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Sales Forecasting Analysis Using Method Moving Average In Jete Gadget Accessories Surabaya.

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Abstract

This research aims to determine and analyze Sales Forecasting using the moving average method on JETE Surabaya gadget accessories. This research uses a descriptive quantitative approach using JETE product sales figures and processes it into calculation results, which will be concluded using a descriptive quantitative analysis approach. The data sources used in this research are secondary data in the form of literature studies, references, internal and external company data. The research results show that based on the forecasting results that have been carried out, the 3-month TWS JETE forecasting data, the lowest forecast is in December 2023, May and June 2024. Meanwhile, in the 4-month TWS JETE forecasting data, the lowest forecast is in August 2024.

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Introduction

The rapid development of communication technology provides many benefits in everyday life. As communication develops, it can be done in two directions or even more at the same time. The existence of the internet also makes internet users use the internet to communicate and make transactions, sell goods, do business, and work (Andriani, N., Jannah, M., Andrianingsih, V. 2022). The existence of cellphones makes all activities carried out today more effective and efficient, especially in communication. Cell phones have turned into important, multi-purpose objects. The more types of cellphones there are, the more various supporting accessories there are to complete them. Mobile phone accessories are supporting devices or electronic instruments that have practical purposes and functions to help human work. The existence of digitalization gives greater strength to customers and makes business people think about how to win the market (Jannah, M. 2021).

There are many and varied cellphone accessory brands in Indonesia, one of which is JETE. The cellphone accessory products that JETE offers are very diverse, ranging from charging cables, charger adapters, car chargers, speakers,

webcams, headsets, headphones, mice, keyboards, power banks and true wireless stereos.

The diversity of cellphone accessory brands in Indonesia means that competition in the cellphone accessories business continues to increase, this encourages JETE to always innovate and improve the quality of its services. JETE itself has the slogan "forabetterday" and provides an official guarantee for 2 years, damage, replace new and exchange as much as you like at existing Jete stores according to the applicable terms and conditions.

Companies often target maximum sales for each product every day, month, even year (Sukirman, 2020). Inaccuracy in predicting or targeting sales will result in waste, thereby causing losses to the company. If sales predictions are made too large, then spending costs will increase and all investments made will become less efficient. Likewise, if sales predictions are too small, the company will face a stockout, which will cause customers to look for other brands that can meet their needs.

Sales forecasting is used to estimate the company's activities in a certain period of time to come, and contains estimates about the condition or financial position of the company in the future (Rahmadiane, 2022). Heizer and Render (2009) explain that forecasting has the aim of reviewing current and past company policies and seeing the extent of their influence in the future.

However, sales forecasting must be followed by efforts to increase sales. Efficiency can be increased by identifying the distribution of marketing costs among various intermediaries in the marketing channel (Syarif, M., Samsuki, Amzeri, A., Azmi, Z. 2022). one of them is by means of promotions both through online and print media to increase consumer buying interest. With this, sales forecasting is very necessary in business management to analyze sales increases.

Sales forecasting is part of the company management system, which functions for planning, organizing, directing, supervising and controlling. JETE also takes into account sales forecasting by analyzing current conditions, such as an increase compared to previous months, so JETE management concludes that in that month there will be big days or moments such as Eid, Christmas and New Year, of course in terms of sales it will increase, because most buyers spend time shopping at the mall.

So the forecast analysis is not appropriate or even less accurate because it does not use special calculation tools/methods, as a result there are several JETE products that are slow moving or product sales are slow. This makes JETE management have to think about solutions and strategies for slow moving products so that they can be sold again according to predetermined targets. Because, strategies in marketing have a strategic role in the success of products in reaching consumers (Fathor and Fatmariyah. 2023). The following is the sales realization data for JETE Gerobak Pakuwon Mall and Jete Pakuwon City Mall every month.

Tabel 1. JETE Sales Data at the Gerobak Pakuwon Mall

JETE Sales (Unit) Pakuwon City Mall

Produk	2022				2023							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Ags
Tripod Holder		2			1		1		1	1	1	3
TWS	13	12	18	23	15	18	14	16	23	17	14	15
Speaker	5	7	3	14	9	6	4	7	9	3	8	8
PowerBank	7	2	7	8	4	4	8	15	8	9	4	7

Batok plug in	6	11	12	6	11	6	6	5	4	7	6	9
HF	32	25	32	46	25	18	20	19	22	18	16	19
HFB	7	9	14	14	10	8	15	17	5	6	8	9
Holder	6	8	1	3	13	16	15	14	12	15	14	8
Cable	22	38	32	19	35	31	25	32	32	29	25	35
Total	**98**	**114**	**119**	**133**	**123**	**107**	**108**	**125**	**116**	**105**	**96**	**113**

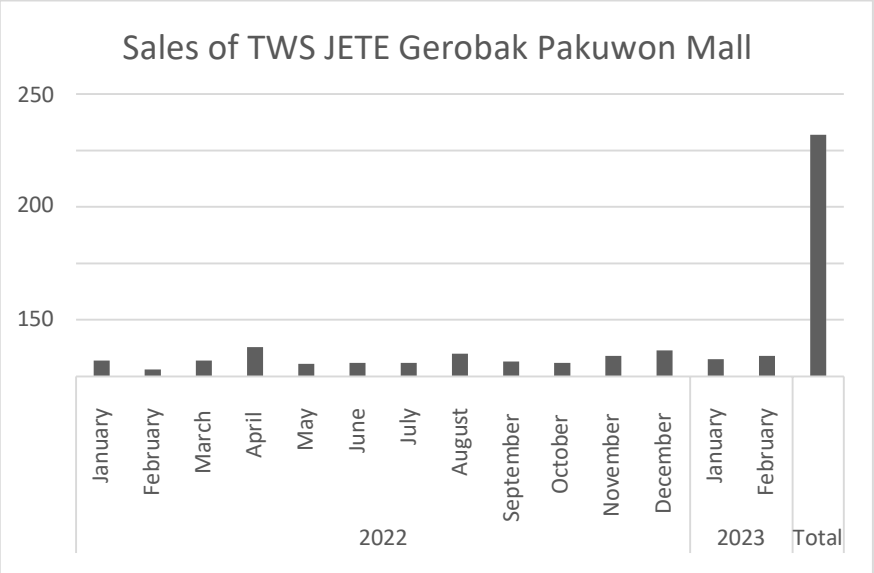
Source: JETE Sales Data (2022-2023)

Tabel 2. JETE Sales Data at Pakuwon City Mall Surabaya

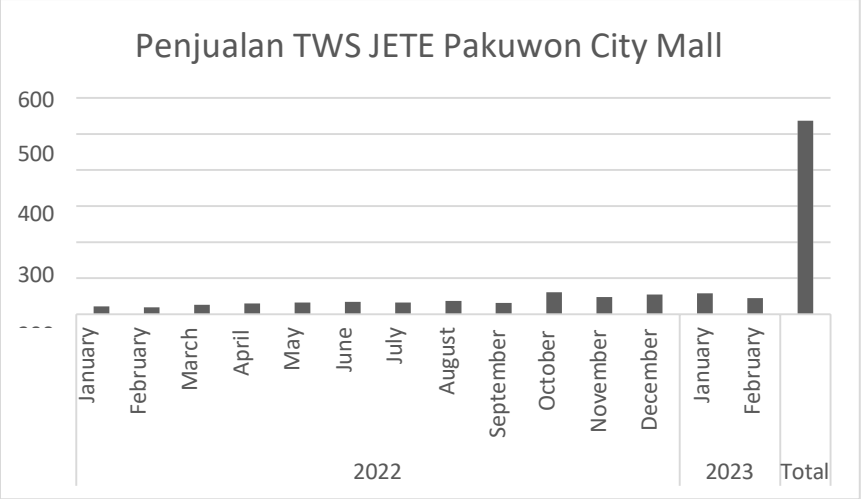
JETE Sales (Unit) Gerobak Pakuwon												
Produk	**2022**				**2023**							
	Sep	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Ags**
Tripod Holder		3	1	1	1	1		1	2	3	6	2
Speaker	18	19	28	38	26	25	13	26	15	18	16	12
Power Bank	15	16	16	20	19	21	19	17	20	15	23	27
Cable	128	154	127	169	153	144	108	102	118	112	165	115
Holder	11	22	18	24	16	17	15	16	18	5	14	12
HF Jete	46	56	56	63	59	60	53	51	56	53	55	56
HFB Jete	2	21	26	34	17	11	16	19	16	17	11	16
Clip On	2	6	2	3	4	11	5	2	3	3	4	8
Batok Plug In	40	45	40	46	39	43	26	24	29	27	23	25
TWS	32	61	48	55	59	45	45	51	45	48	40	43
Total	**294**	**403**	**362**	**453**	**393**	**378**	**300**	**309**	**322**	**301**	**357**	**316**

Source: JETE Sales Data (2022-2023)

From the table above, it can be seen that JETE sales fluctuate every month, going up and down. As a result, many product items have piled up into slow moving stock, one of which is the True Wireless Stereo JETE product.



Picture 1. Sales of TWS JETE Carts Pakuwon Mall
Source: JETE Sales Data (2022-2023)



Picture 2. Sales of TWS JETE Pakuwon City Mall
Source: JETE Sales Data (2022-2023)

Based on the graph above, researchers are interested in further analysis of the TWS JETE product. By looking at the current problems, many JETE TWS products are experiencing problems, such as one part of the TWS not working, the touch sensor is not sensitive, and other system problems, thus causing an increase in returns for TWS series products. This will indirectly reduce customer confidence in purchasing JETE products, especially in the TWS series.

Based on the sales reports that have been received and achieved in previous months, Jete feels it is necessary to make a sales forecast for the following month. Because the analysis of the situation that occurred was felt to be ineffective and inaccurate, therefore the researchers will take into account the forecast for the next month to the next year. By using the time series moving average method, it is hoped that it can help company planning to be much more accurate, effective and efficient.

Moving average is the method most often used in sales forecasting. Moving averages are a common forecasting method and are easy to use using the tools available for technical analysis. Moving averages provide a simple method for smoothing past data. This method is useful for forecasting when there is no trend, use different estimates to account for it. This is called “moving” because as new data becomes available, the oldest data is no longer used.

Based on the background above, the author is interested in conducting research on the JETE store located in Surabaya which has been operating for 1 year regarding sales forecasting with the title "Sales Forecasting Analysis Using Method Average in JETE Gadget Accessories in Surabaya".

RESEARCH METHODS

The research approach that will be used is descriptive quantitative. From the data in the form of sales figures for TWS JETE products at the Gerobak Pakuwon Mall and Pakuwon City Mall stores, it will be processed into calculation results, from the results of these calculations a conclusion will be drawn using a descriptive quantitative analysis approach. So, some studies emphasize customer loyalty as the core of sales (Jannah, M., and Pranjoto, G. H. 2023). In this case the researcher used Jete sales data reports from September 2022 to August 2023. The data source that the researcher used in this research was secondary data. Secondary data is data published or used by organizations that are not the processors (Suliyanto, 2005). According to Sugiyono (2018) secondary data is a data source that does not directly provide data to data collectors, for example through other people or through documents.

There are 2 data collection methods and techniques in this research, by using Primary data, is data obtained from primary sources, individuals or individuals, such as from the results of analysis and direct observation in the field, as well as direct interviews with company management as sources (Rahman & Sastro, 2018). To implement the primary data, we will use the observation method, namely observing directly at the JETE Pakuwon City Mall store and JETE Gerobak Pakuwon Mall Surabaya. The results of these observations will later be correlated with the results of calculations using the moving average method. Secondary data is data obtained directly from the company in the form of documents or company records (Wardah & Iskandar, 2017). For secondary data collection in this research, it was obtained from records of JETE product sales from September 2022 to August 2023. This data will be processed to predict sales for the next year using the moving average calculation method.2. Secondary data is data obtained directly from the company in the form of documents or company records (Wardah & Iskandar, 2017). For secondary data collection in this research, it was obtained from records of JETE product sales from September 2022 to August 2023. This data will be processed to predict sales for the next year using the moving average calculation method.

Data processing technique in this research was carried out descriptive quantitatively. Quantitative analysis uses various mathematical models with past data to forecast demand (Rahman & Sastro, 2018). Data processing analysis in this research will be used to forecast sales of TWS JETE products for the next year. The method for forecasting TWS JETE product sales uses a time series considering that sales data is a time series, meaning that it is presented based on the time of event without showing the factors that influence it, namely the moving average method. It is a forecasting method that uses the average of a number (n) of recent data to predict the future period. The average of a number (n) will be

calculated from JETE sales data starting from September 2022 to August 2023 using the moving average method, known by the following formula:

$$M_t = F_{t+1} = \frac{X_t + X_{t-1} + X_{t-2} + \cdots + X_{t-n+1}}{n}$$

$M\ t$ = Moving Average periode t
$F\ t+1$ = Forecasting periode $t+1$
$X\ t$ = Real value of period to t
n = Number of limits in the moving average
$X\ t$ = Real value of period to t
n = Number of limits in the moving average

Forecasting results are used to set sales targets for TWS products at the JETE Pakuwon City Mall and JETE Gerobak Pakuwon Mall Surabaya stores. Meanwhile, to calculate forecasting errors, use MAD (Mean Absolute Division) and MSE (Mean Squere Error). The results of these calculations can be used as company analysis to prepare production plans for the next year. The quantitative data is processed using a 3-month moving average calculation method by adding up sales data for 3 consecutive months then dividing by 3 and 4 months by adding up sales data for 4 consecutive months then dividing by 4, and processed using Microsoft Excel 2013 software.

RESULT

In calculating sales forecasting for JETE products, researchers used sales data from March 2022 to February 2023 for analysis. The method used by researchers is Moving Averages. By comparing the forecasting results, it is hoped that the smallest error rate can be obtained, so that it can be used as a guide for future periods.

Determination of Sales Forecasting Methods *Moving Averages* 3 months at the JETE Pakuwon City Mall Store

Table 3. TWS JETE Pakuwon City Mall Sales Data September 2022-August 2023

No	Bulan	Penjualan (unit)
1.	Sep	32
2.	Oct	61
3.	Nov	48
4.	Dec	55
5.	Jan	59
6.	Feb	45
7.	March	45
8.	April	51
9.	May	45
10.	June	48
11.	July	40
12.	August	43

Source: JETE Indonesia Sales Data

Based on table 3, this is sales data for TWS JETE units at the Pakuwon City Mall store. And it can be seen that in October 2022 TWS JETE unit sales were ranked highest, namely 61 units, and in September 2022, they were ranked lowest, namely

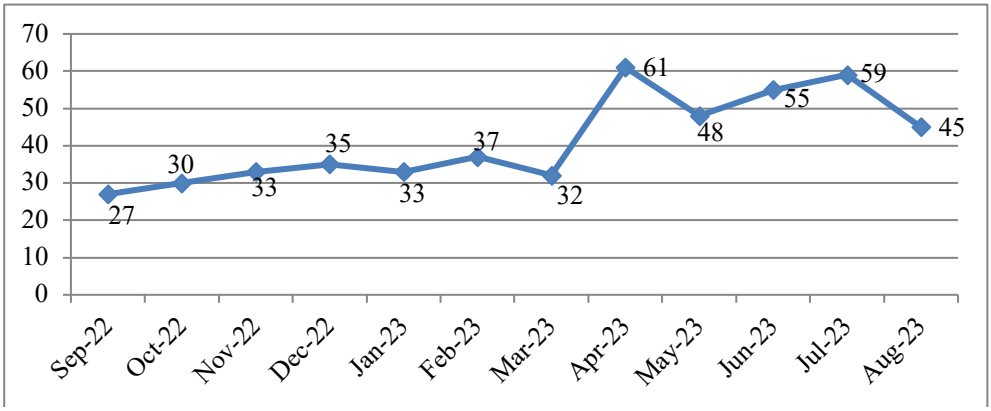
32 units. So, there is a very significant difference between September and October 2022. And in other months the average sales of TWS JETE are around 40-50 units.

Table 4. TWS JETE Sales Calculation by Method*Moving Averages* 3 months September 2023 – August 2024

TWS PAKUWON CITY MALL					
Moon	**Unit Sales**	**Forecasting**	**fall down**	**{Error}**	**Error^2**
September (2023)	32				
October	61				
November	48				
December	55	47	8	8	64
January (2024)	59	54.66667	4.333333	4.333333	18.7778
February	45	54	-9	9	81
March	45	53	-8	8	64
April	51	49.66667	1.333333	1.333333	1.77778
May	45	47	-2	2	4
June	48	47	1	1	1
July	40	48	-8	8	64
August	43	44.33333	-1.333333	1.333333	1.77778
Total	572	444.6667	-14	42.999999	300.333
Averages	47.66666667		-1.518519	4.777777667	33.3704
Next Periode Forecast		49.40741		**MAD** Std Err	**MSE**

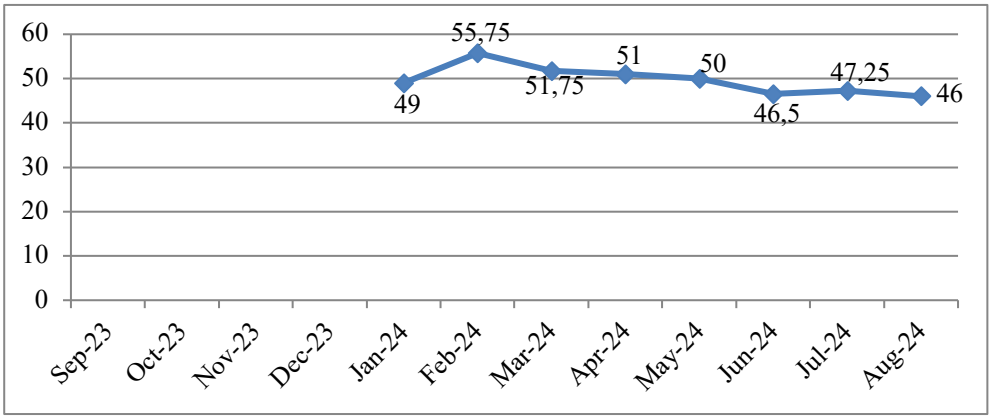
Source: Ms.Excel 2013 data processing results

Based on table 4 above, it can be seen that the TWS JETE Pakuwon City Mall forecast in January 2024 is ranked highest with forecast results of 54.66667 rounded up to 55 units. Meanwhile, in August 2024 it was ranked lowest with forecasting results of 44.33333 rounded up to 44 units.



Picture 3. 1 3-month TWS JETE Unit Sales Pakuwon City Mall
Source: Indonesian jete sales data

Based on figure 4.1 above, it can be seen that the sales graph for TWS units in September 2022 – August 2023 shows that sales are less stable and have even decreased. In September 2022, the lowest sales were 32 units and the highest sales were in October 2022, 61 units.



Picture 4. 1 3-month TWS JETE Sales Forecast for Pakuwon City
Source: Indonesian jete sales data

Based on figure 4 above, Pakuwon City Mall's 3-month TWS JETE forecasting data shows that in January 2024 it will occupy the highest ranking, namely 54,66667 or 55 units. And in December 2023, May – June 2023 occupy the lowest forecasting ranking. namely 47 units.

Mathematically, the equation used is:
Moving average = £n previous data requestsn
The method used is 3-month Moving Averages, so to forecast for a 3-month period starting from the 4th month, namely with the following calculations:
F December: $\frac{32+61+48}{3}$ = 47
F January: $\frac{61+48+55}{3}$ = 54.6667 rounded to 55
To calculate the next month's forecast, the steps are the same as above, namely by adding up the sales data for 3 months, the data is taken 3 months before the forecast month, and divided by n, namely 3.
The forecast results (forecast) for April 2024 are:
F April : $\frac{59+45+45}{3}$ = 49.666 rounded to 50
Because it is sales data, it is impossible for the results to be fractional. For this reason, forecasting results are rounded with the following conditions:
0 – 0.49 rounded to 0
0.5 – 0.99 rounded to 1
Calculating the error rate mathematically, the equation used is:

MAD = £ $(\frac{At-Ft}{n})$
= $\frac{42.999999}{9}$
= 4.77778

MSE = £ $(\frac{At-Ft}{n})$
= $\frac{300.333}{9}$
= 33.3704

Determination of Sales Forecasting MethodsMoving Averages 3 monthly

Pakuwon Mall JETE Cart Store

Table 5. JETE Product Sales Data at the Pakuwon Mall Cart Store
September 2022 – August 2023

No	Month	Sales (unit)
1.	Sep	13
2.	Oct	12
3.	Nov	18
4.	Dec	23
5.	Jan	15
6.	Feb	18
7.	March	14
8.	April	16
9.	May	23
10.	June	17
11.	July	14
12.	August	15

Source: TWS Jete sales data

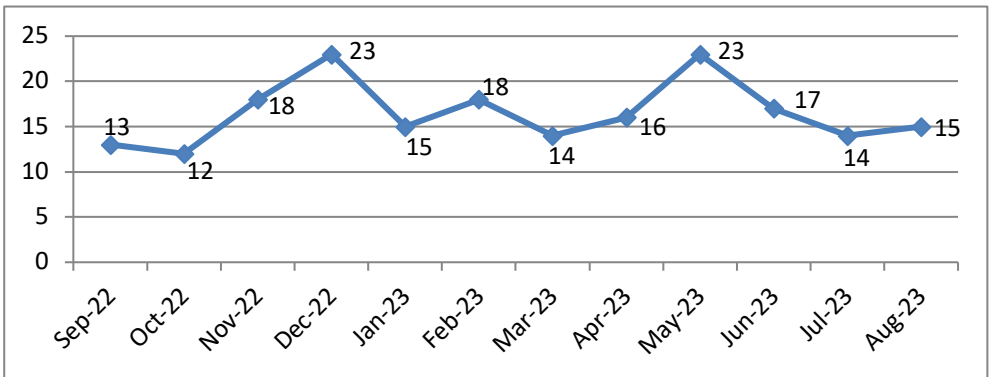
Based on table 5 above, the sales data for TWS JETE units at the Pakuwon mall cart store. And it can be seen that in December and May 2022, TWS JETE unit sales were ranked highest, namely 23 units, and in October 2022, they were ranked lowest, namely 12 units. So, there is a significant difference between December, May 2022 and October 2022. And in other months the average sales of TWS JETE are around 12-18 units.

Table 6 TWS JETE Sales Forecasting Calculations using Methods*Moving Averages* 3 months September 2023 – August 2024

TWS GEROBAK PAKUWON MALL					
Moon	**Unit Sales**	**Forecasting**	**fall down**	**{Error}**	**Error^2**
September (2023)	13				
October	12				
November	18				
December	23	14.3333	8.66667	34.3333	1178.78
January (2024)	15	17.6667	-2.6667	2.6667	7.11129
February	18	18.6667	-0.6667	0.6667	0.44449
March	14	18.6667	-4.6667	4.6667	21.7781
April	16	15.6667	0.33333	0.33333	0.11111
May	23	16	7	7	49
June	17	17.6667	-0.6667	0.6667	0.44449
July	14	18.6667	-4.6667	4.6667	21.7781
August	15	18	-3	3	9
Total	198	155.333	-0.3333	58.0002	1288.45
Averages	16.5		-0.037	6.44446	143.161
Next Periode Forecast		17.2593		**MAD**	**MSE**
				Std Err	

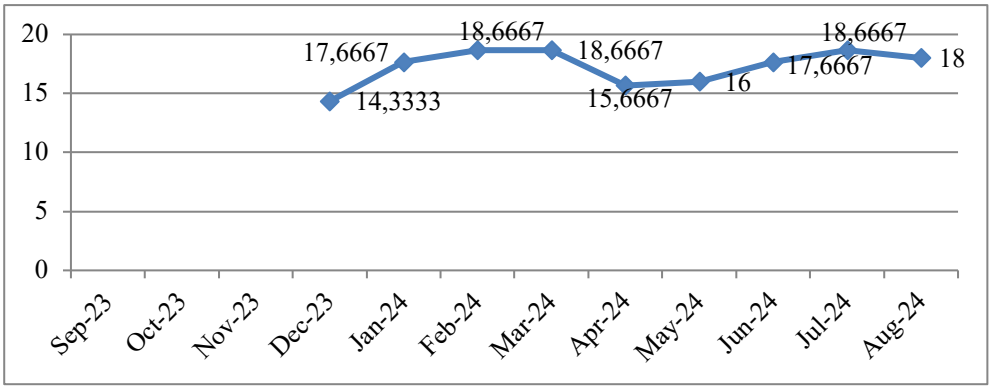
Source: Ms.Excel 2013 data processing results

Based on table 4.4 above, the 3-month TWS JETE forecasting data for Pakuwon Mall Cart shows that in February, March and July 2024 it will occupy the highest ranking, namely 18,6667 or 19 units. And in December 2023 it will occupy the lowest forecasting ranking, namely 14,3333 or 14 units.



Picture 5. Sales of TWS JETE Cart Pakuwon Mall Units
Source: Indonesian jete sales data

Based on figure 5, it shows that sales of TWS JETE Cart Pakuwon Mall are less stable and even tend to decline. In December 2022 and May 2023 it was ranked the highest at 23 units and in October 2022 it was ranked the lowest at 12 units.



Picture 6. 1 3-month TWS JETE Sales Forecast Pakuwon Mall cart
Source: Indonesian jete sales data

Based on figure 6, it shows that the 3-month TWS JETE sales forecasting data for Pakuwon Mall Carts in February, March and July 2024 is in the highest rank, namely 18,6667 or 19. And the lowest rank is December 2023, worth 14,3333 or 14.

Mathematically, the equation used is:
Moving average = £n previous data requestsn
The method used is 3-month Moving Averages, so to forecast for a 3-month period starting from the 4th month, namely with the following calculations:

F December: $\frac{13+12+18}{3}$ = 14.3333 rounded to 14
F January: $\frac{12+18+23}{3}$ = 17.6667 rounded to 18

To calculate the next month's forecast, the steps are the same as above, namely by adding up the sales data for 3 months, the data is taken 3 months before the forecast month, and divided by n, namely 3.
The forecast results (forecast) for April 2024 are:
F April : $\frac{15+18+14}{}$ = 15.666 rounded to 16

3

Because it is sales data, it is impossible for the results to be fractional. For this reason, forecasting results are rounded with the following conditions:

0 – 0.49 rounded to 0

0.5 – 0.99 rounded to 1

Calculating the error rate mathematically, the equation used is:

MAD = £ $(\frac{At-Ft}{n})$ MSE = £ $(\frac{At-Ft\text{^}2}{n})$

= $\frac{58.0002}{9}$ = $\frac{1288.45}{9}$

= 6.44446 = 143.161

Determination of Sales Forecasting Methods*Moving Averages* 4 monthly

Table 7. TWS JETE Sales Data at the Pakuwon City Mall Store September 2022 – August 2023

No	Month	Sales (unit)
1.	Sep	32
2.	Oct	61
3.	Nov	48
4.	Dec	55
5.	Jan	59
6.	Feb	45
7.	March	45
8.	April	51
9.	May	45
10.	June	48
11.	July	40
12.	August	43

Source: TWS Jete sales data

Based on table 7 above, this is sales data for TWS JETE units at the Pakuwon City Mall store. And it can be seen that in October 2022 TWS JETE unit sales were ranked highest, namely 61 units, and in September 2022, they were ranked lowest, namely 32 units. So, there is a very significant difference between September – October 2022. And in other months the average sales of TWS JETE are around 40-50 units.

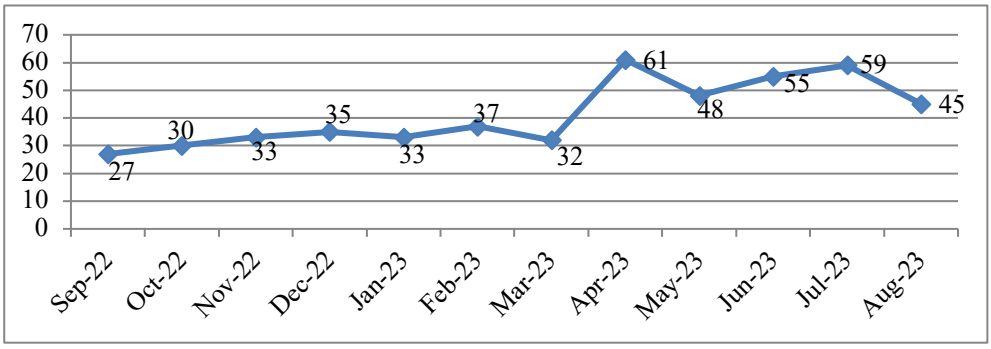
Table 8. TWS JETE Sales Forecasting Calculations using MethodMoving Averages 4 months September 2023 – August 202

TWS PAKUWON CITY MALL					
Moon	**Unit Sales**	**Forecasting**	**fall down**	**{Error}**	**Error^2**
September (2023)	32				
October	61				
November	48				
December	55				
January (2024)	59	49	10	10	100
February	45	55.75	-10.75	10.75	115.563
March	45	51.75	-6.75	6.75	45.5625
April	51	51	0	0	0
May	45	50	-5	5	25
June	48	46.5	1.5	1.5	2.25
July	40	47.25	-7.25	7.25	52.5625
August	43	46	-3	3	9
Total	572	397.25	-21.25	44.25	349.938
Averages	47.66666667		-2.6563	5.53125	43.7422

Next Periode Forecast	49.6563	**MAD**	**MSE**
		Std Err	

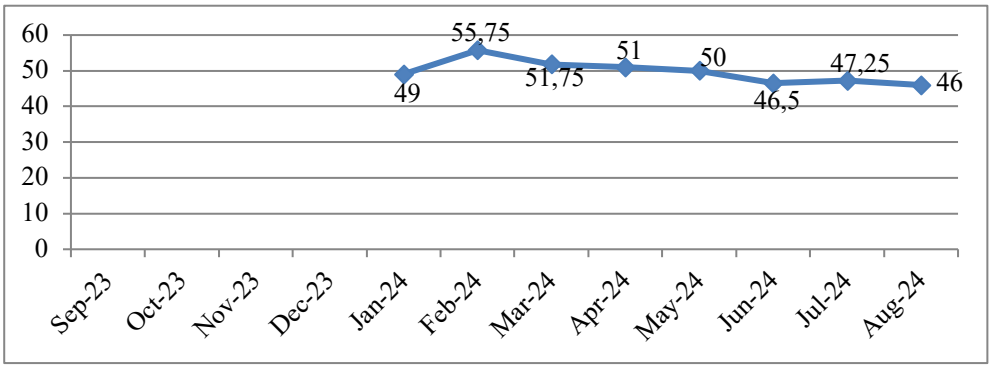
Source: Ms.Excel 2013 data processing results

Based on table 8, the 4-month TWS JETE forecasting data for Pakuwon City Mall shows that in February 2024 it will occupy the highest ranking, namely 55.75 or 56 units. And in August 2024 it will occupy the lowest forecasting ranking, namely 46 units.



Picture 7. Unit Sales of TWS JETE Pakuwon City Mall September 2022 - August 2023
Source: Indonesian jete sales data

Based on figure 7, it can be seen that sales of TWS JETE units in September 2022 - August 2023 show less stable sales and have even experienced a decline. Then, in September 2022, TWS unit sales were the lowest, namely 32 units, and the highest sales were in April 2023, 61 units.



Picture 8. 1-3 Monthly TWS JETE Sales Forecast for Pakuwon City Mall September 2023 – August 2024
Source: data processed by researchers in 2023

Based on figure 4.6 above, it shows that the 4-month TWS JETE sales forecast data for Pakuwon City Mall in February 2024 is ranked highest, namely 55.75 or 56. And the lowest sales forecast is in August 2024, which is 46.
Mathematically, the equation used is:
Moving average = £n previous data requestsn
The method used is 4-month Moving Averages, so to forecast with a 4-month period starting from the 5th month, namely with the following calculations:
F January: $\frac{32+61+48+55}{4} = 49$
F February : $\frac{61+48+55+59}{} = 55.75$ rounded to 56

4

To calculate the next month's forecast, the steps are the same as above, namely by adding up the sales data for 4 months, the data is taken 4 months before the forecast month, and divided by n, namely 4.

The forecast results (forecast) for May 2024 are:

May: $\frac{59+45+45+51}{4} = 50$

Because it is sales data, it is impossible for the results to be fractional. For this reason, forecasting results are rounded with the following conditions:

0 – 0.49 rounded to 0

0.5 – 0.99 rounded to 1

Calculating the error rate mathematically, the equation used is:

MAD = £ $(\frac{At-Ft}{n})$

$= \frac{44.25}{8}$

$= 5.53125$

MSE = £ $(\frac{At-Ft\hat{}2}{n})$

$= \frac{349.938}{8}$

$= 43.7422$

Sales Forecasting 4 Monthly Moving Averages Method Store JETE Gerobak Pakuwon Mall

Table 9. TWS JETE Sales Data at the Pakuwon Mall Cart Store September 2022 – August 2023

No	Month	Sales (unit)
1.	Sep	13
2.	Oct	12
3.	Nov	18
4.	Dec	23
5.	Jan	15
6.	Feb	18
7.	March	14
8.	April	16
9.	May	23
10.	June	17
11.	July	14
12.	August	15

Source: TWS Jete sales data

Based on table 9, the sales data for TWS JETE units at the Pakuwon mall cart store. And it can be seen that in December and May 2022, TWS JETE unit sales were ranked highest, namely 23 units, and in October 2022, they were ranked lowest, namely 12 units. So, there is a significant difference between December, May 2022 and October 2022. And in other months the average sales of TWS JETE are around 12-18 units.

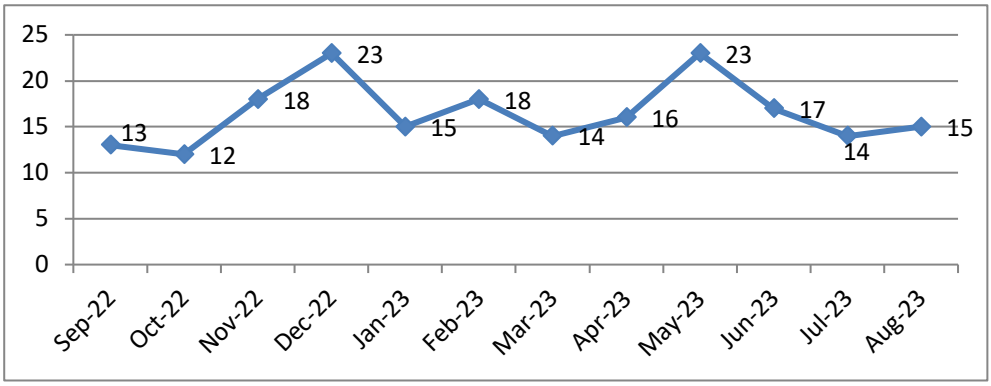
Table 10. WS JETE Sales Forecasting Calculations using MethodMoving Averages 4 months September 2023 – August 2024

TWS GEROBAK PAKUWON MALL					
Moon	**Unit Sales**	**Forecasting**	**fall down**	**{Error}**	**Error^2**
September (2023)	13				
October	12				
November	18				
December	23				

January (2024)	15	16.5	-1.5	1.5	2.25
February	18	17	1	1	1
March	14	18.5	-4.5	4.5	20.25
April	16	17.5	-1.5	1.5	2.25
May	23	15.75	7.25	7.25	52.5625
June	17	17.75	-0.75	0.75	0.5625
July	14	17.5	-3.5	3.5	12.25
August	15	17.5	-2.5	2.5	6.25
Total	198	138	-6	22.5	97.375
Averages	16.5		-0.75	2.8125	12.1719
Next Periode Forecast		17.25		**MAD** Std Err	**MSE**

Source: Ms.Excel 2013 data processing results

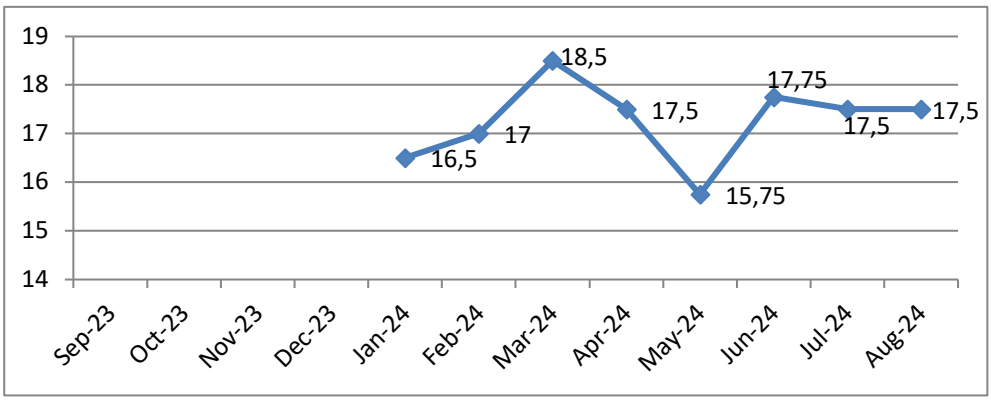
Based on table 4.8 above, it shows that the 4-month TWS JETE forecasting data for Pakuwon Mall Cart shows that in March 2024 it will occupy the highest rank, namely 18.5 or 18 units. And in May 2024 it will occupy the lowest forecasting rank, namely 15.75 or 16 units.



Picture 9. Sales of TWS JETE Cart Pakuwon Mall Units September 2022 – August 2023

Source: Indonesian jete sales data

Based on figure 4.7 above, it shows that the sales data for TWS JETE Gerobak Pakuwon Mall units is less stable and has even decreased. in October 2022 there was the lowest decline, namely 12 units. Meanwhile, December 2022 and May 2023 experienced the highest sales, namely 23 units.



Picture 10. 1-3 month TWS JETE Sales Forecast for Pakuwon Mall Carts
September 2023 – August 2024
Source: data processed by researchers in 2023

Based on figure 4.8, it shows the 4 month TWS JETE sales forecasting data. Pakuwon Mall carts in March 2024 experienced the highest sales, namely 18.5 or 18. and the lowest sales in May 2024 were 15.75 or 16.

Mathematically, the equation used is:
Moving average = £n previous data requestsn
The method used is 4-month Moving Averages, so to forecast with a 4-month period starting from the 5th month, namely with the following calculations:

F January: $\frac{13+12+18+23}{4}$ = 16.5 rounded to 16

F February : $\frac{12+18+23+15}{4}$ = 17

To calculate the forecast for the next month, the steps are the same as above, namely by adding up the sales data for 4 months, the data is taken 4 months before the forecast month, and divided by n, namely 4.
The forecast results (forecast) for May 2024 are:

May: $\frac{15+18+14+16}{4}$ = 15.75

Because it is sales data, it is impossible for the results to be fractional. For this reason, forecasting results are rounded with the following conditions:
0 – 0.49 rounded to 0
0.5 – 0.99 rounded to 1
Calculating the error rate mathematically, the equation used is:

MAD = £ $(\frac{At-Ft}{n})$
= $\frac{22.5}{8}$
= 2.8125

MSE = £ $(\frac{At-Ft\hat{}2}{n})$
= $\frac{97.375}{8}$
= 12.1719

DISCUSSION

TWS JETE 3 and 4 Monthly Sales Forecasting Pakuwon City Mall

Based on the description of the research results above, it can be seen that sales data for TWS JETE Pakuwon City Mall units from September 2022 - August 2023 experienced less stable sales, where in October 2022 the highest sales were 61 units. And in September 2022 it experienced the lowest sales of 32 units. And global sales in other months are still said to be low. This is because in that month there was less stock of TWS JETE and there were fewer variants of TWS JETE compared to stock in other months.

From the sales of TWS JETE units which decreased every month, this ultimately had an impact on the forecasting results of 3 and 4 monthly TWS JETE sales at the Pakuwon City Mall Store starting from September 2023 - August 2024.

Based on 3-month TWS JETE forecasting data, the lowest forecast is in December 2023, May and June 2024. Meanwhile, in 4-month TWS JETE forecasting data, the lowest forecast is in August 2024.

This can be used as an evaluation for the JETE Indonesia team in the future to prioritize stock availability and scarcity. Stock of goods plays a very important role in retail business operations because this will also determine how

big or small a company's profit is because by providing stock of goods, the business will be able to easily follow and serve customer requests. Managing stock of goods will also prevent customer disappointment.

TWS JETE 3 and 4 Monthly Sales Forecasting for Pakuwon Mall Carts

Based on the description of the research results above, it can be seen that sales data for TWS JETE Gerobak Pakuwon Mall units from September 2022 - August 2023 experienced less stable sales. Where, in December 2022 and May 2023, the highest sales were 23 units. and in October 2022 experienced the lowest sales of 12 units. And global sales in other months are still said to be low. This is because, during that month, mall visitor traffic decreased.

From the sales of TWS JETE units which have decreased every month, this ultimately has an impact on the forecasting results of 3 and 4 monthly TWS JETE sales at Pakuwon Mall Carts starting from September 2023 – August 2024. In the 3 monthly TWS JETE forecasting data, the lowest sales forecast is in December 2023. Meanwhile, in the 4-month TWS JETE forecasting data, the lowest sales forecast is in May 2024.

This can be used as an evaluation for the JETE Indonesia team, especially the marketing section, to organize future strategies. Because, basicallytraffic Visitors also influence retail business operations. Visitors includecustomer or customers are the main target for retail businesses. This is also related tobrand awareness so that the products being marketed can be increasingly known and attached to the community. It's also important to applycustomer experience in business so that when faced with a problem such as declinetraffic Visitors like this will really help the retail business.

CONCLUSION

Based on the analysis and discussion that the researcher has carried out, conclusions can be drawn from the discussion in the research SALES FORECASTING ANALYSIS USING THE METHODMOVING AVERAGE ONACCESSORIES GADGET IN SURABAYA (Case Study of Store JETE Cart PakuwonDan Mall JETE Pakuwon City Mall Surabaya) are as follows: The forecast for the number of sales for 2023-2024 based on the Moving Averages method is as follows: 3-month Moving Averages method at TWS Pakuwon City Mall (Sales Forecast is 49.40741, MAD is 42.999999, MSE is 300,333). 3-month Moving Averages method on TWS Gerobak Pakuwon Mall, (Sales Forecast is 17.2593, MAD is 58.0002, MSE is 1288.45). 4-month Moving Averages method at TWS Pakuwon City Mall (Sales Forecast is 49.6563, MAD is 44.25, MSE is 349,938). 4-month Moving Averages method on TWS Gerobak Pakuwon Mall (Sales Forecast is 17.25, MAD is 22.5, MSE is 97,375)

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