1	January	35	41	41
2	February	42	45	48
3	March	45	42	50
4	April	39	39	42
5	May	46	44	48
6	June	41	42	52
7	July	48	45	46

The calculation algorithm using the Trend Moment method in predicting automatic motorcycle sales for August 2022 in table 2.

Sales Prediction Calculation

Table 2. Prediction of Beat Type Motorcycle Sales for the 2022 Period

No	Month	Honda Beat	X	X²	XY
1	January	35	0	0	-
2	February	42	1	1	42
3	March	45	2	4	90
4	April	39	3	9	117
5	May	46	4	16	184
6	June	41	5	25	205
7	July	48	6	36	288
	Total	296	21	91	926

Trend Moment Formula:
Equation (i): $\sum Y = n\,a + b \sum X$

$$296 = 7a + 21b$$
Equation (ii) : $\sum XY = a \sum X + b \sum X^2$
$$926 = 21a + 91b$$

Looking for Similarities Between Value A Or Value B :
296 = 7a + 21b   x 3 = 888 = 21a + 63b
926 = 21a + 91b   x 1 = 926 = 21a + 91b

Equation (ii) – Equation (i)

$$
\begin{array}{r}
888 = 21a + 63b \\
926 = 21a + 91b \\
\hline
-38 = -28b
\end{array}
$$
b   = -38/-28
b   = 1.357

Value a : 296 = 7a + 21b
296 = 7a + 21 (1,357)
296 = 7a + 28.5
7a = 296 – 28.5
7a = 267
a = 267/7
a = 38

Trend Moment Equation:
Y = a + bX
Y = 38 + 1,357 (7)
= 38 + 9
= 47

Result forecasting Motorcycle sales in August 2022 Amount: 47 Units
Prediction results for Honda Beat, Vario, and Scoopy automatic motorcycles in August 2022 in table 3.

Table 3. Forecasting Motorcycle Sales for August 2022

Month	Motorcycle Type		
	Beat	Vario	Scoopy
August	47 Units	44 Units	53 Units

Error Calculation Forecasting Motorcycle Sales Forecast is shown in table 4.

Table 4. Analysis of Motorcycle Sales Forecasting Errors for August 2022

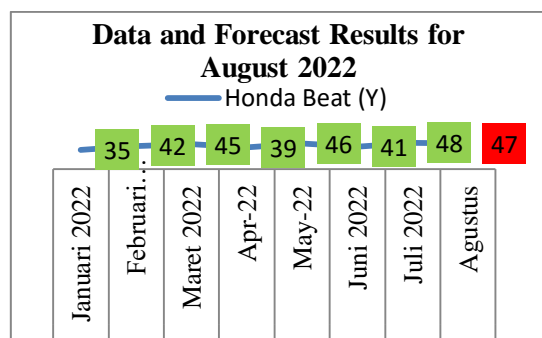| No	Type Motorcycle	MAD	MSE	MAPE
1	Beat	3.143	10,286	7,534
2	Vario	1,714	4.286	4.088
3	Scoopy	2.286	7,429	4,934

Image 1. Actual Data and Forecast Results

Image 1 the difference between the actual data and the forecast results for August 2022. The green numbers are actual data or previous data, while the red numbers are the forecast results in August. It can be seen that beat motorcycle sales experienced a decline in sales in August 2022.

CONCLUSION

The Trend Moment method can help PT. Panca Niaga Mandiri in overcoming problems of efficiency and time-liness in decision making, this method can also provide information about the number of motorcycle sales in the period August 2022 and this information is presented in the form of tables and graphs of actual data with predictive results.

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