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Artificial Intelligence (AI) Adoption as Marketing Tools among Micro, Small, and Medium Enterprises (MSMEs) in Indonesia

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Abstract

Despite MSMEs' crucial role in Indonesia's economy, their utilization of artificial intelligence (AI) remains restricted. This paper investigates the adoption of artificial intelligence (AI) among micro, small, and medium enterprises (MSMEs) in Indonesia, providing a comprehensive analysis of the difficulties and potential advantages. AI implementation is essential for these businesses because it may significantly enhance economic growth through improved productivity, cost reduction, and increased competitiveness. Furthermore, AI facilitates the decision-making process and fosters data-based innovation. The study investigates the correlation between competitive pressure, top management commitment, staff adaptability, perceived utility, and simplicity of use in the adoption of artificial intelligence (AI) among micro, small, and medium enterprises (MSMEs) in Indonesia. By addressing these gaps, we can enhance our comprehension of how MSMEs can utilize AI adoption as a marketing tool, thereby fostering their growth and success. The results emphasize the significance of top management commitment (TMC), employee adaptability (EA), perceived usefulness (PU), and perceived ease of use (PEOU) in encouraging the adoption of AI among micro, small, and medium enterprises (MSMEs) in Indonesia.

Keywords: *Artificial Intelligence; AI Adoption; Marketing Tools; MSMEs; Indonesia.*

Introduction

Micro, Small, and Medium Enterprises (MSMEs) are the backbone of Indonesia's economy, contributing significantly to employment and GDP growth. However, these businesses face numerous challenges in the current competitive landscape. In recent years, Artificial Intelligence (AI) has emerged as a transformative technology capable of enhancing efficiency, competitiveness, and innovation across various industries. This research aims to provide a comprehensive background on the adoption of AI among MSMEs in Indonesia, shedding light on the current status, challenges, opportunities, and implications for the country's economic growth. The adoption of Artificial Intelligence (AI) by Micro, Small, and Medium Enterprises (MSMEs) is crucial for several compelling reasons. Firstly, it serves as a potent driver of economic growth within a country. By integrating AI into their operations, MSMEs can substantially boost productivity, reduce operational costs, and gain a competitive edge in today's ever-changing business landscape (Keegan et al.,

2022).Furthermore, AI-driven automation and data analytics enable MSMEs to make well-informed decisions, streamline processes, and target their customer base more effectively, fostering innovation and sustainability. With global markets increasingly reliant on digital technologies, embracing AI is no longer a choice but a necessity for MSMEs to stay relevant and competitive on both domestic and international fronts. Ultimately, AI adoption has the potential to unlock new opportunities, driving the growth and prosperity of MSMEs while contributing to broader economic development.

AI technologies, such as machine learning, natural language processing, and data analytics, can revolutionize the marketing landscape for MSMEs by providing valuable insights into customer behavior, automating marketing tasks, and personalizing customer experiences. For instance, AI-driven tools can analyze large volumes of data to identify market trends, segment audiences, and predict consumer preferences, allowing MSMEs to tailor their marketing strategies more effectively. Additionally, AI can enhance customer interactions through chatbots, personalized recommendations, and targeted advertising, which are critical for maintaining customer loyalty and driving sales.

The current state of AI adoption among Micro, Small, and Medium Enterprises (MSMEs) in Indonesia is characterized by a notably low rate of adoption. Despite the substantial potential benefits that AI can offer, its integration into the operations of Indonesian MSMEs lags significantly behind that of larger enterprises. This disparity in adoption rates is primarily attributable to a multitude of barriers that hinder progress. These obstacles encompass a range of factors, including limited awareness and understanding of AI's transformative capabilities, constrained access to necessary resources and expertise, and pervasive concerns surrounding data security and privacy. Overcoming these challenges is essential to unlock the full potential of AI within the MSME sector. By doing so, Indonesian MSMEs can enhance their efficiency, competitiveness, and capacity for innovation, ultimately contributing to the broader economic growth and prosperity of the nation. However, there is a growing recognition of the need to embrace digital transformation to remain competitive in the rapidly evolving market.

A comprehensive investigation into the impact of AI adaptability has previously been undertaken by a group of researchers, including (Keegan et al., 2022; Lada et al., 2023; Regona et al., 2022; Ulrich & Frank, 2021) . However, it is essential to recognize that Micro Small and Medium Enterprises (MSMEs) operate within distinct and diverse ecosystems, making it imprudent to generalize broad conclusions from these studies to MSMEs. Research on AI adoption among MSMEs is still very limited, but there is one previous study in Malaysia (Lada et al., 2023) and Germany (Ulrich & Frank, 2021) that examined factors influencing AI adoption among SMEs. Consequently, this study aims to delve into the intricate relationship between External factor such as Competitive Pressure (CP), Internal factors such as Top Management Commitment (TMC) and Employee Adaptability, and reasons to adopt such as Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) towards the adoption of AI among MSMEs. This exploration is conducted from the perspective of MSME management, which includes owners and managers, in Indonesia accros various sectors. Addressing these gaps in research will contribute significantly to an enhanced comprehension of the pivotal determinants associated with AI adoption among MSMEs.

Ultimately, this knowledge will facilitate the development of effective strategies, frameworks, and tools aimed at supporting MSMEs in harnessing the full benefits of AI technologies. Understanding the adoption of AI as marketing tools among MSMEs in Indonesia is essential for several reasons. First, it can provide insights into the challenges and opportunities faced by these enterprises in the digital age. Second, it can inform policymakers and stakeholders about the necessary support and interventions required to facilitate AI adoption. Finally, it can contribute to the broader discourse on digital transformation and innovation in emerging markets, highlighting the role of AI in driving economic development and competitiveness.

Literature Review

Artificial Intelligence

Artificial Intelligence (AI) has emerged as a transformative force in the business landscape, reshaping the way organizations operate, make decisions, and engage with customers. In recent years, AI-driven technologies, particularly machine learning and deep learning, have revolutionized various aspects of business operations. From predictive analytics that optimize supply chains to chatbots providing instant customer support and recommendation engines personalizing shopping experiences, AI is driving efficiency and enhancing customer satisfaction (Verma et al., 2021). AI-powered data analytics have enabled businesses to extract valuable insights from massive datasets, aiding in strategic decision-making. Micro, small and medium-sized enterprises (MSMEs) can reap numerous advantages from the adoption of artificial intelligence (AI) technology. This encompasses opportunities for optimizing internal operations, enhancing decision-making processes, and amplifying overall productivity(Haleem et al., 2022). Nonetheless, prior research has delved into the challenges and restrictions that MSMEs encounter when implementing AI solutions

Competitive Pressure (CP) towards AI Adoption

Competitive pressure is a fundamental concept in business literature, reflecting the intensity and dynamics of competition within industries (Lada et al., 2023). It plays a pivotal role in shaping an organization's strategies, performance, and overall survival. Scholars have extensively examined the impact of competitive pressure on various facets of business operations, including innovation, pricing strategies, market entry decisions, and firm profitability. The intensity of competitive pressure often serves as a catalyst for innovation and drives companies to continuously improve their products and services to gain a competitive edge. Additionally, studies have highlighted the role of competitive pressure in influencing market entry and exit decisions, which can have profound implications for a firm's long-term viability. As markets evolve and become increasingly globalized, understanding the nature and effects of competitive pressure remains a critical area of research to inform strategic decision-making and foster competitiveness in the business landscape. AI empowers competitive assessment, tailoring marketing strategies, refining pricing tactics, improving customer experiences, and predictive data analysis. It empowers enterprises to glean insights, efficiently reach their target audience, fine-tune pricing approaches, enrich customer interactions, and make informed decisions grounded in data to maintain their competitiveness (Verma et al., 2021). A substantial body of empirical

research indicates that higher levels of innovation adoption are aligned with increased competitive pressures, which also motivate micro, small, and medium-sized enterprises (MSMEs) to integrate AI into their daily activities. Consequently, competitive pressure serves as a driving force compelling businesses to employ AI solutions, leading to the first hypothesis: H1: Competitive Pressure (CP) significantly pushes SMEs toward AI adoption.

Top Management Commitment (TMC) towards AI Adoption

Strong commitment from top management is crucial for success across various areas like quality improvement, innovation adoption, and strategic planning (Lada et al., 2023) . When top managers visibly support these initiatives, it inspires employees at all levels, cultivates a culture of innovation, and eases transitions during organizational changes. In Micro, Small, and Medium Enterprises (MSMEs), top management commitment is especially vital due to their limited resources and budget constraints. In this context, the involvement and commitment of top management are closely linked to the effective implementation of transformative projects, including the integration of advanced technologies like artificial intelligence. For MSMEs, Top Management Commitment (TMC) is of great importance in strategic decision-making regarding AI adoption and integration (Sipola et al., 2023).Past research consistently shows a clear connection between TMC and AI Adoption because TMC plays a pivotal role in SMEs' strategic decision-making related to AI. Top management commitment (TMC) plays a crucial role in fostering an understanding of AI's potential, ensuring its smooth integration, overcoming resistance to change, and realizing its benefits. Acting as a catalyst, TMC enhances decision-making, competitiveness, and overall performance in SMEs. Given these findings, the next step is to test the hypothesis: H2: MSMEs' top management commitment (TMC) significantly influences AI adoption.

Employee Adaptability towards AI Adoption

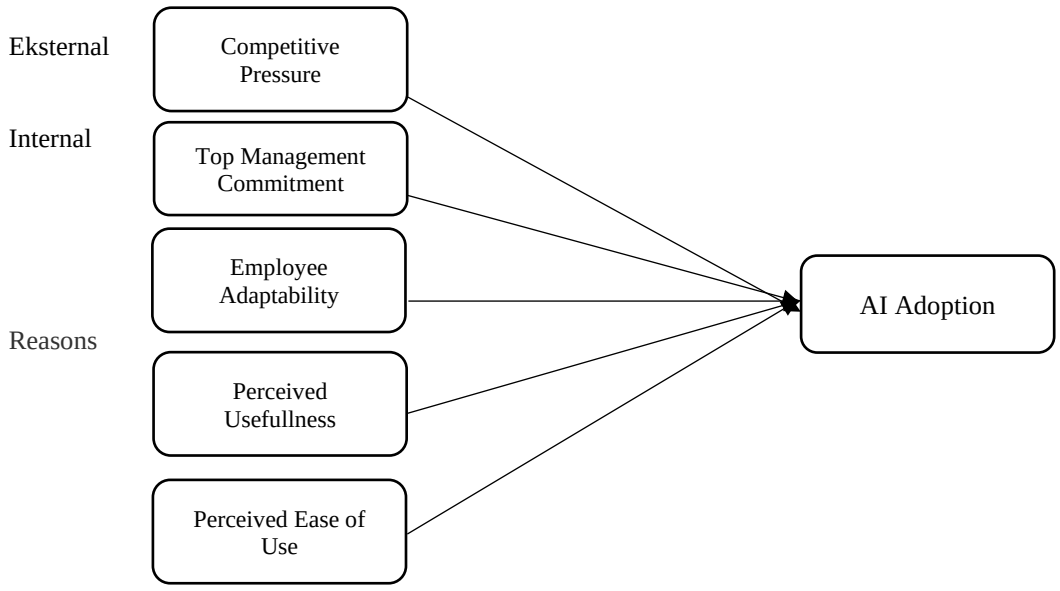
Employee adaptability plays a critical role in the context of Micro, Small, and Medium Enterprises (MSMEs) when it comes to the adoption of Artificial Intelligence (AI). As AI technologies increasingly find their way into the operations of smaller businesses, the adaptability of their human resources becomes a vital determinant of the success of AI initiatives (Bettoni et al., 2021; Lada et al., 2023). Employee adaptability within MSMEs refers to the capability of individuals to embrace and effectively utilize AI tools and systems in their daily tasks. Research underscores that in the dynamic and often resource-constrained environment of MSMEs, employee adaptability assumes particular significance. AI adoption often necessitates changes in job roles, skill requirements, and work processes, and adaptable employees are better positioned to navigate these transitions. Fostering employee adaptability through training, education, and a supportive organizational culture is essential for the effective and sustainable integration of AI within MSMEs. Furthermore, adaptability not only reduces resistance to AI adoption but also contributes to creating a workforce that is agile and resilient in the face of technological advancements (Bettoni et al., 2021; Kumar et al., 2023; Lada et al., 2023). Understanding and nurturing employee adaptability is paramount for MSMEs seeking to harness the benefits

of AI and ensure a smooth and successful transition to AI-driven operations. This leads to the hypothesis: H3: Employee Adaptability significantly influences AI adoption.

Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) towards AI Adoption

In the adoption of Artificial Intelligence (AI), two key factors stand out: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Rasheed et al., 2023). PU is about believing that AI can bring real benefits, like better decision-making or improved productivity. On the other hand, PEOU measures how easy it is to use AI tools and platforms. Studies consistently show that these factors are pivotal in AI adoption. When people perceive AI as useful and easy to use in their work or daily life, they are more likely to embrace it. These beliefs influence their intention to use AI and, consequently, its actual adoption. This leads to the hypotheses: H4: Perceived Usefulness significantly influences AI adoption, and H5: Perceived Ease of Use significantly influences AI adoption. Figure 1 illustrates the process of analyzing data for competitive pressure, top management commitment, employee adaptability, perceived usefulness, and perceived ease of use in relation to AI adoption.

Figure 1 Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) towards AI Adoption



Methodology

This study uses a semantic differential scale which is an attitude measurement scale with a 10-point measurement scale (Osgood et al., 1957) the continuum of this scale is very negative on the left and very positive on the right. The research variables consisted of 6 variables, namely Competitive Pressure which consisted of 4 measurement items, Top Management Commitment consisted of 3 measurement items, Employee Adaptability consisted of 3 measurement items, Perceived Usefulness consisted of 3 measurement items, Perceived Ease of Use consists of 4 measurement item and AI Adoption consists of 3 measurement items. The objects in this study are MSMEs in Indonesia which adopt AI. The analytical tool used in this research is Structural Equation Modeling (SEM). The questionnaire used to obtain data in this study was

distributed to 131 respondents. This number has met the minimum number of respondents, which is five times the estimated parameter, which is as many as 23x5= 115 respondents (Hair & et al., 2010). Before distributing the questionnaire, this study conducted a pilot test to 30 respondents to verify the validity and reliability of the statements in the questionnaire. The result of pilot test is the fit questionnaire which was then distributed as a questionnaire of this study.

Result and Discussion

As seen in Table 1, the data obtained in this study were as many as 131 respondents with the number of respondents being dominated by owner or manager of Food and Beverage MSMEs (45,03%) and Fashion MSMEs (35,11%). The age of respondents is dominated by the age of 26-33 years (51,14%).

Table 1 Respondent Profile Based on Sector

MSMEs Sector	N (owner/manager)	Percentage
Food & Beverage	59	0.4503
Fashion	46	0.3511
Services	7	0.0534
Furniture	7	0.0534
Baby Stuffs	8	0.0610
Others	4	0.0305
Age		
18-25 years old	24	0.1832
26-33 years old	67	0.5114
34-41 years old	31	0.2366
42-49 year	9	0.0687
50 and above	0	0
Gender		
Female	52	0.3969
Male	79	0.6030

Measurement Model Analysis

The composite reliability coefficient exceeds the 0.70 threshold for each variable construct in this study, confirming measurement reliability. The Average Variance Extract (AVE) test, as outlined by Hair et al. (2010), supports this by ensuring that AVE values for each variable surpass 0.50; all AVE values in this study exceed this threshold (see Table 2), indicating effective representation of the developed latent variables.

Table 2 Average variance extracted (AVE) dan Composite Reliability (CR)

Construct	CR	AVE
Competitive Pressure	0.914329	0.75633
Top Management Commitment	0.954746	0.86742
Employee Adaptability	0.987501	0.86434
Perceived Usefulness	0.945450	0.83522
Perceived Ease of Use	0.906549	0.84543
AI Adoption	0.921465	0.79363

The findings presented in Table 3 reveal that the squared correlations between the constructs are smaller than the AVE root values, indicating that the measurement models in the research meet the criteria for discriminant validity.

Tabel 3 Discriminant validity of measured items

	CP	**TMC**	**EA**	**PU**	**PEOU**	**AIA**
CP	0.931					
TMC	0.802	0.925				
EA	0.668	0.756	0.935			
PU	0.364	0.573	0.728	0.886		
PEOU	0.258	0.412	0.765	0.775	0.908	
AIA	0.368	0.438	0.687	0.464	0.561	0.894

Goodness of Fit

In Structural Equation Modeling (SEM) analysis, the Goodness of Fit test is conducted to see if the research model is suitable for further research. This test involves comparing various results like ChiSquare, Probability, CMIN/DF, GFI, AGFI, TLI, CFI, and RMSEA to specific values. To pass the goodness of fit test, at least five of these criteria should meet the predetermined thresholds, as explained in a study by Hair & et al., 2010. The results of this assessment can be found in Table 4 below. After analyzing the data with SEM using AMOS 23.0 software, here's a summary of the goodness of fit evaluation:

Table 4 *Goodness of Fit*

No.	Goodness of Fit Index	Cut of Value	Model Analysis Result	Description
1	$\chi 2$ – Chi Square	Expected small	401,791	Marginal
2	Probability	> 0,000	0,000	Marginal
3	CMIN/DF	< 2,00	1,2141	Good
4	RMSEA	< 0,08	0,068	Good
5	GFI	> 0,90	0,936	Good
6	AGFI	> 0,90	0,956	Good
7	TLI	> 0,95	0,953	Good
8	CFI	> 0,95	0,972	Good

Referring to Table 4, it is evident that there are six criteria evaluating the model's goodness of fit falling within the "good" category. This indicates that the model used in this study is highly suitable and of excellent quality.

Hypothesis Test

The aim of hypothesis testing is to decide if the research idea is supported or rejected. In SEM analysis, this testing happens at a 95% significance level, which is marked as $\alpha = 0.05$. The hypothesis is considered valid if the Critical Ratio (CR) is above 2, and the p-value is less than 0.05. Additional information can be found in Table 5 below for a more comprehensive understanding.

Table 5 Research Hypothesis Test Results

Hypothesis	Research Hypothesis	CR Value	P	Hypothesis Test Result
H1	Competitive Pressure → AI Adoption	1.2427	0,2132	Rejected
H2	Top Management Commitment → AI Adoption	7.7469	0,0000	Accepted
H3	Employee Adaptability→ AI Adoption	7.7732	0,0000	Accepted
H4	Perceived Usefulness → AI Adoption	5.5778	0,0000	Accepted
H5	Perceived Ease of Use → AI Adoption	4.2212	0,0000	Accepted

Based on table 5, the results revealed that Top Management Commitment (TMC), Employee Adaptability (EA), Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) have a significant impact on Artificial Intelligence (AI) adoption. Hence, H2, H3, H4 and H5 were supported. However, the results also revealed that Competitive Pressure (CP) was not supported or rejected. The results of the hypothesis testing provide valuable insights into the determinants of AI adoption among MSMEs in Indonesia. The analysis reveals that internal organizational factors play a critical role in influencing AI adoption, while external competitive pressures are less significant. This discussion explores these findings in detail, emphasizing the importance of top management commitment, employee adaptability, perceived usefulness, and perceived ease of use.

Discussion

Top Management Commitment (TMC) emerged as a significant factor influencing AI adoption, with a CR value of 7.7469 and a p-value of 0.0000. This strong relationship underscores the pivotal role of leadership in driving technological change within MSMEs. When top management demonstrates a commitment to AI adoption, it signals a strategic prioritization of technology, which can mobilize resources, align organizational goals, and foster an innovation-friendly culture. Leaders who are proactive in supporting AI initiatives are likely to overcome resistance to change, provide necessary training, and allocate financial resources effectively, thereby facilitating successful AI integration. Employee Adaptability (EA) also significantly impacts AI adoption, as indicated by a CR value of 7.7732 and a p-value of 0.0000. This finding highlights the importance of having a workforce that is flexible and willing to embrace new technologies. Adaptable employees can quickly learn and integrate AI tools into their daily tasks, enhancing overall productivity and efficiency. This result suggests that MSMEs should invest in continuous training and development programs to build a workforce capable of adapting to technological advancements. Encouraging a culture of lifelong learning and openness to change can further support AI adoption and utilization.

Perceived Usefulness (PU) was found to be a significant determinant of AI adoption, with a CR value of 5.5778 and a p-value of 0.0000. This underscores the importance of demonstrating the tangible benefits of AI technologies to potential users. When MSMEs perceive AI as useful and capable of improving their business processes, they are more likely to adopt these technologies. This finding suggests that vendors and developers of AI solutions should focus on highlighting practical applications and success stories that

showcase the effectiveness of AI in solving real-world business problems. Clear communication of the value proposition of AI can enhance its perceived usefulness and drive adoption.

Perceived Ease of Use (PEOU) also plays a crucial role in AI adoption, with a CR value of 4.2212 and a p-value of 0.0000. This result indicates that the simplicity and user-friendliness of AI tools are essential for encouraging their adoption. MSMEs are more likely to integrate AI technologies if they are easy to use and require minimal technical expertise. This finding suggests that AI developers should prioritize creating intuitive interfaces and providing comprehensive support and training to ensure that users can easily navigate and utilize AI tools. Simplifying the user experience can significantly lower the barriers to AI adoption and promote widespread use. Contrary to expectations, Competitive Pressure (CP) was not found to have a significant impact on AI adoption, as evidenced by a CR value of 1.2427 and a p-value of 0.2132. This result suggests that external competitive forces are not the primary drivers of AI adoption decisions among Indonesian MSMEs. Instead, internal factors such as management commitment and employee adaptability are more influential. This finding implies that MSMEs may prioritize internal readiness and capability over external pressures when considering AI adoption. It highlights the need for focusing on building internal competencies and fostering a supportive environment to drive technological innovation.

The analysis reveals that Competitive Pressure (CP) does not significantly influence AI adoption in MSMEs. This outcome may seem counterintuitive at first, as one might assume that the pressure to stay competitive in the market would drive MSMEs to embrace AI technologies. However, it's essential to consider the specific nature of CP within MSMEs. CP, in the context of larger corporations, might be a driving force for AI adoption due to the need to outperform rivals. However, in MSMEs, competitive pressures can be different. These businesses may face more immediate challenges, such as resource constraints or market niches with less competition. As a result, the urgency to adopt AI technologies may not be as pronounced, and MSMEs may prioritize other aspects of their operations.

Top Management Commitment (TMC) TMC plays a crucial role in shaping the AI adoption landscape within MSMEs. When top-level executives, often owners or managers themselves in these smaller enterprises, actively endorse and commit to AI adoption, it can facilitate a smoother transition and reduce resistance within the organization. Their commitment not only influences the perception of AI's potential benefits but also ensures the realization of those benefits through effective implementation. The results also shows Employee Adaptability (EA) as a critical factor in the successful adoption of AI. MSMEs often have smaller teams and limited resources, making it essential for employees to adapt to new technologies effectively. AI adoption frequently involves changes in job roles, skill requirements, and work processes. Adaptable employees are better equipped to navigate these transitions and harness the potential of AI effectively. Hence, human resources are still the key.

The study also highlights a substantial and positive relationship between Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) towards AI adoption in MSMEs. Perceived Usefulness refers to the extent to which individuals believe that AI can provide tangible benefits, such as enhancing decision-making, improving productivity, or delivering favorable business outcomes. In the context of MSMEs, this perception is a crucial driver of AI adoption. When owners, managers, and employees perceive AI as a valuable tool that

can contribute to their business success, they are more likely to embrace AI technologies. Perceived Ease of Use reflects individuals' beliefs about the simplicity of using AI tools and platforms. In the context of MSMEs, where resources and technical expertise may be limited, the perception of AI as user-friendly and accessible is a key determinant of its adoption. When employees and decision-makers find AI systems easy to use, they are more inclined to integrate AI into their daily operations.

AI's role in predictive analytics is another crucial benefit for MSMEs. By forecasting future trends and consumer behaviors, AI allows businesses to make informed decisions and adapt their strategies proactively. This foresight is particularly valuable in a rapidly changing market, where staying ahead of trends can be a significant competitive advantage. Furthermore, AI-driven advertising optimization ensures that marketing budgets are spent effectively. By continuously analyzing ad performance and adjusting bids and targeting in real-time, AI maximizes return on investment (ROI) and ensures that marketing efforts reach the most relevant audience segments. Despite these benefits, the integration of AI in marketing also poses challenges that need to be addressed. One major concern is the initial investment required for AI technology, which can be a significant barrier for MSMEs with limited budgets. Additionally, there is a need for skills development and training to effectively implement and manage AI tools. Without the necessary expertise, businesses may struggle to fully leverage AI's potential, leading to suboptimal outcomes. Therefore, it is crucial for MSMEs to not only invest in AI technology but also in training their workforce to harness its capabilities effectively.

The adoption of AI in marketing offers MSMEs a powerful means to enhance customer insights, engagement, and operational efficiency. By leveraging AI, these enterprises can achieve a level of personalization and optimization that was previously out of reach, thereby gaining a competitive edge in the market. However, successful AI integration requires careful consideration of costs and a commitment to developing the necessary skills within the organization. As AI technology continues to evolve, its impact on MSME marketing will likely grow, providing even greater opportunities for innovation and growth in the sector.

Conclusion

This study examines factors influencing AI adoption in Indonesian MSMEs, highlighting the critical role of top management commitment. When top management is dedicated to AI adoption, it aligns organizational resources and emphasizes its strategic importance. Resource allocation, including finances, technology, and human resources, is crucial for successful AI adoption. The study validates the relationship between top management commitment and AI adoption. The study also validates that adaptability of employees plays a crucial role in influencing the adoption of AI among MSMEs in Indonesia. As these businesses strive to harness the potential of AI technologies for growth and efficiency, a workforce that is open to change, willing to acquire new skills, and able to integrate AI into their daily operations is essential.

The successful integration of AI in MSMEs is not only dependent on the technology itself but also on the adaptability and readiness of the workforce to embrace and leverage AI's capabilities, ultimately driving

the transformation of these businesses in Indonesia's evolving digital landscape. Perceived usefulness and ease of use significantly influence AI adoption. MSMEs embracing AI see it as enhancing efficiency, decision-making, and customer satisfaction. User-friendly AI systems lower adoption barriers, making MSMEs more likely to adopt AI, fostering innovation and competitiveness. However, future research should explore specialized AI applications within MSMEs and consider the limitations of a small sample size. Local factors affecting AI adoption in different regions of Indonesia also need exploration for a more comprehensive understanding.

Limitations and Future Research Directions

The research faced limitations, primarily concerning the sample size and composition. While the study involved 131 respondents from MSMEs, its scope might not fully represent the diverse MSME landscape. This could restrict the generalizability of findings. Future research with larger, more diverse samples is needed for a broader perspective on AI adoption among MSMEs. Additionally, the sample was skewed towards Food and Beverage and Fashion sectors, potentially introducing sector-specific bias. Future studies should strive for balanced sector representation to gain a comprehensive understanding of AI adoption trends among MSMEs. In light of the research limitations, several promising avenues for future research can be explored. One crucial direction is the conduct of large-scale and sectorally diverse studies. Researchers can consider conducting studies that encompass a more extensive and diverse sample of MSMEs, with participants from various sectors, geographic locations, and business sizes. This approach would enable a more comprehensive analysis of the factors influencing AI adoption in MSMEs. Exploring factors against AI adoption would be beneficial.

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