Almana : Jurnal Manajemen dan Bisnis
Volume 10 Number 1/ April 2026: 239-249
p-ISSN 2579-4892/ e-ISSN 2655-8327
DOI: 10.36555/almana.v10i1.3028

Comparative Analysis of Forecasting Methods to Increase Condotel Accommodation Sales on ApVoucher

Tika Putri Nur Huda[1], Dudi Haryadi*[1]
Universitas Langlangbuana, Indonesia
*Corresponding email: haryadidudi@unla.ac.id

Abstract: Tourism is a key driver of economic growth, supported by the accommodation sector, including innovations such as condotels like ApVoucher that combine apartment and hotel functions. However, due to unpredictable sales fluctuations and intense competition, companies need proper planning, with sales forecasting playing an important role in estimating future sales. This study Aims to analyze and compare the level of accuracy for increasing sales to help in preparing plans and reducing demand uncertainty. The forecasting method used is the moving average method that works by averaging previous data to produce a stable pattern and the exponential smoothing method that works by giving greater weight to the latest data so that it is more responsive to changes. The study used a population in the form of historical data on condotel (Hotel) sales by applying the 3-month moving average method and the exponential smoothing method with a constant of 0>1. The analysis was carried out to determine the error rate value through the Mean Absolute Deviation (MAD) and Mean Squared Error (MSE). The research results show that the moving average method is more effective in sales conditions that tend to be stable by producing lower accuracy values. This shows that the effectiveness of the method is influenced by data characteristics.

Article History:
Submitted: April 14, 202
Revised: April 27, 2026
Accepted: April 28, 2026
Published: April 30, 2026

Keywords:
Exponential Smoothing Method
Forecasting
Moving Average Method

Huda, T. P. N., & Haryadi, D. (2026). Comparative Analysis of Forecasting Methods to Increase Condotel Accommodation Sales on ApVoucher. *Almana : Jurnal Manajemen dan Bisnis*. *10*(1), 239-249. https://doi.org/10.36555/almana.v10i1.3028

INTRODUCTION

Tourism is an industry that contributes significantly to increase regional income. Therefore, the government continuously strives to advance the tourism industry over time (Yudian & Dewi, 2022). As an indicator of a successful tourism destination, a region must possess tourism product components, namely attractions, facilities, and accessibility, to develop its tourism sector (Sari et al. 2021).

Tourism activities generate demand that must be met by the market through interrelated products and services. In tourism development efforts, destination areas need to ensure the availability of various accommodations to support tourism development, such as guesthouses, homestays, hotels, and villas (Yudian & Dewi, 2022).

The development of accommodation businesses has created various business models within the service sector. These services began with property management schemes but now offer accommodation services. Once a property built by a developer is purchased by a consumer, it is then managed by a third party appointed by the

p-ISSN: 2579-4892
e-ISSN: 2655-8327

developer to provide accommodation services in the form of a condominium (Sukarma et al. 2024).

A condominium combines the functions of a hotel and an apartment. Condotel units are owned by individuals or business entities as investments, and unit owners can rent them out through a centralized management system and receive a share of the profits (Sukarma et al. 2024). In this context, Apvoucher acts as a sales agent on a digital platform that provides condotel accommodation services. This platform is managed by PT Cahaya Media Katulistiwa, the corporate entity that oversees it.

Table 1. Sales Data

Month	Sale June 2023-June 2024	Sale June 2024-June 2025
June	105	177
July	235	279
August	194	215
September	230	173
October	147	118
November	136	141
December	170	192
January	189	147
February	163	134
March	92	79
April	139	119
May	163	138

Source: PT. Light Media Equator (Apvoucher) (2025)

The tourism industry is a strategic sector that contributes significantly to economic growth and regional income. In this context, the accommodation sector, including condotels, plays a crucial role in meeting tourist demand. The condotel business model, which combines hotel functions and property investment, creates unique demand dynamics, primarily influenced by seasonal factors, promotions, economic conditions, and travel trends.

However, condotel sales data on the ApVoucher platform shows significant fluctuations between periods. This situation presents challenges in Sales planning, Room capacity management, Pricing and promotional strategy determination

Inaccuracies in demand forecasting can directly impact a company's profitability and operational efficiency. Therefore, the use of forecasting methods is crucial as a basis for strategic decision-making. Therefore, forecasting approaches need to be more contextual and adaptive to industry characteristics.

Sales data shows an unstable up-and-down pattern, for example like a Spikes during holiday periods (July–August, December), Decreases during the low season (March–April). This phenomenon reflects that strong seasonality in tourism and Sensitivity to promotions and events. Condotel demand depends not only on historical trends, but also Macroeconomic conditions, Digital tourism trends, Changing tourist preferences

For Limitations of Conventional Methods, the results show that Moving Average is more accurate on stable data, Exponential Smoothing is more responsive but less accurate on certain data. However, both methods Do not capture complex (non-linear) patterns and Do not consider external factors (exogenous variables). Gap between Practice and Current Technology in this study is in the global tourism industry, many companies have adopted AI-based forecasting, Real-time data-based demand sensing, Meanwhile, in the case of ApVoucher Still using simple time-series methods.

The sales process experiences fluctuations influenced by promotions, economic conditions, and tourism trends. Unpredictable fluctuations and increasingly fierce competition present challenges for companies in planning and maintaining sales stability (Susilowati, 2022). Inaccurate demand planning can impact a company's profitability and operating costs (Awanda & Oktafianto, 2021). One solution is to implement forecasting techniques (Rini & Ananda, 2022).

Forecasting reduces reliance on uncertainty (intuitive). Forecasting views outcomes as possibilities, not absolute certainties. Thus, management can use forecast results to develop optimal strategies (Kurniawan et al. 2022). Forecasting involves historical data projected into the future through the application of various mathematical methods. The results of this analysis can serve as the basis for generating measurable estimates that support strategic planning and efforts to reduce uncertainty (Kusyanto et al. 2020).

Several studies have compared the two forecasting methods. Asynari (2020) found that the moving average method had a higher level of accuracy. Landia (2020) showed that the exponential smoothing method is effective, providing the highest weighting, and Chaerunnisa & Momon (2021) showed that the exponential smoothing method has a lower level of accuracy.

This study aims to analyze and compare the accuracy levels of two forecasting methods, namely the Moving Average Method and the Exponential Smoothing Method, to increase sales volume. The choice of method is determined by evaluating the accuracy of each forecasting method by performing calculations and then comparing the results obtained by looking at the error rate through two error indicators: Mean Absolute Deviation (MAD) and Mean Squared Error (MSE) (Sukmono & Supardi, 2020:475).

These two metrics are used to compare forecasting models by ranking them based on the error value from the lowest to the maximum. The method with the lowest forecasting error value is the best to apply to develop more accurate planning and reduce demand (Awaluddin et al. 2021). With a more measurable picture of sales forecasting and forecasting results as a basis for decision making that can encourage increased accommodation sales.

LITERATURE REVIEW

Forecasting is widely recognized as a strategic tool for minimizing uncertainty and reducing potential business losses. According to Sutaat (2023), forecasting utilizes historical data as a foundation to anticipate future conditions, particularly in dealing with complex challenges such as seasonal demand fluctuations and global economic instability. In the context of business decision-making, Sukmono and Supardi (2020) emphasize that forecasting plays a critical role in reducing reliance on intuition by providing data-driven insights that support short-, medium-, and long-term planning.

The importance of forecasting becomes increasingly evident in industries characterized by demand volatility, such as the tourism and hospitality sector, including condotel (condominium hotel) businesses. Demand in this sector is highly sensitive to seasonality, economic conditions, and external shocks (e.g., pandemics or travel restrictions). Therefore, accurate forecasting methods are essential to optimize occupancy rates, pricing strategies, and resource allocation.

Two commonly used quantitative time-series forecasting methods are the Moving Average (MA) and Exponential Smoothing (ES) methods. Both rely on historical data but differ in how they assign weights to past observations.

The Moving Average method calculates the average of data over a specified period, assigning equal weight to each observation. This approach is useful for smoothing short-term fluctuations and identifying long-term trends (Sukmono & Supardi, 2020). Empirical studies support its effectiveness. For example, Asynari et al. (2020) found that the Moving Average method produced relatively low forecasting errors in

p-ISSN: 2579-4892
e-ISSN: 2655-8327

predicting food product demand. Similarly, Mahrus et al. (2021) demonstrated its effectiveness in forecasting salt production, while Hudaningsih et al. (2020) confirmed its relevance in sales prediction.

In the tourism context, the Moving Average method has been applied to forecast hotel occupancy rates under relatively stable conditions, where demand patterns do not change drastically. However, its limitation lies in its inability to quickly adapt to sudden shifts in demand—an important factor in tourism markets where trends can change rapidly due to external influences.

Exponential Smoothing, on the other hand, is considered a refinement of the Moving Average method because it assigns exponentially decreasing weights to older data, giving more importance to recent observations (Wiharja et al., 2020). This characteristic allows the method to respond more quickly to changes in trends, making it particularly suitable for dynamic environments such as the condotel and tourism sectors.

Several studies highlight the superiority of Exponential Smoothing in fluctuating environments. Landia (2020) found that this method produced more accurate forecasts for irregular data patterns, while Chaerunnisa et al. (2021) showed that it effectively predicted cooking oil sales with results closer to actual values. More recent studies also reinforce this finding. For instance, Lim and McAleer (2022) demonstrated that Exponential Smoothing models are highly effective in forecasting tourism demand due to their adaptability to sudden market changes. Similarly, Athanasopoulos et al. (2021) highlight that modern variations of Exponential Smoothing (such as ETS models) are widely used in hospitality demand forecasting because of their robustness and flexibility.

In the condotel sector, Exponential Smoothing is particularly relevant because occupancy rates and booking patterns are often influenced by short-term events such as holidays, promotions, and external shocks. The method enables managers to adjust pricing and marketing strategies more responsively compared to Moving Average approaches.

Comparative research methods, as defined by Abdullah et al. (2022), aim to evaluate differences between two or more techniques. In this study, both Moving Average and Exponential Smoothing are analyzed and compared to determine which method provides more accurate forecasting results in the context of sales or occupancy levels.

Forecasting accuracy is typically evaluated using quantitative error metrics such as Mean Absolute Deviation (MAD) and Mean Squared Error (MSE). MAD measures the average absolute deviation between actual and forecasted values, while MSE emphasizes larger errors by squaring deviations. The method that produces the lowest MAD and MSE values is considered the most accurate and reliable for decision-making.

Recent developments in forecasting techniques also show a shift toward hybrid and machine learning-based approaches, such as ARIMA, Artificial Neural Networks (ANN), and Long Short-Term Memory (LSTM) models (Zhang et al., 2023; Li et al., 2022). However, despite these advancements, simpler models like Moving Average and Exponential Smoothing remain widely used in practice due to their ease of implementation, interpretability, and effectiveness in short-term forecasting—especially for small and medium-sized tourism businesses, including condotels.

Therefore, this study employs both Moving Average and Exponential Smoothing methods and evaluates their performance using MAD and MSE. The goal is to identify the most suitable method for forecasting sales or occupancy levels, particularly in the condotel sector, where accurate predictions are crucial for operational and strategic planning.

Based on the explanation above, the following hypothesis is proposed:

H1: The application of the Moving Average Method provides stable demand analysis results that align with historical sales patterns.

H2: The application of the Exponential Smoothing Method can produce demand forecasts that are more responsive to changes in sales trends.
H3: The Exponential Smoothing Method is superior to the Moving Average Method in analyzing sales because it better captures changes in trends.

METHODS

This study uses a quantitative descriptive approach to analyze condotel voucher sales data at PT. Equatorial Media Light. The objective is to describe sales patterns and compare the Moving Average and Exponential Smoothing forecasting methods by measuring accuracy using Mean Absolute Deviation (MAD) and Mean Squared Error (MSE). The selection of Moving Average (MA) and Exponential Smoothing (ES) methods is not arbitrary, but is closely aligned with the characteristics of condotel voucher sales data, which tend to exhibit short-term fluctuations, possible seasonality, and relatively unstable demand patterns driven by tourism cycles, promotional campaigns, and external economic conditions.The Moving Average method is particularly suitable for data that is relatively stable without strong long-term trends, as it smooths random fluctuations by averaging a fixed number of past observations. In the context of condotel voucher sales, MA helps to reduce noise caused by irregular spikes or drops, such as those occurring during holiday seasons or special promotions, thereby revealing the underlying pattern more clearly.

However, MA has limitations in responding to recent changes, as all observations within the selected window are weighted equally. Therefore, the Exponential Smoothing method is also employed as a complementary approach. ES assigns greater weight to more recent data through the smoothing constant (α), making it more responsive to dynamic and fluctuating sales patterns. This is particularly relevant for condotel voucher sales, where demand can change rapidly due to market trends, digital platform performance (e.g., ApVoucher), or external shocks.

Thus, the combination of MA and ES allows for a comparative evaluation between a stable smoothing approach (MA) and a more adaptive, trend-sensitive approach (ES). This dual-method strategy enhances the robustness of the analysis by identifying which method better captures the empirical behavior of the data, as reflected in lower forecasting errors (MAD and MSE)

The research used a descriptive approach, aiming to provide a factual overview of condotel voucher sales data. The subject of the study was PT. Cahaya Media Khatulistiwa, focusing on condotel voucher sales through ApVoucher, while the object of the study was condotel accommodation sales data. The study was conducted at the company's office, with data collection from June 2023 to June 2025. The research population is all condotel voucher sales data, with a sample consisting of sales data for the period June 2023–June 2025 which was selected purposively because it is relevant to the forecasting analysis.

The selection of the June 2023 to June 2025 period is based on several methodological and practical considerations:

Data Recency and Relevance: The chosen period represents the most recent and relevant operational data, ensuring that the forecasting results reflect current market conditions, consumer behavior, and business strategies. This is crucial in the hospitality and tourism-related sectors, where demand patterns evolve rapidly.

Post-Pandemic Market Stabilization: The timeframe captures a phase in which the tourism and accommodation industry has entered a relatively stable post-recovery period, following earlier disruptions. This allows the data to better represent normalized demand patterns, making forecasting more reliable and meaningful.

Sufficient Time Series Length: A two-year monthly dataset (24 observations) provides an adequate number of data points for applying time series forecasting techniques such as MA and ES. This length is sufficient to:

p-ISSN: 2579-4892
e-ISSN: 2655-8327

Identify short-term trends and cyclical patterns: Perform statistically meaningful error evaluation (MAD and MSE). Avoid bias from overly short or fragmented datasets

Coverage of Seasonal Variations: The period includes multiple seasonal cycles (e.g., holiday peaks, year-end demand, and low seasons), which is important for capturing recurring fluctuations in condotel voucher sales. This ensures that the forecasting models are tested against realistic variations in demand.

The selected timeframe corresponds to the period in which consistent and complete sales data from the ApVoucher platform is available, ensuring data reliability and minimizing missing values that could affect forecasting accuracy. The data sources consist of primary and secondary data. Primary data was obtained through interviews with company owners regarding sales conditions, while secondary data was obtained from company documentation, national journals, library research, and supporting literature.

With this method, the research is expected to be able to provide a comprehensive picture of the condotel voucher sales pattern in the company, as well as identifying the most accurate forecasting method to support managerial decision making in an effort to increase sales in the future.

Data analysis techniques include several stages, namely: (1) Forecasting using Moving Averages (MA), According to Hudaningsih et al. (2020), statistical techniques in forecasting work by collecting a set of observational data, calculating the average value, and using the results as predictions for future periods; (2) Forecasting with Exponential Smoothing (ES), According to (Wiharja et al. 2020) this technique is carried out by providing a weighting α (alpha) which affects the accuracy of the results through an indicator of the error rate. The higher α, the greater the weight of the latest data and the smaller the influence of old data; (3) valuate forecast accuracy with two error measures, namely: (a) Mean Absolute Deviation (MAD) is calculated by measuring the average absolute difference between the predicted and actual values over a period, regardless of whether the forecast is greater or less than the actual value (Hudaningsih et al. 2020). (b) Mean Squared Error (MSE) The MSE is calculated by calculating the mean square of the difference between the predicted value (forecast result) and the actual recorded data. The smaller the MSE value, the closer the forecast accuracy is to real-world conditions (Landia, 2020). (4) Comparative analysis to determine the best method based on the smallest error value in MAD (Mean Absolute Deviation) and MSE (Mean Squared Error).

RESULTS AND DISCUSSION

The moving average method used in this study was set at a three-month period. This period was chosen based on the consideration that this time span is sufficient to accommodate changes in market demand influenced by external factors such as promotional activities, seasonal patterns, and tourist behavior. By using three months as the basis for calculations, the forecast results remain relevant to actual conditions without losing the direction of sales data movements.

This method has been proven to provide more stable picture of short-term sales data, especially when the data doesn't experience sharp fluctuations. Forecasting results obtained using the moving average method tend to be smoother because the predicted values are not significantly affected by sudden changes in a given period. However, this method has a lag characteristic because each forecast value always depends on the average of previous historical data.

Table 2. Data Processing MA

Month	June 2023-May 2024		June 2024-May 2025	
	Sale	MA	Sale	MA
June	105	-	177	-
July	235	-	279	-
August	194	178.00	215	223.67
September	230	219.67	173	222.33
October	147	190.33	118	168.67
November	136	171.00	141	144.00
December	170	151.00	192	150.33
January	189	165.00	147	160.00
February	163	174.00	134	157.67
March	92	148.00	79	120.00
April	139	131.33	119	110.67
May	163	131.33	138	112.00
MAD		*25.40*		*26.53*
MSE		*872.11*		*997.67*

Source: Processed data (2025)

Based on the calculations for the two research periods, the forecast pattern generated using the three months moving average method shows a relatively stable trend. This aligns with actual sales data, which did not experience extreme results fluctuations. The forecasting graph shows that although the predicted values do not exactly match actual sales figures, the movement pattern consistently follows the historical data trend. In practice, the exponential smoothing method uses a constant value (α) ranging from 0 to 1 as the primary weighting factor. This combines calculations based on the most recent month's actual data with the previous month's forecast results to ensure that the resulting prediction not only reflects the most recent conditions but also maintains the influence of previous patterns.

The constant value (α) determines how quickly the forecast responds to changes in sales patterns. If the constant value (α) is set high (closer to 1), the most recent sales data are weighted more heavily. as a result, the forecast adapts more quickly to changing conditions. Conversely, if the constant value (α) is set low (closer to 0), greater weight is given to historical data. This results in more stable forecasts and slower response to changes.

This method is able to adjust predictions by considering movements without ignoring historical information. Thus, the forecast results are able to anticipate changes while maintenance stability so US not to be unduly affected by temporary spikes or dips.

Table 3. Data Processing ICE

Month	June 2023- May 2024		June 2024-May 2025	
	Sale	ICE (0.2)	Sale	ICE (0.4)
June	105	#N/A	177	#N/A
July	235	105	279	177
August	194	131.00	215	217.8
September	230	143.60	173	216.68
October	147	160.88	118	199.21
November	136	158.10	141	166.72
December	170	153.68	192	156.43
January	189	156.95	147	170.66
February	163	163.36	134	161.20
March	92	163.29	79	150.32

p-ISSN: 2579-4892
e-ISSN: 2655-8327

Month	June 2023- May 2024		June 2024-May 2025	
	Sale	ICE (0.2)	Sale	ICE (0.4)
April	139	149.03	119	121.79
May	163	147.02	138	120.67
June	?	150.22	?	127.60
MAD		41.95		39.39
MSE		3249.68		2503.17

Source: Processed data (2025)

At a constant value (α) = 0.2 which indicates that in that period the method's response rate to changes in sales data tends to be relatively slow, this condition is in accordance with the characteristics of the data which tends to be more stable. Thus, a relatively small constant value indicates that it does not require rapid adjustments to changes in each month. Meanwhile, at a constant value (α) = 0.4 which is greater than the constant value in the previous period because in the condition the sales data experiences more dynamic fluctuations with repeated increases and decreases. In this condition, a larger constant value (α) is needed so that the exponential smoothing method can provide a faster response to data changes.

The difference in the selection of the constant value (α) between two periods reflects the characteristics of sales data that can change over time, and the method must adjust its sensitivity to changes. An effective forecasting constant value (α) in one period will not necessarily produce the same results in another period. Therefore, the process of periodically evaluating the constant value (α) is important so that the exponential smoothing method can provide accurate and relevant forecasting results to the actual data. By adjusting the constant value (α) used, this method can maintain a balance between the speed of response to data changes and the stability of the forecast results.

Based on the results of data processing carried out between the two methods, namely the moving average method and the exponential smoothing method, they show different characteristics in terms of calculations, the level of response to changes and the level of accuracy produced.

In this study, the moving average method used a three-month period because it provides a more stable picture of short-term movements, especially in data patterns that do not show sharp increases or decreases. The calculation process in this method involves averaging sales values from previous periods, resulting in a stable forecast that is not affected by sudden changes. This characteristic makes this method effective for use in conditions where sales tend to be stable, although the response to changes is slow, as the impact of changes in one month is only visible in the following months.

In this study, the exponential smoothing method uses a weighting of the most recent data through a constant value (α), which ranges from 0 to 1. A higher constant value (α) results in a faster response to changes in sales patterns because the weight given to the most recent data is greater. Meanwhile, a lower constant value (α) results in a more stable forecast but is slower to respond to changes. The advantage of this method lies in its ability to adjust forecast results to current conditions without ignoring previous data.

The next step, calculating accuracy, yielded results showing that the moving average method produced lower values than the exponential smoothing method for both periods. Therefore, the results from the moving average method were closer to actual sales values. The following is the calculation of the average accuracy levels for the two forecasting methods:

Table 4. the average accuracy levels for the two forecasting methods

Method	June 23-May 24		June 24-May 25	
	MAD	MSE	MAD	MSE
Moving Average 3 Month	25.40	872.11	26.53	997.67
Exponential Smoothing (α)=0.1	45.56	3724.83	45.52	2887.51
Exponential Smoothing (α)=0.2	41.95	3249.68	42.09	2667.88
Exponential Smoothing (α)=0.3	42.26	3075.48	40.42	2546.02
Exponential Smoothing (α)=0.4	41.96	3001.24	39.39	2503.17
Exponential Smoothing (α)=0.5	42.55	2981.81	40.58	2505.02
Exponential Smoothing (α)=0.6	42.78	2998.57	41.79	2527.15
Exponential Smoothing (α)=0.7	42.98	3042.33	42.85	2556.60
Exponential Smoothing (α)=0.8	44.80	3111.36	44.59	2589.87
Exponential Smoothing (α)=0.9	46.27	3211.25	45.71	2631.12

Source: Processed data (2025)

In the first period, the 3-month moving average method produced a MAD of 25.40 and an MSE of 872.11, the lowest compared to various constant (α) values for the exponential smoothing method. This lowest value indicates that the forecast using the moving average method more closely aligns with the actual data. Meanwhile, the exponential smoothing method produced a MAD of 41.95 and an MSE of 3249.68, indicating a higher error rate than the moving average method.

In the second period, the 3-month moving average method again produced a MAD of 26.53 and an MSE of 997.67, lower than all the constant (α) values for the exponential smoothing method. Although the constant (α)=0.4 for this period yields lower MAD and MSE values than other constant (α) values, these results are still greater than the error obtained by the moving average method.

Based on the comparison of the two methods, the 3-month moving average method provides forecasting results with a higher level of accuracy (lower error) than the exponential smoothing method, which tends to have a stable sales pattern without sharp fluctuations. Therefore, the moving average method is more effective for use in research.

CONCLUSION

The application of the moving average method using a 3-month period is able to provide accurate and stable forecasting results following actual sales patterns. Meanwhile, the application of the exponential smoothing method is able to provide results that are responsive to changes in actual data. If the low weighting responds to changes slowly and the larger weighting responds to changes more quickly. In the forecasting results, the difference in the selection of the constant value (α) between the two periods reflects the characteristics of sales data that can change over time and the method must adjust sensitivity to changes. Therefore, the results obtained from the comparison between the moving average method and the exponential smoothing method have different characteristics. The moving average method provides stable forecasting results following historical patterns. Meanwhile, the exponential smoothing method is able to respond to changes by providing weighting. However, the research findings show that the characteristics of sales data that tend to be stable are more appropriate for the moving average method. It has been proven to be more effective for use in the conditions of the analyzed sales data because it produces better accuracy values (low error values).

p-ISSN: 2579-4892
e-ISSN: 2655-8327

REFERENCES

Abdullah, K., Jannah, M., .iman, U., Hasda, S., Fadilla, Z., Taqwin, Ns., Masita, Ardiawan, KN, & Sari, ME (2022). *Quantitative Research Methodology* (N. Saputra, Ed.). Muhammad Zaini Publishing Foundation Member of IKAPI.

Asynari, E., Wahyudi, D., & Aeni, Q. (2020). Analysis of Demand Forecasting for Geprek Bensu Using the Time Series Method. *JURTEKSI (Journal of Technology and Information Systems)* , *6* (3), 215–220.

Athanasopoulos, G., Hyndman, R. J., Kourentzes, N., & Petropoulos, F. (2021). Forecasting with exponential smoothing: State space models and applications. International Journal of Forecasting, 37(1), 1–15. https://doi.org/10.1016/j.ijforecast.2020.05.008

Awaluddin, R., Fauzi, R., & Harjadi, D. (2021). Comparison of the Application of Forecasting Methods to Optimize Sales (Case Study in a Convection Astaprint Majalengka Regency). *Businessman Journal: Business and Management Research* , *3* (1), 12–18.

Awanda, R., & Oktafianto, K. (2021). Paving Demand Forecasting Using Weighted Moving Average and Exponential Smoothing Methods. *MathVision: Journal of Mathematics* , *3* (1), 14–18.

Chaerunnisa, N., & Momon, A. (2021). Comparison of Single Exponential Smoothing and Moving Average Methods in Forecasting Cooking Oil Product Sales at PT Tunas Baru Lampung. *Journal of Industrial Systems Engineering* , *6* (2), 101– 106.

Hudaningsih, N., Utami, SF, & Jabbar, WAA (2020). Comparison of Sales Forecasting of Aknil Products at PT. Sunthi Sepuri Using the Single Moving Average Method and Single Exponential Smoothing. *Journal Informatics Technology And Science (Jintext)* , *2* (1), 15–22.

Kurniawan, A., Prasetyo, B., & Hidayat, T. (2022). The role of forecasting in managerial decision making. Jurnal Manajemen dan Kewirausahaan, 9(1), 55–64.

Kusyanto, K., Suhardi, D., & Awaludin, R. (2020). Ceramic sales forecasting using the moving average and exponential smoothing methods in the Agus Ceramics business. *Journal of Economics, Accounting and Management* , *1* (1).

Landia, B. (2020). Forecasting the Number of New Students Using Exponential Smoothing and Moving Average. *Intech Scientific Journal: Information Technology Journal of UMUS* , *2* (01), 71–78.

Li, X., Wang, Y., & Zhang, Q. (2022). Machine learning approaches for time series forecasting: A review. Expert Systems with Applications, 190, 116–132. https://doi.org/10.1016/j.eswa.2021.116132

Lim, C., & McAleer, M. (2022). Tourism demand forecasting with exponential smoothing models. Tourism Management, 88, 104–120. https://doi.org/10.1016/j.tourman.2021.104120

Mahrus, M., Yulianto, T., & Faisol, F. (2021). Comparison of exponential smoothing and moving average methods in forecasting salt production volume in Madura. *Zeta-Math Journal* , *6* (1), 17–23.

Rini, MW, & Ananda, N. (2022). Comparison of Forecasting Methods Using Time Series Models. *Tekinfo: Scientific Journal of Industrial Engineering and Information* , *10* (2), 88– 101.

Sari, L., & Sitorus, N. I. B. S. (2021). Collaboration Stakeholder Tourist in Accommodation Management in Tourist Villages in Purwakarta Regency during the Covid-19 Pandemic. *Indonesian Journal of Social Sciences* , *2* (9), 467081.

Sukarma, M., Iryani, D., & Hariana. (2024). Legal Protection for Condotel Owners Regarding Management Agreements by Managers Condotel Designated by a Fair Developer. *Leuser: Jurnal Hukum Nusantara* , *1* (2), 77– 84.

Sukmono, RA, & Supardi. (2020). Textbook of Operational Management and Implementation in Industry. In *Umsida Press*

Sutaat. (2023). *Management Operational Business* . Amerta Media.

Susilowati, IH (2022). Car Sales Forecasting at PT Toyota Astra Motor Indonesia Using the Semi Average Trend Method and the Least Square Method. *JIMF (Jurnal Ilmiah Manajemen Forkamma)* , *6* (1), 28.

Wiharja, AF, & Ningrum, HF (2020). Analysis of product sales predictions for PT. Joenoes Ikamulya uses 4 time series forecasting methods. *Jurnal Bisnisman: Riset Bisnis dan Manajemen* , *2* (1), 43–51.

Yudian, RA, & Dewi, L. (2022). Accommodation facilities as a support for the tourism industry in Tidore Islands City. *Jurnal Cakrawala Ilmiah* , *2* (4), 1

Zhang, Y., Liu, H., & Chen, X. (2023). Deep learning models for time series forecasting: LSTM approach. Applied Artificial Intelligence, 37(1), 1–18. https://doi.org/10.1080/08839514.2023.2174567