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Mengkaji Dampak Kecerdasan Buatan (AI) – Pemasaran Media Sosial Berbantuan dalam Meningkatkan Efektivitas Kinerja Bisnis UMKM di Indonesia

Examining The Impact of Artificial Intelligence (AI) – Assisted Social Media Marketing in Improving the Effectiveness of SMES Business Performance in Indonesia

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Abstrak

Kecerdasan Buatan (Artificial Intelligence/AI) dipandang sebagai teknologi kunci untuk mendukung pertumbuhan ekonomi dengan menawarkan peluang inovasi dan efisiensi manajemen. Penelitian ini berfokus pada Pemasaran Media Sosial Berbantuan Kecerdasan Buatan (AI-Supported Social Media Marketing/AISMM) sebagai strategi untuk mengatasi tantangan pemasaran dan meningkatkan efektivitas kinerja bisnis UMKM, dengan efektivitas manajemen sebagai mediator. Penelitian ini menggunakan pendekatan kuantitatif dan deskriptif dengan metode Partial Least Squares Structural Equation Modeling (PLS-SEM), melibatkan 200 pelaku UMKM di Indonesia sebagai responden. Hasil penelitian menunjukkan bahwa AISMM dan manajemen bisnis yang efektif memiliki pengaruh signifikan terhadap peningkatan kinerja bisnis UMKM. Temuan ini memberikan kontribusi teoretis dan praktis, serta menjadi referensi bagi pelaku UMKM dalam mengadopsi strategi transformasi digital berbasis AI.

Artificial Intelligence (AI) is seen as a key technology to support economic growth by offering opportunities for innovation and management efficiency. This study focuses on Artificial Intelligence-Supported Social Media Marketing (AISMM) as a strategy to overcome marketing challenges and improve the effectiveness of SMES business performance, with management effectiveness as a mediator. This study uses a quantitative and descriptive approach with the Partial Least Squares Structural Equation Modeling (PLS-SEM) method, involving 200 SMES actors in Indonesia as respondents. The results of the study show that AISMM and effective business management have a significant influence on improving SMES business performance. These findings provide theoretical and practical contributions, as well as being a reference for SMES actors in adopting AI-based digital transformation strategies.

BACKGROUND OF STUDY

Digitalization is now a must for small and medium enterprises (SMEs). This transformation process needs to be carried out proactively because it is one of the main sources of opportunities to increase growth and competitiveness in the future (Pelletier. C & Cloutier, 2019). Current information technology can accelerate the rate of lead generation and lead conversion, with artificial intelligence being one notable example. Innovative technologies such as artificial intelligence (AI) offer new opportunities and solutions when human capabilities and conventional systems begin to reach their limitations (Wangler & Botthof, 2019). Comprehensive data fluctuations, which emerge through the integration of intelligent IT systems,) can only be analyzed in a structured manner through the use of artificial intelligence (AI). Data is not only the basis for recommending actions and decisions, but is also used to directly control devices and processes, thus driving the development of Industry 4.0 to a more advanced stage (Veit. J et al., 2017; Y. Yu et al., 2019). However, SMEs are still under-utilizing transformation opportunities to develop in business sustainability (Zimmerman, 2016). This gap is also reflected in one of the key elements that triggers technological transformation. Therefore, the urgency of this research lies in the effort to understand the role of artificial intelligence supported by social media marketing strategies and strengthened by effective business management is very important to be implemented in the performance of SMEs in Indonesia. The development of artificial intelligence (AI) has experienced significant progress through various important innovations, especially over the past fifty years (R.G. Duffett, 2017). Along with the increasing use of social media in the promotion of products and services, especially in the business sector, the role of AI has become increasingly prominent in supporting marketing strategies and interactions with consumers, questions arise regarding the ability of AI to measure the effectiveness of social media, especially regarding its use in marketing activities and business management (H. Keinanen, 2015). It is known that around 2.77 billion active users on social media platforms, contribute greatly to the data collection owned by the platform (H. Keinanen, 2015; Jara, A. J. et al., 2014).Through social media marketing, several studies argue that the results produced involve the use of AI C. Zheng et al., (2018; H.R. Nemati et al., (2002) based on further observed trends to help understand and track various aspects of user behavior (C. Zheng et al., 2018; Torre et al., 2014; V. Kumar & R. Mirchandani, 2012). Various aspects of user behavior observed to encourage the adoption of AISMM include individual motivations in using social media, the types of platforms most often used to interact, and the duration of time spent in online activities (Torre et al., 2014; V. Kumar & R. Mirchandani, 2012). According to Gabelaia, (2022) show that AI in marketing (AIM) develops an applicable and comprehensive approach to maximize the potential of data-based marketing strategies, in order to achieve optimal performance for business organizations, including SMEs. Although the digital transformation of SMEs in Indonesia has grown quite rapidly in recent years, there are several classic problems or obstacles faced by SMEs, such as limited capabilities and lack of effectiveness in managing SMES business performance as discussed by Wael, (2020) in previous research. Based on the problems faced by SMEs in Indonesia, a digital transformation is needed that can be a solution to increase the effectiveness of SMES business performance management and grow and develop in increasingly high competition. The role of SMEs in the national economy can be seen from macroeconomic indicators such as gross domestic product (GDP) growth, job creation, growth and new income for business creativity (Nofirda. F.A & M. Ikram, 2023). Empirically, the relationship between the application of artificial intelligence (AI) in social media marketing strategies and the effectiveness of business management has shown a significant effect on improving the performance of the SMES business (C. Zheng et al., 2018; V. Kumar & R. Mirchandani, 2012). These findings encourage researchers to further explore and understand the application of AI - based social media marketing in the context of micro small and medium enterprises (SMEs)

(N. Michaelidou et al., 2011; V. Kumar & R. Mirchandani, 2012; Wael, 2020). This study specifically aims to study and map the concept of social media marketing supported by artificial intelligence in the SMES environment in Indonesia. First, this research identifies the main components of AI-based social media marketing which contributes to the effectiveness of business management and improving SMES performance. Given the rapid changes in technology, SMES actors are required to respond by finding alternative solutions to increase the competitiveness of their business. In this context, technology has a strategic role, especially through digital transformation which is directly related to the effectiveness of the management of the SMES business. A number of previous studies also highlighted that limitations in technology ownership and the use of outdated equipment are the main obstacles in the development of SMEs (Nofirda, F.A & Dwi, 2021). Based on this background, this research was conducted to further investigate the relationship between marketing social media based on artificial intelligence and improvement of SMES performance through optimizing the effectiveness of business management.

Literature Review

Micro small and medium enterprises (SMEs) are one form of economic activity that is widely carried out by the people of Indonesia as the main source of livelihood. Based on reports from the Ministry of Cooperatives and Small and Medium Enterprises (2020), around 90% of business actors in Indonesia are included in the SMES category, while only around 10% are classified as large businesses. The role of SMEs in encouraging national economic growth is quite significant, with a contribution of approximately 60% to Gross Domestic Product (GDP) (Suci, 2008). SMES management is based on the provisions in Law No. 20 of 2008, which states that SMEs are run by individuals or business entities that manage economic activities are productive. In Chapter I Article 1 of the Law, SMEs are divided into three main categories according to their size and criteria, namely: 1) Micro businesses, namely productive business units owned and managed by individuals or individual business entities, and meet micro criteria in accordance with statutory regulations. 2) Small businesses, namely productive businesses that are established independently, managed by individuals or business entities that have no connection, both directly and indirectly, with medium or large businesses, and meet the applicable legal provisions. 3) Medium businesses, namely productive businesses that are also independent, are not part of, or owned by, larger businesses, and meet the requirements that have been regulated in statutory regulations. 9]

Artificial intelligence M, (2005) is knowledge that aims to enable machines to think (intelligence) like humans. AI technology includes machine learning and deep learning. The era of the industrial revolution 4.0 is a term to describe the advancement of digital-based industrial technology. The development of technology has benefits for everyday human life. One of them is artificial intelligence (AI). Artificial intelligence (AI) is a branch of computer science that develops software to enable machines (computers) to carry out certain tasks as well as humans. Artificial intelligence is of course also developed and utilized in various industrial fields.

RESEARCH METHODS

Respondents were selected using a method of stratified sampling. Respondents were permitted to complete the questionnaire and were acquainted with UMKM Indonesia, whose number is not yet known for certain. From January to February of 2024, it will take eight weeks to collect the data. The sample is 200 respondents using the Hair et al (2017) formula. This is a quantitative survey-based study with closed-ended questions.

Data Collection Techniques

To obtain data, data was collected using a questionnaire. The questionnaire method is a series or list of questions that are systematically arranged, then sent to be filled out by respondents. After filling out the questionnaire, it was sent back (Burhan, 2003). The questionnaire used is an optional type to make it easier for respondents to provide answers, because alternative answers have been provided and only require a shorter time to answer. The questionnaire contains questions related to research variables.

RESULTS AND DISCUSSION

Reliability Test

Reliability Test and Average Variance Extracted (AVE) Test

This test aims to assess whether the measurement results are stable and consistent, and have a high level of reliability. The consistency of respondents' answers to the question items was tested using internal consistency method namely Composite Reliability and Cronbach's Alpha. According to Chin (1998) in Ghozali and Latan (2015), a construct is said to have good reliability if the Cronbach's Alpha and Composite Reliability values > 0.70, especially in confirmatory studies. Meanwhile, for exploratory research, reliability values between 0.60-0.70 are still considered acceptable. In the context of construct reliability testing using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach through SmartPLS software, both indicators are used to assess the internal consistency of the measured construct, both measures are used to evaluate data stability and consistency. Although Cronbach's Alpha is commonly used, the Composite Reliability value is more recommended because it can provide more accurate and usually higher estimates. Based on Table 4, all variables in this study have reliability values that exceed the minimum limit of 0.70 for both measures. In addition, the construct validity is also stated to be good because the AVE value of each variable exceeds the threshold of 0.50. Therefore, all constructs are declared valid and reliable so that they can be used in the next stage of testing the structural model.

Table 4.1 Reliability and Average Variance Extracted (AVE)

	LF	Cronbachs Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Artificial Intellegence Assisted Social Media Marketing		0,804	0,806	0,872	0,631
AI1 <- Artificial Intellegence Assisted Social Media Marketing	0,732				
AI2 <- Artificial Intellegence Assisted Social Media Marketing	0,790				
AI3 <- Artificial Intellegence Assisted Social Media Marketing	0,821				
AI4 <- Artificial Intellegence Assisted Social Media Marketing	0,830				

	LF	Cronbachs Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Effective Business Management		0,714	0,727	0,823	0,539
E1 <- Effective Business Management	0,674				
E2 <- Effective Business Management	0,738				
E3 <- Effective Business Management	0,824				
E4 <- Effective Business Management	0,693				
SMEs Bussiness Performance		0,737	0,744	0,835	0,558
S1 <- SMEs Bussiness Performance	0,695				
S2 <- SMEs Bussiness Performance	0,756				
S3 <- SMEs Bussiness Performance	0,755				
S4 <- SMEs Bussiness Performance	0,780				

All variables show values above 0.70, indicating that the research instrument has high consistency and stability, so it is reliable. The AVE test is used to assess the extent to which the indicators represent latent constructs. An AVE value ≥ 0.50 indicates good convergent validity. The results show that the variable meets the criteria according to the minimum limit set by Haryono (2017).

Discriminant Validity Test

The steps to determine Discriminant validity are as follows:

1) **View Cross loading value**
   Cross loading is determined if the correlation coefficient is above each construct value in comparison with the indicator relationship coefficient numbers in other construct columns, so that a conclusion can be drawn that each indicator in the block is a construct in that column (Haryono, 2017).
2) **Comparing root AVE values**
   This test is carried out by comparing the quadratic root value of Ave to the correlation between other constructs. If the AVE square root value is greater than the correlation between constructs, the construct is declared to have a good discriminant validity.

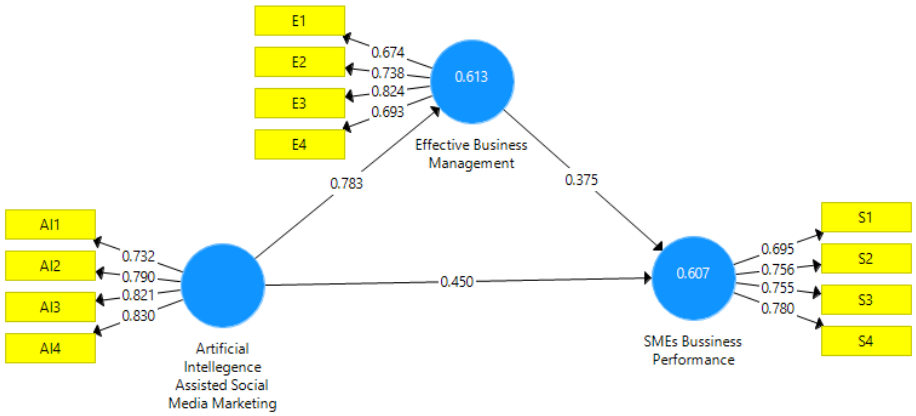
Table 4.2 Cross Loading Value Results

	Artificial Intellegence Assisted Social Media Marketing	Effective Business Management	SMEs Bussiness Performance
AI1	0,732	0,508	0,641
AI2	0,790	0,589	0,628
AI3	0,821	0,672	0,521
AI4	0,830	0,709	0,576
E1	0,500	0,674	0,398
E2	0,650	0,738	0,551
E3	0,621	0,824	0,627
E4	0,512	0,693	0,534
S1	0,469	0,533	0,695
S2	0,575	0,466	0,756
S3	0,537	0,494	0,755
S4	0,626	0,659	0,780

Table 4.3 Results of AVE Root Value and Correlation Between Constructs

	Artificial Intellegence Assisted Social Media Marketing	Effective Business Management	SMEs Bussiness Performance
Artificial Intellegence Assistd Social Media Marketing	0,794		
Effectived Business Management	0,783	0,734	
SMEs Bussiness Performance	0,743	0,727	0,747

All indicators have a higher correlation to their variables than other variables, indicating that discriminant validity has been met. In addition, all outer loading values are above 0.7, thus meeting the indicator validity requirements.



R-Square (R^2)

This value describes the extent to which exogenous latent variables have a significant influence on endogenous latent variables. R-square values of 0.67, 0.33 and 0.19 indicate strong,

moderate and weak models (Chin et al., 1998 in Ghozali and Latan, 2015). The following is Table 4.4

Table 4.4 R Square

	R Square	R Square Adjusted
Effective Business Management	0,613	0,609
SMEs Bussiness Performance	0,607	0,599

The R-Square value of 0.764 with Adjusted R-Square of 0.754 indicates that variables X1, X2, and X3 simultaneously explain 76.4% of the variation in Y, which is included in the strong influence category. While the R-Square value of 0.638 and Adjusted R-Square of 0.627 indicate that the combination of X1, X2, X3, and Y affects Z by 62.7%, which is classified as a moderate influence.

Tabel 4.5 Outer Loading

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
AI1 <- Artificial Intelligence Assisted Social Media Marketing	0,732	0,726	0,060	12,822	0,000
AI2 <- Artificial Intelligence Assisted Social Media Marketing	0,790	0,790	0,047	16,654	0,000
AI3 <- Artificial Intelligence Assisted Social Media Marketing	0,821	0,820	0,037	22,416	0,000
AI4 <- Artificial Intelligence Assisted Social Media Marketing	0,830	0,827	0,041	20,298	0,000
E1 <- Effective Business Management	0,674	0,671	0,076	8,820	0,000
E2 <- Effective Business Management	0,738	0,741	0,057	12,832	0,000
E3 <- Effective Business Management	0,824	0,82	0,038	21,81	0,000
E4 <- Effective Business Management	0,693	0,682	0,071	9,717	0,000
S1 <- SMEs Business Performance	0,695	0,685	0,069	10,051	0,000
S2 <- SMEs Business Performance	0,756	0,748	0,066	11,534	0,000
S3 <- SMEs Business Performance	0,755	0,755	0,050	14,996	0,000
S4 <- SMEs Business Performance	0,780	0,780	0,039	20,201	0,000

Based on table 4.6 of the PLS SEM bootstrapping results in the Outer Loading section, all indicators show a significance value of $p < 0.05$. Thus, it can be concluded that all indicators

are significant and convergently valid, as shown through the bootstrapping analysis on the outer loading value.

Hypotheses Testing

The hypothesis is accepted or rejected, can be seen from the significance value between constructs, t-statistics, and p-value. Through the bootstrap resampling method in this study, the hypothesis is accepted if the t-statistic >1.96, the p-value < 0.05, so that H_a is accepted and H_0 is rejected, and vice versa.

Table 4.6 Path Coeficient

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Artificial Intelligence Assisted Social Media Marketing → Effective Business Management	0,783	0,786	0,051	15,304	0,000
Artificial Intelligence Assisted Social Media Marketing → SMEs Business Performance	0,450	0,449	0,120	3,762	0,000
Effective Business Management → SMEs Business Performance	0,375	0,377	0,116	3,223	0,001

Discussion

The significant relationship between the use of Artificial Intelligence-Based Social Media Marketing (AISMM) and improved business performance in SMEs, both directly and through management effectiveness, demonstrates a high level of urgency for business owners. These results reinforce the understanding that the use of AI technology in digital marketing activities has become an integral part of business strategy, no longer an optional option. This technology helps improve operational efficiency, strengthen customer engagement, and support more accurate, data-driven decision-making.

For SMES owners, this is an important indicator that investments in digital technologies such as chatbots, automated social media advertising systems, and consumer behavior analysis can increase business competitiveness and flexibility in responding to market changes. Management effectiveness plays a crucial role in ensuring that technology implementation actually has a tangible impact on business performance.

These findings align with studies by Zheng et al. (2018) and Kumar & Mirchandani (2012), which emphasize that AI integration in marketing supports effective business management. Gabelaia (2022) and Wael (2020) also stated that AI contributes to the quality of customer interactions and smarter business decision-making. AI technology will have optimal impact if effectively integrated into a business's internal management system. However, the unique contribution of this research lies in the local context of SMEs in Indonesia and the use of management effectiveness as a mediator, something rarely discussed in depth in previous studies. Thus, this research provides important scientific and practical contributions in illustrating how SMEs can maximize the application of AI technology to achieve better business performance.

From a managerial perspective, these results provide recommendations for SMEs to be more responsive to digital transformation by integrating AI-based technology into their marketing activities. Steps such as implementing an AI-based customer management system, training human resources, and evaluating digital promotional strategies need to be implemented

immediately. Furthermore, management effectiveness must be prioritized in the transformation process, given its crucial role in ensuring the success of technology adoption.

CONCLUSION

This study concluded that the application of artificial intelligence (AI) in social media marketing strategies had a positive and significant impact on increasing the effectiveness of the SMES business performance in Indonesia. All tested indicators show strong convergent validity, meaning that using AI technology in marketing helps improve competitiveness and supports the success of SMEs. This finding underlines the importance of investment in digital technology, especially AI, as an adaptive effort of SMEs in dealing with market dynamics and creating added value for consumers.

SUGGESTION

From this study, it is suggested that SMEs in Indonesia start considering and implementing AI-based marketing strategies to increase their marketing effectiveness. Training and education on the use of new technologies need to be expanded so that more SMEs understand the application of AI. In addition, there needs to assistance from the government and related institutions in the form of subsidies to support the sustainability of SMEs can access technology more easily.

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