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Analysis of MSME Actors' Perception in West Java Toward the Use of Artificial Intelligence (AI) as an Effort to Improve Operational Efficiency

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A B S T R A C T

This study aims to analyze the perceptions of Micro, Small and Medium Enterprises (MSMEs) in West Java regarding the use of Artificial Intelligence (AI) as an effort to increase operational efficiency. The method used is quantitative research with a survey via questionnaire distributed to 100 MSME players. Data analysis includes descriptive statistics to identify the level of understanding, benefits, barriers, and expectations regarding AI adoption. The research results show that 32% of respondents have used AI, with the majority using it for sales data analysis. As many as 75% of AI users find it easy to operate the technology, and 84% state that the cost of use is relatively affordable. The main obstacle is a lack of understanding of the technology, which has led to low widespread adoption of AI. As many as 52% of respondents expressed interest in taking AI training. This research concludes that although AI provides significant benefits in increasing efficiency, technological literacy and more affordable access are needed to accelerate digital transformation in the MSME sector. Recommendations include developing AI-based training and providing technology solutions that are easier to implement.

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1. INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) have an important role in the Indonesian economy, especially in West Java, these businesses are numerous and have great potential to encourage regional economic growth (Putri, A. F. H., & Novani, 2024) and contribute to employment and reducing poverty levels. However, in facing increasingly tight market competition and globalization challenges such as operational efficiency, productivity, innovation and competitiveness, MSMEs need to adopt technological innovation to survive and develop. One of the technologies that is starting to be introduced to the MSME sector is Artificial Intelligence (AI). AI revolves around developing machines with an intellect like humans (Kar, 2023). AI technology has great potential to increase operational efficiency through process automation, faster data analysis, and personalization of customer service (Davenport, T., & Ronanki, 2018). In developed countries, the implementation of AI has been proven to help small businesses make

smarter decisions, reduce operational costs, and increase the speed and accuracy of services (Schatsky, D., Muraskin, C., & Gurumurthy, 2017). However, the application of AI in the Indonesian MSME sector still faces various obstacles, including limited knowledge, resources and infrastructure readiness (Kementerian Perindustrian, 2021)

MSME actors' perceptions of AI are an important factor because their understanding of the benefits and risks of AI can influence the adoption of this technology (Venkatesh et al., 2003). According to Fahmi et al (2024), the majority of MSMEs in West Java still use conventional marketing methods, so there are still differences in views and understanding of AI. Decisions about technology adoption are influenced by perceptions of AI, caused by limited knowledge, technological experience, and available resources. To increase the acceptance of AI in the MSME sector, Education programs; adequate resources; and examples of MSMEs that have successfully implemented AI technology are very much needed. This research aims to identify the perceptions of MSME players, especially in the West Java region, regarding the use of AI in increasing the operational efficiency of MSMEs, find out the factors that influence the perceptions of MSME players, analyze the benefits felt by MSME players who have used AI, and identify obstacles in adopting AI. in MSMEs; so this research can identify factors that can encourage or hinder the use of AI technology in the MSME sector in West Java.

The expected benefits of this research include providing insight to academics regarding the potential, challenges and impact of AI in increasing the operational efficiency of MSMEs. It is hoped that the results of this research can provide guidance for the government, MSMEs and other related parties in formulating policies and strategies that support the implementation of AI. Apart from the academic and practical aspects above, this research serves as a guide and helps MSME actors and the government to design intensive programs for collaboration between AI and MSMEs in Indonesia, especially West Java.

The method used in this research is a survey method by distributing questionnaires to MSME actors in West Java and analyzing the knowledge and conditions currently experienced by MSME actors. The results of this research can provide a deeper understanding to MSME players in West Java regarding the use of AI technology on MSME productivity efficiency, so that it is hoped that knowledge and application of AI technology can be improved and targeted for the development of MSME businesses in West Java

2. LITERATURE REVIEW

The use of Artificial Intelligence (AI) by Micro, Small and Medium Enterprises (MSMEs) in Indonesia, especially in West Java, faces several problems. First, limited knowledge and understanding of AI among MSME players hinders the adoption of this technology, because many still depend on conventional marketing methods. Second, limited resources and inadequate infrastructure are significant challenges in applying AI to improve operational efficiency. Third, negative perceptions of the risks and benefits of AI can influence MSMEs' decisions to adopt this technology, so education programs and successful examples are needed to increase acceptance.

However, the MSME sector has a very important role in development and direct economic improvement, which can be seen from the emergence of new businesses that generate employment opportunities (Saragih, 2019). According to data from the Ministry of Cooperatives and SMEs, MSMEs contribute more than 60% of national GDP and are the backbone of the Indonesian economy (Kementerian Koperasi dan UKM, 2022). In addition, MSMEs help reduce unemployment, including in remote areas, with a contribution of 56.6% to reducing unemployment (Ganesa, Egen, Catur P Putri, Evi Nashriyah, 2024)

The use of AI in MSMEs can help business owners in several important areas. For example, AI can be used to handle financial data more effectively, provide real-time data analysis, and help in quickly identifying fraud and business cycles (Arsenio et al, 2024). The following is AI technology that can be utilized by MSMEs: (1) Chatbots: In its application, chatbots are usually

used for consumer or customer service which allows fast, personal and efficient interaction between users and the platform. With the aim of strengthening communication with customers, increasing service efficiency, and improving the overall shopping experience (Guntara, 2022), (2) ChatGPT: MSMEs have several problems such as limited use of technology such as the use of technology to support their business. ChatGPT can be used by MSMEs to request marketing strategies, creative ideas for product promotions and so on (Rachmawati, et al., 2023), (3) Canva: MSME actors' low understanding of digital technology, especially in creating attractive visual content and product photography techniques, has an impact on the less than optimal selling value of products on the market. To overcome this, MSMEs can utilize easy-to-use design applications such as Canva as a practical solution in developing digital marketing materials, including creating logos, brochures and other promotional materials that can increase the attractiveness of their products (Putro, et al., 2024), (4) AI ADS: AI ads are used for digital marketing strategies, content development, and other things that help the marketing process to develop further and not be left behind even in rural areas. (Novantara, et al., 2024), (5) Gofood and Grabfood: MSMEs can utilize marketplace technology such as gofood and grabfood to market their products and support increased online sales (Fandriansyah, 2022).

3. RESEARCH METHOD

In this research, the type of research used is quantitative research using a survey method by distributing questionnaires to MSME players, especially in the West Java area. Quantitative research is research that emphasizes analysis on numerical data (numbers) which are processed using statistical methods (Ardiansyah Harahap, 2022). Sugiyono (2018) stated that quantitative methods can be interpreted as research methods that are based on the philosophy of positivism, used to research certain populations or samples, data collection uses research instruments, analysis is quantitative/statistical. Meanwhile, the survey method is used to obtain data that occurred in the past or currently from samples taken from a certain population (Sugiyono, 2018).

Questionnaires as a research instrument were used in this research as a tool in collecting the required data and distributed to the respondents (research samples) being studied (Rahmani & Erpurini, 2020). This questionnaire consists of several sections designed to measure various aspects of MSME players' perceptions of AI. The created questionnaire is distributed online via a survey platform. There are types of populations and samples used in collecting research data, where the population itself is the entire research subject while the sample is a portion of the population that has been previously determined to be studied (Rahma, RA, et al, 2023). The population in this study is all types of MSMEs in the West Java area in various industrial sectors that have the potential to adopt AI technology, where based on data from opendatajabar.co.id in West Java there are around 6,257,390 MSME actors in various categories and the largest contributing category is sector food and Drink. Meanwhile, the number of samples in this study was determined using a random sampling or purposive sampling method to obtain representation from various types of MSMEs. For example, taking a sample of MSMEs in the retail, service, manufacturing and technology sectors in big cities and determined based on the Slovin formula with a population of 6,257,390 MSME actors and an error of 10%, it is found that the sample data that must be collected for research is namely as many as 100 MSME players with the following calculations:

Slovin Equation: $n = \frac{N}{1+N.e^2}$

$= \frac{6.257.390}{1+6257390\ .\ (10\%)^2}$

= 99,998 ≈ 100 MSME Actors'

Description :
n = Minimal Sample Value
N = Population
e = error margin

4. RESULT AND DISCUSSION

Based on the results of the questionnaire obtained, validity and reliability tests were carried out on 100 respondents. In the validity test, the significance value used is 5% so that the rtable value is 0.195. Data is said to be valid if the rcount value > rtable and the significance value <0.05. The results of data processing in the Pearson validity test using SPSS stated that

the rcount value > rtable, with the average rcount value for each questionnaire being 0.6262 > 0.195 and the significance value <0.05 so that the questionnaire data was declared valid. Next, the reliability test is used to see whether the questionnaire has consistency if measurements are carried out with the questionnaire and repeatedly. The results of the questionnaire are declared reliable if the Cronbach Alpha value is > 0.6. The results of the reliability test using SPPS showed that the Cronbach Alpha value was 0.926 > 0.6 so the data was said to be reliable and worthy of further testing. An explanation of the perceptions of MSME actors towards AI is then measured based on the following 6 categories.

Table 1. Categories of perception of MSME actors towards AI

Category 1	MSME activities
Category 2	Level of Understanding and Use of AI
Category 3	Perceptions of the Use of AI
Category 4	Perceived Benefits of Using AI
Category 5	Obstacles in Using AI
Category 6	Expectations for AI in the Future

4.1 Category 1 (MSME Activities)

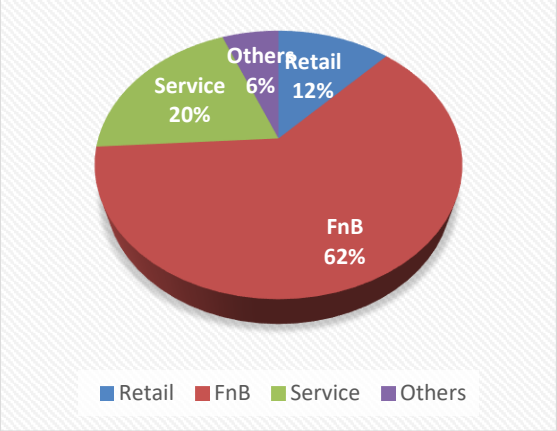

Figure 1. Type of MSME business

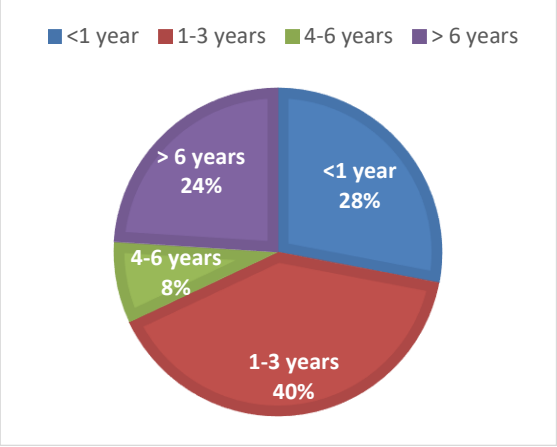

Figure 2. Duration of MSME business

Based on Figure 1 and 2 above, the majority of business types owned by respondents are FnB (Food and Beverages) types of business, namely 62% with the largest business duration, namely 40%, having been operating for around 1-3 years.

4.2 Category 2 (level of understanding and use of AI)

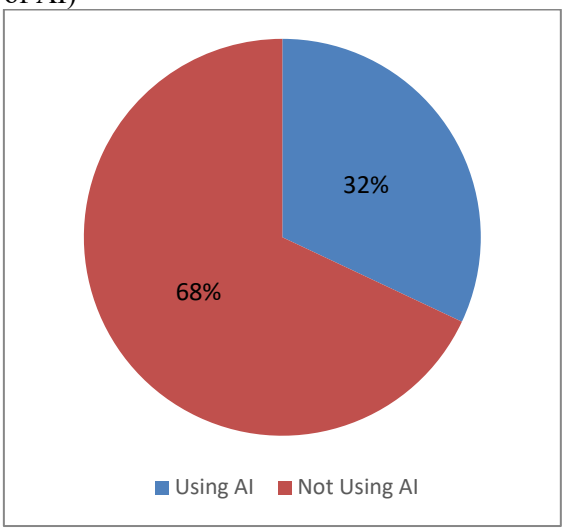

Figure 3. Percentage of AI Use in MSMEs

Based on Figure 3, 32% of respondents use AI in operating their business, so there are still many MSMEs who do not understand the function of AI in developing their business. This is because access and knowledge of technology for MSMEs is still minimal, resulting in low use of AI in business processes.

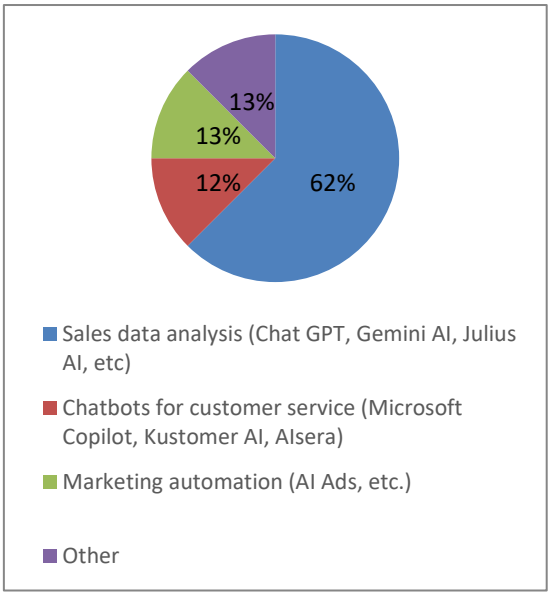

Figure 4. Types of AI used

Based on 32 respondents who answered that they had used AI in their business processes, it was found that 62% respondents used AI the most for sales data analysis (ChatGPT, Gemini AI, Julius AI, etc.). This can be seen from the level of ease with which the AI platform is operated by MSME actors.

4.3 Category 3 (Perceptions of AI Use)

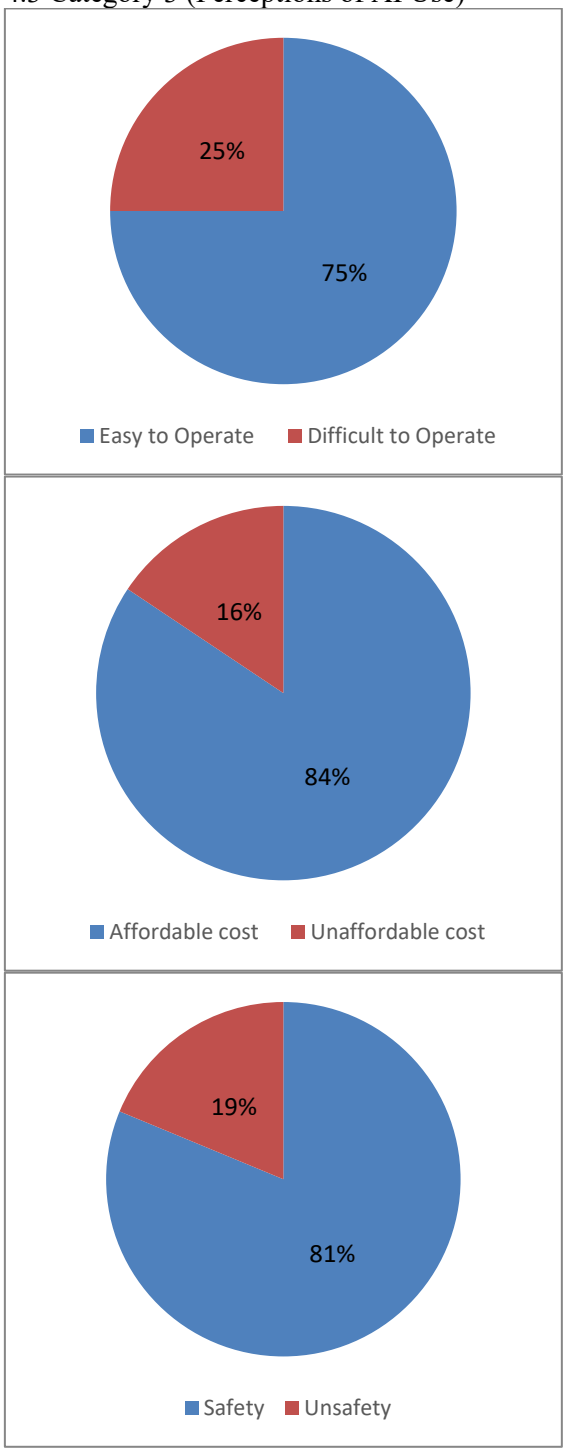

Figure 5. Use of AI in MSME management

Based on Figure 5, it can be seen that the majority of respondents who use AI find it easy to operate AI (75%) for their business needs because it is able to integrate many things that can support business development. 84% of respondents also felt that the costs incurred in using AI were relatively affordable and 81% felt that data security was maintained when operating AI for business development. Integrated technology and easy data storage on the internet support the ease, affordability and safety of AI in its adoption.

4.4 Category 4 (Perceived Benefits from Using AI)

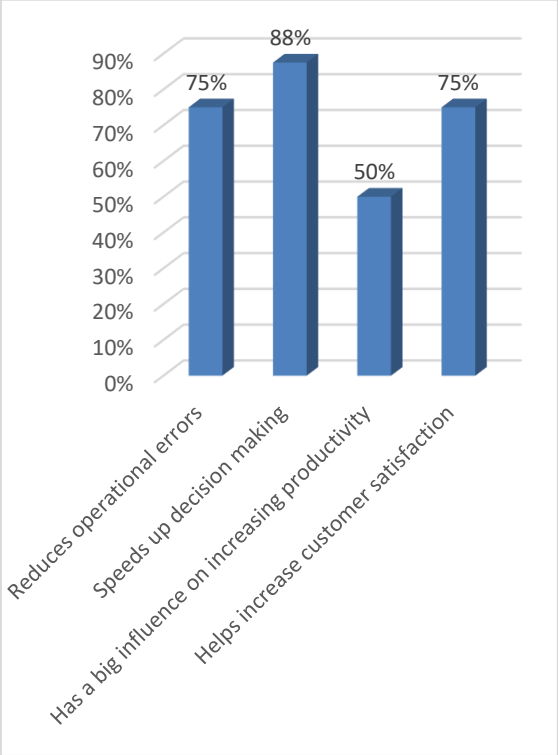

Figure 6. Benefits of AI felt by users

The majority of respondents stated that the use of AI in business operations provides many benefits that can help their business develop, namely 88% of respondents were able to speed up decision making after using AI, 75% of respondents also stated that AI could help them reduce operational errors and help increase customer satisfaction . Meanwhile, 50% think that AI has a big influence on increasing the productivity of MSMEs that are being run.

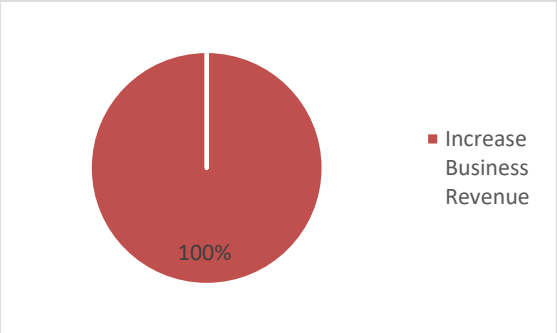

Figure 7. AI helps increase revenue

And based on 32 respondents who used AI in their business processes, it was found that all respondents experienced an increase in business revenue.

4.5 Category 5 (Barriers to the Use of AI)

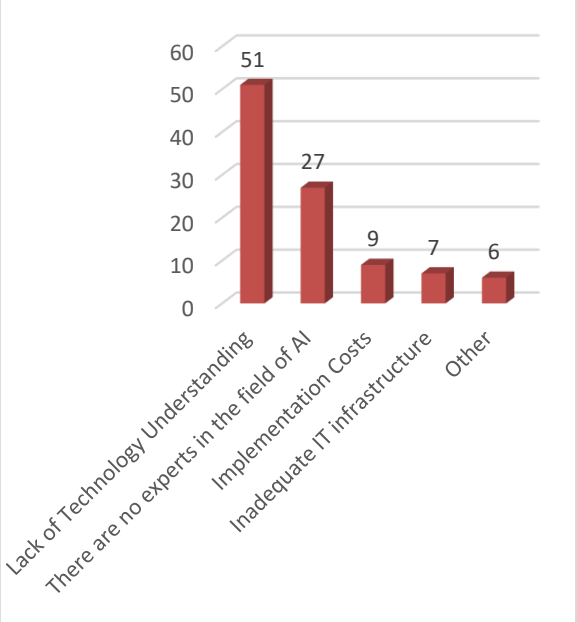

Figure 8. Obstacles to using AI

Based on Figure 7 above, the most common obstacle experienced by respondents in using AI is a lack of understanding of technology, as many as 51 respondents, so that many MSMEs still end up choosing to use conventional methods in carrying out their business processes.

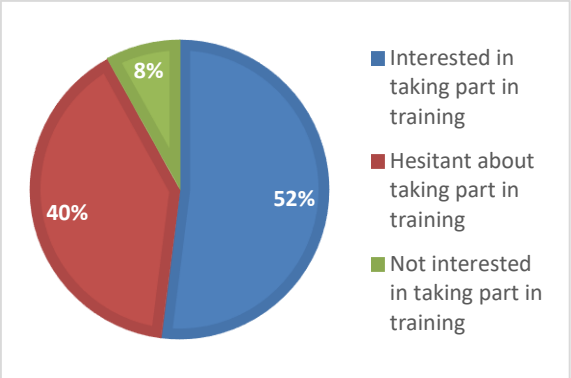

Figure 9. Additional AI Training for MSMEs

The obstacles experienced by respondents resulted in the need for additional training to improve MSMEs' abilities and knowledge in using AI for business development. As many as 52% of respondents were interested in taking AI training because they felt it was necessary to keep up with current technological developments if their business wanted to survive in this era of very rapid development of technology and AI.

4.6 Category 6 (Expectations for AI in the Future)

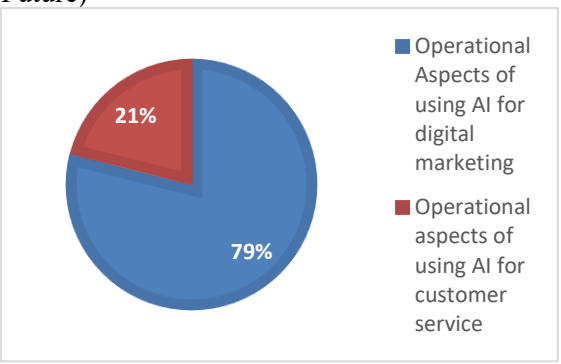

Figure 10. Expectations of using AI from operational aspects

79 respondents stated that they had hopes of being able to use AI, especially in terms of digital marketing, seeing the rapidly developing capabilities of today's technology, while 21 others had hopes of being able to use AI to improve services to their customers.

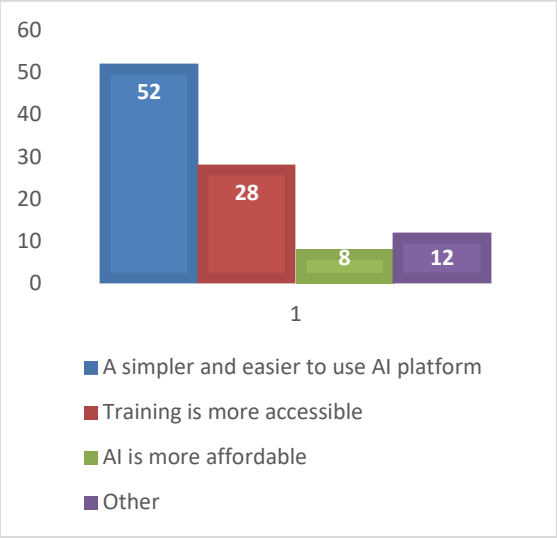

Figure 11. Respondents' expectations of AI

Based on Figure 10 above, it can be concluded that respondents hope for an AI platform that is simpler and easier to use so that more and more MSMEs can use AI for their business operations. Easy access to training is also an opportunity for MSME players to increase their knowledge and abilities in running a business. In table 2 below are the results of an analysis of MSME players' perceptions of the use of AI in their business based on 6 categories, namely:

Table 2. Percentage of questionnaire results on perceptions of MSME players regarding the use of ai in business

No	Category	Results
1	MSME activities	- 60% of MSME players run FnB (Foods and Beverages) businesses - 40% of MSMEs have only been in business for around 1-3 years
2	Level of Understanding and Use of AI	- 32% or 32 respondents use AI to run their business - 62% or 20 out of 32 respondents use AI for sales data analysis (ChatGPT, Gemini AI, Julius AI, etc.)
3	Perceptions of the Use of AI	- 75% or 24 out of 32 respondents said it was easy to use AI for business management - 84% or 27 out of 32 respondents stated that the costs incurred to use AI were still affordable - 81% or 26 out of 32 respondents felt that data security was maintained when operating AI
4	Perceived Benefits of Using AI	- The majority of respondents, namely around 88% or 28 out of 32 respondents felt that AI speeds up decision making
5	Obstacles in Using AI	- The majority of respondents feel that they still have difficulty using AI due to a lack of understanding of current technology.
6	Expectations for AI in the Future	- The biggest hope of MSME players for AI is that there is an AI platform that is simpler and easier to use so that they can use AI for digital marketing. - As many as 52% of respondents were interested in conducting further training regarding understanding AI for business development, while 40% were still unsure and 8% were not interested.

5. CONCLUSION

As many as 68 MSME players have not used AI in their business processes, so the level of understanding they have is still minimal regarding AI technology and there are still many business actors who are not familiar with this technology. This shows the need to increase technological literacy among small and medium businesses, especially in the West Java area. Lack of understanding of technology as an obstacle means that AI adoption is still not able to run optimally. Even though the number of respondents who use AI in business processes is still minimal, there are 32 respondents, respondents stated that AI helps them to increase operational efficiency, especially in increasing data accuracy, increasing speed of customer service, and automating business processes. The analysis results show a positive correlation between AI adoption and increased operational efficiency. Business actors who use AI can save time and costs more than those who do not use this technology. Analysis of the technology acceptance scale shows that the majority of MSMEs have a positive attitude towards the use of AI, although there is a need for further support, such as training and access to more affordable solutions (52 respondents are interested in taking additional training).

Based on this explanation, it can be concluded that the use of AI in business processes for MSMEs, especially in the West Java area, is still minimal due to a lack of knowledge

regarding AI technology, so it is necessary to provide training and outreach programs for MSMEs by the government and business associations to increase literacy. AI among MSME players; It is also hoped that more affordable access, such as an AI platform that is easier and cheaper, can be realized by technology providers so that MSME players can easily implement AI technology to meet the needs of MSMEs; and support is also needed in improving technological infrastructure for MSMEs to accelerate the implementation of AI. This research provides a comprehensive picture of the perceptions and challenges faced by MSMEs regarding the use of AI. These results can be the basis for policy and strategy decisions to accelerate the digital transformation of the MSME sector in the future.

REFERENCES

Ardiansyah H, Siswadi. (2022). Pengaruh Model Pembelajaran Two Stay-Two Stray Terhadap Kreativitas Belajar Siswa Pada Pokok Bahasan Eksponen Kelas X IPA. *Jurnal Al Ulum LPPM Universitas Al Washliyah Medan*, *X*, 46–53. Volume 10 Nomor 1, Tahun 2022. ISSN 2655-9862 (Media Online)

Davenport, T., & Ronanki, R. (2018). Artificial Intelligence For The Real World. *Harvard Business Review*, *96*(1), 108–116.

Fahmi, S., Tinggi, S., Ekonomi, I., & Malang, K. (2024). Pemanfaatan Teknologi Ai Untuk Menunjang Pemasaran Produk Umkm Di Kota Malang. *BERDAYA EKONOMI : Jurnal Pengabdian Masyarakat*, *2*(2), 91–103. https://www.jurnal.stiekma.ac.id/index.php/PkM/article/view/208

Fandriansyah, M. A. (2022). Pemanfaatan Market Place Grabfood & Gofood Dalam Peningkatan Penjualan Pada Umkm Food And Beverages Mao-Mao Cirebon. *Jurnal Ekonomi, Bisnis, Dan Akuntansi (Jeba)*, 11–18.

Ganesa, Egen, Catur P Putri, Evi Nashriyah, A. H. A. (2024). *Pengaruh Pertumbuhan Umkm Terhadap Tingkat Pengangguran Di Jakarta Pusat Pada Usaha " Mie Gacoan ."* *2*(2), 244–254.

Guntara, R. G. (2022). Indonesian Journal of Digital Business A B S T R A K Informasi Artikel. *Indonesian Journal of Digital Business*, *2*(1), 9–14.

Kar, S. (2023). Impact of Artificial Intelligence on Digital Marketing. *Interantional Journal of Scientific Research in Engineering and Management*, *07*(07). https://doi.org/10.55041/ijsrem25001

Kementerian Koprasi dan UKM. (2022). Laporan Tahunan UMKM Indonesia. *Jakarta: Kemenkop UKM*.

Kementerian Perindustrian. (2024). Kementerian Perindustrian Republik Indonesia. *Kemenperin Indonesia*, *13*, 1–136.

Putri, A. F. H., & Novani, S. (2024). *Improvizing West Java MSMEs Using Quality Service Gaps Model*. *7*(1), 132–143. https://doi.org/10.54268/baskara.v7i1.24376

Schatsky, D., Muraskin, C., & Gurumurthy, R. (2017). Cognitive Technologies The real opportunities for business. *Deloitte Insights*, *16*, 17. https://dupress.deloitte.com/dup-us-en/deloitte-review/issue-16/cognitive-technologies-business-applications.html#endnote-15

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly: Management Information Systems*, *27*(3), 425–478. https://doi.org/10.2307/30036540