FORECASTING TOTAL ASSETS OF PT. BPD KALTIM KALTARA FROM 2018 TO 2024 USING THE SINGLE EXPONENTIAL SMOOTHING METHOD

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ABSTRACT
PT. BPD Kaltim Kaltara is one of the regional development banks that plays a crucial role in supporting regional economic development in East Kalimantan and North Kalimantan. The company's total assets reflect significant financial stability and growth, making it an interesting topic to analyze in the context of strategic financial planning. The purpose of this study is to use the Single Exponential Smoothing (SES) approach to forecast PT. BPD Kaltim Kaltara's total assets. In the forecasting process, alpha 0,3, alpha 0,6, alpha 0,7, and alpha 0,8 are tested to determine the best value that gives the most accurate results. Based on the forecasting accuracy analysis, the SES method with alpha = 0,7 proved to be the most optimal in predicting the company's total assets, achieving MAE = 1454272,737, MSE = 4764920751283, and MAPE = 4,0433% (excellent forecasting ability). The forecasting results show an upward trend in assets, with total assets in September 2024 estimated to reach IDR 48.440.683,75. This method provides valuable guidance in thecompany's financial strategic planning, helping to anticipate future asset developments more precisely.These forecasting results also emphasize the importance of selecting the right parameters in the forecasting model to improve prediction accuracy.

Keywords: *Forecasting, Single Exponential Smoothing, Time Series Analysis, Total Assets.*

INTRODUCTION

PT. BPD Kaltim Kaltara is a regional-owned enterprise (BUMD) that is owned by the provinces of East Kalimantan and North Kalimantan. It was founded in 1965 with an initial capital of IDR 100.000.000, which was earned through the sale of shares to private and government entities. At the end of 1970, shares owned by private parties or individuals have been bought back by the local government, so that currently the entire capital of the company is fully owned by the local government with a capital value of IDR 10.000.000.000.000,- (ten trillion rupiah). Economic resources owned by PT. BPD Kaltim Kaltara and can be expressed in the form of monetary units are called assets (Bankaltimtara, 2022).

Total assets are the total amount of assets owned by a company or financial institution to support its operations (Utama, 2012). Total assets measure the size of the company in the financial statements. The greater the total assets, the higher the company's wealth and good performance, thus attracting investor interest (Kothari et al., 2016). Increased interest from investors can contribute to an increase in the company's share price (Juwita et al., 2021). Total assets are important in financial analysis as an indicator of the resources owned by the entity and a performance comparison tool between companies in the same industry. In the financial statements, total assets are recorded in the balance sheet section of the business which provides an overview of the entity's financial position in a certain period (Capelli et al., 2021). Forecasting total assets is necessary in banking companies, as larger assets have the potential to generate higher profits.

Forecasting is one of the methods in time series analysis used to estimate a future value based on previous data at a certain time and the same time interval. Single Exponential Smoothing (SES) is one technique that can be applied to forecasting utilizing trend data patterns (Z. Liu et al., 2021). SES is a simple method becauseit only requires one smoothing parameter, making it suitable for asset data that is stable and without a clear trend. This method prioritizes the latest value in the calculation, making it suitable for predicting relatively stable assets without significant fluctuations (Romaita et al., 2019). There are several forecasting accuracies that can be used including Mean Absolute Error (MAE), Mean Squared Error (MSE) and Mean Absolute Percentage Error (MAPE) (Aijaz & Agarwal, 2020). MAE represents the average of the absolute differences between the actual and predicted values in the data set (Chicco et al., 2021). MAE measures the average of the residuals in the dataset (Y. Liu et al., 2022). MSE represents the average of the squared differences between the actual and predicted values in the data set (Karunasingha, 2022). MSE measures the variance of the residuals. MAPE is an extension of determining the MAE value by determining the resulting percentage value (Sulastri et al., 2023).

There are several previous studies that become references in this research, including research by Prastyabudi et al. (2024) conducted a study comparing the Moving Average and Exponential Smoothing methods to estimate the number of internet service interruptions. The results obtained using 3 forecasting accuracies namely Mean Absolute Devitiation (MAD), MSE, and MAPE show that the SES method provides much better forecasting results than the MA method for all types of interference data. The SES method is able to produce a relatively small error value with a MAPE value below 2%. Chandra & Rohmaniah (2022) which implements a comparison of the Moving Average and SES methods for inflation forecasting in Purwokerto City. The results of the method comparison show that the SES method provides better results than Moving Average because it has a better accuracy value so it is feasible to use to forecast inflation in Purwokerto City. Furthermore, Riauwanto & Sulastiningsih (2019) study on the effect between total assets and banking profit sharing and the number of third party funds (DPK) in Islamic commercial banks found that total assets significantly increase the amount of DPK at the same time. Profit sharing has no discernible impact on the quantity of third party funds (DPK), and the regression coefficient value is 0,9491 with a significance level of 0,0000. With a significance level of 0,1139, the regression coefficient value is -0,0871.

Researching the case study of total assets at PT. BPD Kaltim Kaltara is intriguing because to its significant contribution to the regional economic development of East and North Kalimantan. In addition, the digital transformation faced has the potential to affect its capital structure and asset growth. This research can also provide insight into the bank's financial performance, the impact of local government policies, as well as how the bank deals with key geographical and industry challenges in the region.

This study aims to determine the description of total assets and determine the results of forecasting the total assets of PT. BPD Kaltim Kaltara in September 2024 using the SES method.

MATERIALS AND METHODS

This study employs a prediction methodology and is quantitative in nature. The sampling method employs purposive sampling with the requirement that it have the necessary data, specifically the most recent data consecutively gathered by PT. BPD Kaltim Kaltara. The data used is secondary data, gathered from PT. BPD Kaltim Kaltara's monthly financial statements during the January 2018–August 2024 timeframe.

The analysis method used is Single Exponential Smoothing (SES) to forecast the total assets of PT BPD Kaltim Kaltara. The steps taken in the analysis are detailed as follows:

1. Creating descriptive statistics.
2. Determining the forecast value using the SES method with $\alpha = 0,3$; $0,6$; $0,7$ and $\alpha = 0,8$. The formula for the SES method is as follows:

$$F_{t+1} = \alpha X_t + (1-\alpha) F_{t-1}$$

where:

F_{t+1} : forecast value for the next period

α : smoothing constant $0 < \alpha < 1$

X_t : actual value at period t

F_{t-1} : forecast value at the previous period

3. Calculating the forecasting accuracy value using the MAE, MSE, and MAPE methods.

$$MAE = \sum_{t=1}^{n} \frac{|X_t - F_t|}{n} \tag{2}$$

$$MSE = \sum_{t=1}^{n} \frac{(X_t - F_t)^2}{n} \tag{3}$$

$$MAPE = \sum_{t=1}^{n} \frac{\left|\frac{X_t - F_t}{X_t}\right| \times 100}{n} \tag{4}$$

where:

X_t : actual value in period t

F_t : forecast value in period t

n : number of data points

The smaller the values of MAE, MSE, and MAPE, the better the forecasting model's performance. The range of MAPE values is as follows:

Table 1. MAPE Value Range

Range of MAPE	Interpretation
< 10 %	Excellent Forecasting Ability
10 - 20 %	Good Forecasting Ability
20 – 50 %	Fair Forecasting Ability
> 50 %	Poor Forecasting Ability

4. Selecting the best SES method as the method used to forecast total assets based on the smallest forecasting accuracy value.
5. Perform total asset forecasting using the best SES method.
6. Creating a time series graph of actual data compared to the forecasted data.

RESULTS AND DISCUSSION

The data in this study is secondary data collected continuously from the period January 2018 to August 2024 from the monthly financial statements of PT. BPD Kaltim Kaltara.

Descriptive Statistics

The descriptive statistics used in this study include measures of concentration, such as mean, maximum, and minimum values, as well as measures of dispersion expressed in standard deviation. The graph that presents this information can be seen in Figure 1.
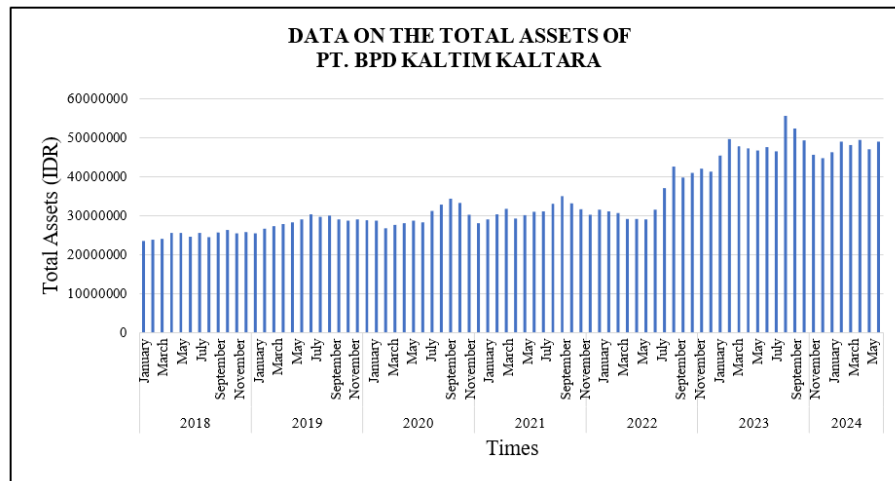

Figure 1. Chart of Total Assets of PT. BPD Kaltim Kaltara

Based on Figure 1, it is obtained that the lowest total assets of IDR 23.408.477,- occurred in the January 2018 period while the highest total assets of IDR 55.561.737,- were recorded in the October 2023 period. The average total assets of PT. BPD Kaltim Kaltara is IDR 34.018.939,- with a standard deviation that is smaller than the average value, so it can be concluded that the data does not vary too much or the range of total asset values is not too far.

Data visualization in the form of a time series graph, which provides an overview of changes in data from time to time in sequence, can be seen in more detail in Figure 2.
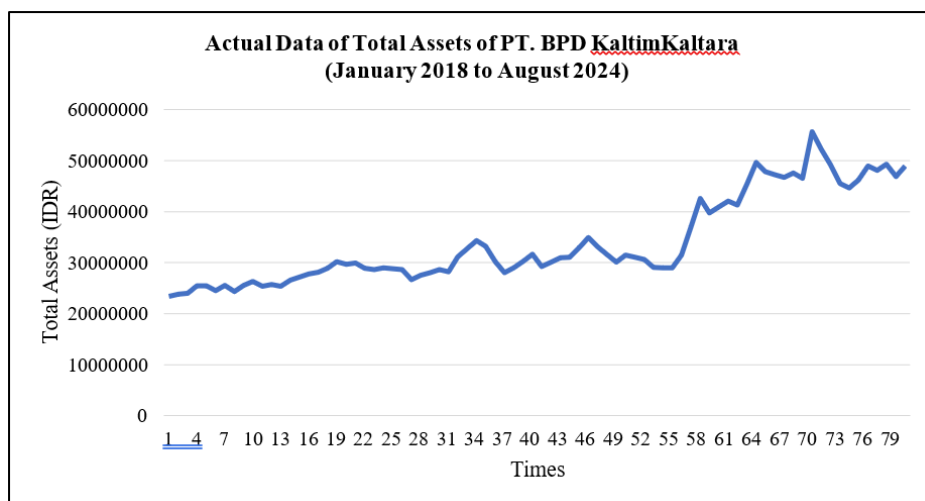

Figure 2. Chart of Total Assets of PT. BPD Kaltim Kaltara

The time series graph of PT. BPD Kaltim Kaltara total assets displays a non-stationary pattern with a trend pattern, as can be observed graphically in Figure 2. Forecasting techniques can be utilized to continue the study because this is the result of data fluctuations and notable increases over an extended period of time.

Determining the Forecasting Value

Calculating Single Exponential Smoothing based on total asset data at PT. BPD Kaltim Kaltara in 2018-2024. In this study only discussed for the SES ($\alpha = 0,3$), SES ($\alpha = 0,6$), SES ($\alpha = 0,7$), and SES ($\alpha = 0,8$) periods.

Table 2. Forecasting Calculation Results Using the SES Method

t	Xt	$Ft+1$			
		$\alpha = 0,3$	$\alpha = 0,6$	$\alpha = 0,7$	$\alpha = 0,8$
1	23408477				
2	23808429	23408477	23408477	23408477	23408477
3	23999361	23528462,60	23648448,20	23688443,40	23728438,60
4	25464988	23669732,12	23858995,88	23906085,72	23945176,52
⋮	⋮	⋮	⋮	⋮	⋮
80	48868043	47749272,51	47578108,11	47443512,15	47269766,16
81		48644288,90	48352069,05	48440683,75	48548387,63

Forecasting Accuracy

Forecasting accuracy is used to measure how precise or accurate the predictions generated by the forecasting model are compared to the actual values that occur. 3 forecasting accuracies are used, the results of which are presented in Table 3.

Table 3. Forecasting Accuracy

α	MAE	MSE	MAPE
0,3	1890312,318	7609766545303	5,1589
0,6	1492063,602	5158495007499	4,1160
0,7	1454272,737	4764920751283	4,0433
0,8	1467794,628	4529854973369	4,0673

Table 3 shows that the MSE accuracy value is at alpha 0,8, while the minimum MAE and MAPE accuracy values are at alpha 0,7 for the whole asset data at PT. BPD Kaltim Kaltara for the period January 2018 to August 2024 using the SES method. Thus, it can be concluded that the SES method's alpha 0,7 is superior and more appropriate for predicting PT. BPD Kaltim Kaltara's total asset data.

Forecasting Results

The Single Exponential Smoothing (SES) approach, which has an alpha value of 0,7, is the most effective approach according to the forecasting accuracy research that was conducted. Accordingly, it is anticipated that PT. BPD Kaltim Kaltara's total assets in September 2024 will rise beyond the previous month and reach IDR 48.440.683,75.

Comparison Chart

The graph that follows compares the forecasted and actual data for PT. BPD Kaltim Kaltara's total assets that are displayed in Figure 3. The graph demonstrates that the forecasting results match the actual data, and the September forecast indicates a rise over the previous month, indicating a positive trend in total assets.
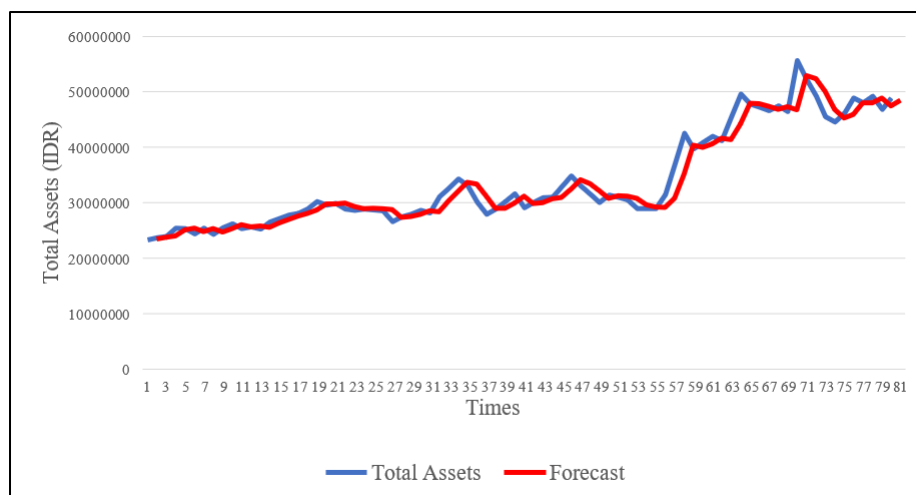
Figure 3. Comparison Chart of Actual Data and Forecasting Data

CONCLUSION

Based on the results of the analysis, it can be concluded that the SES approach with $\alpha = 0,7$ produces MAE = 1454272,737; MSE = 4764920751283 and MAPE = 4,0433% demonstrating good accuracy. Thus, it is the best SES method to predict the total assets of PT. BPD Kaltim Kaltara, base on the analysis conducted. The forecasted total assets for September 2024 amount to IDR 48.440.683,75. For future research, it is suggested to compare the SES method with other forecasting approaches, such as ARIMA, to determine the most accurate method for predicting financial data.

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