

Leveraging Artificial Intelligence to Enhance Market Intelligence for MSMEs in Bekasi, Indonesia: Challenges and Opportunities

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ABSTRACT

LEVERAGING ARTIFICIAL INTELLIGENCE TO ENHANCE MARKET INTELLIGENCE FOR MSMEs IN BEKASI, INDONESIA: CHALLENGES AND OPPORTUNITIES. This study examines the role of Artificial Intelligence (AI) in enhancing market intelligence among Micro, Small, and Medium Enterprises (MSMEs) in Bekasi Regency, West Java, Indonesia, within the context of digital transformation. Using a descriptive qualitative approach, data were collected through literature review, secondary data, and field observations from the Institution Collaboration for International Community Service 2026. The findings reveal a significant shift from intuition-based decision-making toward data-driven approaches, where AI enables MSMEs to analyze consumer behavior, predict market trends, and optimize digital marketing strategies. Furthermore, international collaboration within community service activities plays a crucial role in facilitating knowledge transfer and accelerating AI internalization, contributing to the development of digital awareness and strategic thinking among MSME actors. However, the study also identifies a substantial gap between AI potential and its actual implementation, driven by low digital literacy, limited technological access, and insufficient understanding of AI integration in daily business processes. These challenges highlight the need for a comprehensive ecosystem approach that includes policy support, continuous training, and infrastructure development. The study contributes to the literature by integrating theoretical perspectives with empirical findings, offering insights into the opportunities and challenges of AI adoption in MSMEs within developing regions.

Keywords: Artificial Intelligence; Market Intelligence; MSMEs; Digital Transformation.

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INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) constitute the backbone of Indonesia's economy, contributing more than 60% to the Gross Domestic Product (GDP) and absorbing over 97% of the national workforce (Sunaryono, 2024). This substantial contribution highlights the critical role of MSMEs in sustaining economic growth,

reducing unemployment, and fostering inclusive development in both urban and rural areas. Their flexibility and resilience make them key actors in maintaining economic stability, particularly during periods of global crises, economic downturns, and structural disruptions (Khurana et al., 2022). However, despite their dominant presence in the national economic structure, MSMEs have not yet fully achieved proportional improvements in innovation capacity and technology-driven competitiveness. This imbalance suggests that while MSMEs are economically significant, they remain vulnerable to increasing global competition and technological disruption (Tsakalerou et al., 2025).

Empirically, MSMEs in Indonesia continue to face a range of structural constraints that limit their ability to scale and compete effectively in the digital era such as These constraints include limited access to formal financing, low levels of digital literacy among business owners, and inadequate technological infrastructure, particularly in semi-urban and rural regions (Widyastuti et al., 2023). Consequently, many MSMEs continue to rely on traditional business models characterized by manual processes and limited data utilization. This condition prevents them from fully capitalizing on the opportunities presented by the rapidly expanding digital economy, including e-commerce, digital marketing, and platform-based business ecosystems (Wirdiyanti et al., 2023). Consequently, a significant gap persists between the substantial economic contributions of MSMEs and their relatively low levels of technological adaptability and innovation capacity.

Simultaneously, the rapid advancement of the digital economy and the emergence of Industry 4.0 demand that MSMEs adopt data-driven technologies to remain competitive. The increasing reliance on digital platforms, combined with shifts in consumer behavior toward online, personalized, and data-centric interactions, requires businesses to leverage technologies such as artificial intelligence (AI) (Lu et al., 2022; Wei and Pardo, 2022). This transformation is not merely optional it has become a strategic necessity for survival and growth in modern markets. However, many MSMEs lack the necessary skills, resources, and awareness to effectively utilize data as a strategic asset. This limitation hinders their ability to generate insights that could support competitive advantages and market responsiveness.

Artificial Intelligence (AI) offers considerable potential for MSMEs to enhance operational efficiency, improve customer engagement, and enable sophisticated decision-making processes. Through capabilities such as machine learning, predictive analytics, and natural language processing, AI allows businesses to process large volumes of data and extract meaningful patterns (Drydakis, 2022). In the context of market intelligence, AI plays a crucial role in transforming raw and unstructured data into actionable insights that can inform strategic decision making. This enables MSMEs to better understand customer needs, anticipate market trends and optimize their marketing strategies (Wei & Pardo, 2022). Consequently, AI can serve as a powerful tool for strengthening the competitiveness of MSMEs in increasingly dynamic markets.

Despite these opportunities, AI implementation among MSMEs in Indonesia remains limited and unevenly distributed. Several barriers hinder adoption, including financial constraints that limit investment in digital tools, insufficient technological capabilities among business actors, and the absence of a supportive digital ecosystem (Trinugroho et al., 2022). These challenges are further compounded by limited access to

training and mentoring programs that facilitate technology adoption. Consequently, a clear gap emerges between the potential benefits of AI technologies and the actual capacity of MSMEs to adopt and utilize them effectively. This gap not only slows down digital transformation but also risks widening the digital divide among businesses.

From a theoretical perspective, most existing studies have relied on established frameworks such as the *Technology Acceptance Model* (TAM), *Diffusion of Innovation* (DOI), and *Resource-Based View* (RBV) to explain technology adoption among MSMEs (Loo et al., 2023; Peñarroya-Farell et al., 2025). While these frameworks provide valuable insights into adoption behavior, they often focus on general technology acceptance rather than the specific integration of AI into market intelligence processes. In particular, there is limited research on how AI can be operationalized as a strategic tool to enhance market intelligence in localized MSME contexts (Ayinaddis, 2025). This theoretical gap highlights the need for more context-specific and application-oriented research. Therefore, the integration of AI-based market intelligence within local MSMEs remains an underexplored but critical research area.

Bekasi Regency, one of Indonesia's largest industrial hubs, presents a unique context for examining the intersection between industrial development and MSME digital transformation. The region hosts numerous large-scale industries and multinational corporations, creating a dynamic economic environment with significant opportunities for local MSMEs to grow. However, a noticeable disparity persists between the technological advancement of large industries and the relatively limited capabilities of local MSMEs. This disparity reflects the structural inequalities in access to resources, knowledge, and innovation ecosystems. Consequently, there is a strong need to investigate how AI can be effectively leveraged to enhance MSMEs' market intelligence within this localized industrial context.

Previous studies have demonstrated that the adoption of AI by MSMEs can significantly improve operational efficiency, innovation capacity, and business competitiveness. AI play a critical role in enabling marketing personalization, analyzing consumer behavior, and optimizing supply chain management (Wei & Pardo, 2022). These findings suggest that AI has transformative potential across multiple dimensions of business operations. However, the extent to which these benefits are realized depends on the readiness and capability of MSMEs to adopt such technologies.

The growing body of literature on AI adoption has primarily focused on general business performance outcomes and technological adoption factors. Limited attention has been given to the specific role of AI in developing market intelligence capabilities within MSMEs, particularly in localized and community-based contexts. Few studies have examined the integration of AI within community service frameworks such as community service (Wei & Pardo, 2022; Sánchez et al., 2025). Therefore, the novelty of this study lies in the integration of AI, market intelligence, and community empowerment through a community service approach in Bekasi Regency. This approach addresses a significant gap in international academic literature and provides practical insights into real-world implementation.

This study aims to analyze how the utilization of Artificial Intelligence can enhance the market intelligence capabilities of MSMEs in Bekasi Regency while identifying the challenges and opportunities associated with its implementation. Th ise

study adopts a Community Service approach that emphasizes empowerment, capacity building, and technological knowledge transfer. By focusing on both opportunities and constraints, this study provides a comprehensive understanding of AI adoption in a localized context. This objective aligns with the broader goal of supporting MSMEs in navigating digital transformation. Therefore, this study contributes to both academic discourse and practical development initiatives.

This study argues that AI serves as a strategic enabler to enhance MSMEs' market intelligence capabilities, particularly in understanding complex and data-driven market dynamics. By leveraging AI technologies, MSMEs can transition from intuition-based decision-making processes to more systematic and analytical approaches (Abrokwah-Larbi, 2023; Le Dinh et al., 2025). This transformation enables more accurate forecasting, targeted marketing, and efficient resource allocation. Consequently, AI strengthens the ability of MSMEs to compete in increasingly data-driven markets. Thus, the adoption of AI represents a critical pathway toward sustainable business development.

This study posits that the successful implementation of AI in MSMEs is not determined solely by technological factors but also by social, institutional, and human resource capacities. Organizational readiness, digital literacy, and access to support systems play crucial roles in shaping adoption outcomes (Cimino et al., 2025; Amanollahnejad et al., 2026). In this context, the community service approach serves as an effective bridging mechanism to address the gap between technological advancement and the practical needs of MSMEs. By facilitating knowledge transfer and hands-on learning, community service programs enhance the absorptive capacity of business actors. Therefore, a holistic approach is required to ensure the successful integration of AI.

This study holds significant importance within the context of Community Service as it directly contributes to strengthening MSMEs' capacity to adapt to the digital era. By incorporating AI-based approaches, community service activities move beyond traditional knowledge dissemination to become transformative interventions that drive significant change. These activities enable MSMEs to become more adaptive, innovative, and competitive in both local and global markets. Moreover, this study provides insights that can inform policy development and institutional support mechanisms. Ultimately, this study contributes to inclusive and sustainable local economic development.

METHOD

This study employs a descriptive qualitative research approach to explore how Artificial Intelligence (AI) can be leveraged to enhance market intelligence among *Micro, Small, and Medium Enterprises* (MSMEs) in Bekasi Regency, West Java, Indonesia. A qualitative approach is particularly appropriate as it enables an in-depth understanding of complex socio-technical phenomena, including the adoption of AI, digital literacy challenges, and market intelligence practices within real-world contexts (Ayinaddis, 2025; Sánchez et al., 2025). The descriptive design systematically captures and interprets empirical realities without manipulating variables, allowing researchers to identify patterns, challenges, and opportunities in AI implementation

among MSMEs (Villamin et al., 2025). This approach aligns with the objective of examining both technological and socio economic dimensions within the framework of Community Service activities.

Data were collected through multiple qualitative techniques to ensure richness and triangulation, including in-depth interviews, participant observations, and document analyses (Chand, 2025). The primary data sources consisted of MSME actors participating in the *Institution Collaboration for International Community Service 2026* program, particularly those involved in the “AI-Based Market Intelligence for Local MSMEs in Bekasi” initiative. Informants were selected using purposive sampling, focusing on MSME owners and managers who actively engaged in community service activities and demonstrated varying levels of digital readiness (Ahmad & Wilkins, 2025). In addition, observational data were obtained during training sessions and mentoring activities conducted on April 21, 2026, at Setiadarma Village Hall. Secondary data were gathered from program reports, policy documents, and relevant institutional records. This multi-source data collection enhances the credibility and validity of our findings.

Data analysis was conducted using an interactive model of qualitative data analysis, consisting of data condensation, data display, and conclusion drawing/verification (Asipi et al., 2022). The analysis process involved coding and categorizing the data to identify key themes related to AI utilization, market intelligence practices, and barriers to adoption. To ensure trustworthiness, this study applied credibility, transferability, dependability, and confirmability criteria as suggested by Enworo (2023), including triangulation, member checking, and audit trails. Furthermore, the interpretation of the findings was guided by theoretical frameworks such as *Resource-Based View* (RBV) and Dynamic Capabilities to strengthen analytical rigor. Through this systematic approach, this study aims to generate contextually grounded insights that contribute to both academic discourse and the practical implementation of AI in MSMEs.

RESULTS AND DISCUSSION

RESULTS

Transformation of MSME Market Intelligence

The findings indicate that a significant transformation has occurred in how MSMEs in Bekasi Regency understand and respond to market dynamics, shifting from conventional approaches to Artificial Intelligence (AI)-based strategies. This transformation is reflected in the growing awareness among MSME actors of the importance of data as a foundation for rational and measurable business decision-making. During the *Institution Collaboration for International Community Service 2026*, held on April 21, 2026, at Setiadarma Village Hall, MSME participants were systematically introduced to AI-based market intelligence concepts. The program not only provided theoretical insights but also demonstrated practical applications relevant to local business needs. Therefore, this transformation represents a paradigm shift from intuition-based decision-making toward data-driven analytics in MSME business practices.

In the context of consumer behavior analysis, AI has been introduced as a tool capable of processing transactional and digital interaction data more comprehensively than conventional methods. This capability allows MSMEs to identify purchasing patterns, customer preferences, and market segmentation with more accuracy and flexibility. As a result, MSMEs can design more personalized marketing strategies tailored to specific consumer requirements. This development demonstrates that AI plays a critical role in enhancing the effectiveness of marketing communication and customer relationship management. Consequently, AI integration significantly improves the quality of MSMEs' market intelligence.

Furthermore, AI-based market trend prediction has emerged as a crucial component of this transformation, as MSME actors increasingly recognize the importance of analyzing historical data to forecast future market conditions. AI enables forecasting processes with higher accuracy by utilizing predictive algorithms that simultaneously process multiple variables. This approach reduces the reliance on subjective experience, which often lacks consistency and scalability. With enhanced predictive capabilities, MSMEs are better equipped to proactively plan their business strategies and adapt to changing market conditions. Thus, AI functions as a strategic tool for strengthening business resilience.

The presentations delivered by keynote speakers, including Abdisamad Abdirahman Omar and M. Yani Syafei, reinforced the conceptual understanding that AI can transform simple transactional data into high-value strategic insights. This perspective highlights that data should no longer be viewed merely as operational records but as strategic assets capable of generating competitive advantages. The interactive sessions demonstrated that the MSME participants began to appreciate the importance of systematic data management. This realization also encouraged them to consider digitalizing their business processes. Consequently, there was a notable increase in digital awareness among MSME actors in Indonesia.

The integration of AI into digital marketing optimization has become a key focus of the program, particularly through the introduction of data-driven personalization strategies. AI enables more precise targeting by analyzing consumer behavior in real time, thus improving marketing efficiency. This capability allows MSMEs to maximize their limited marketing resources while increasing conversion rates through more relevant communication strategies. Additionally, these approaches enhance customer engagement by delivering tailored content and offers. Therefore, AI contributes significantly to improving the overall marketing performance of MSMEs.

The direct interaction between participants and speakers revealed that MSMEs' understanding of AI extended beyond theoretical knowledge and evolved into practical and applicable insights. The participants actively engaged in discussions and asked questions related to AI implementation in their respective businesses. This indicates a high level of interest and readiness to adopt new technology. Furthermore, an interactive learning environment facilitate a deeper comprehension of complex concepts. As a result, knowledge transfer occurred effectively and contextually.

The findings demonstrate that AI-based market intelligence has begun to be internalized within MSME business practices at the local level, although it is still in its early stages. This transformation reflects the substantial potential for future digital capacity development among MSMEs. With structured support through programs such

as community service, the technology adoption process can be accelerated systematically. This indicates that MSMEs are entering the initial phase of AI-driven digital transformation. Therefore, AI integration represents a strategic step toward enhancing MSME competitiveness.

Knowledge Transfer and AI Internalization

The findings reveal that international collaboration within the community service program plays a crucial role in accelerating knowledge transfer related to AI utilization among MSMEs. The presence of international academics and researchers provided global perspectives that enriched MSMEs' understanding of AI's potential applications of AI. These perspectives enable MSMEs to benchmark their practices against those implemented in other developing countries with similar economic characteristics. This exposure broadened participants' strategic outlook on technology adoption. Therefore, international collaboration is a key driver of the learning process.

Abdisamad Abdirahman Omar provided valuable insights into how AI has been utilized to enhance market intelligence in various developing countries. His presentation offered relevant comparative examples that helped MSMEs in Bekasi to contextualize their position within the global digital economy. This exposure also reduced participants' perception of the complexity of AI technologies. As a result, MSMEs have developed a more optimistic perspective on AI adoption. Thus, knowledge transfer acted as a catalyst for technological transformation.

Yani Syafei delivered a localized perspective by linking AI concepts to the specific needs and characteristics of MSMEs in Bekasi. This approach effectively bridges the gap between global theory and local practice. The contextualization of AI applications made the material more accessible and relevant for the participants. Consequently, the learning process became more effective and impactful. This demonstrates the importance of integrating global and local perspectives into technology adoption.

The discussions during the program indicated that MSME actors began to recognize the strategic importance of data as an economic asset for their businesses. They realized that previously overlooked data could be transformed into valuable business insights. AI plays a crucial role in converting such data into actionable information that supports decision-making processes. This shift reflects a significant change in how MSMEs perceive and utilize data. Therefore, cognitive internalization of AI concepts was clearly evident.

The internalization process is further reflected in the growing interest of MSMEs in adopting digital technologies within their business operations. This indicates that learning outcomes extend beyond theoretical understanding to behavioral transformation. MSME actors began to consider integrating digital tools into their daily activities. These behavioral changes are essential indicators of successful digital transformation. Thus, AI internalization occurred progressively.

International collaboration also fostered a conducive learning environment through cross-country knowledge exchange and idea sharing. This environment supports innovation and encourages technology adoption. The interaction between academics and practitioners creates a synergistic relationship that enhances learning effectiveness. Consequently, the process became more dynamic and engaging. This highlights the importance of collaborative ecosystems in digital transformation.

The findings confirm that knowledge transfer through international collaboration significantly contributes to the internalization of AI among MSMEs. This process serves as a foundation for building digital capabilities among business actors. Therefore, global collaboration is a critical element in AI-driven market intelligence transformation. This strengthens the relevance of international community service initiatives.

The Gap between AI Potential and Implementation

The significant opportunities identified, the findings also reveal a substantial gap between the potential and actual implementation of AI among MSMEs in Bekasi Regency. While MSME actors showed strong enthusiasm toward AI adoption, they lacked sufficient capacity to implement it effectively. This condition reflects a discrepancy between conceptual understanding and practical capabilities. This gap presents a major challenge to the digital transformation of MSMEs. Therefore, the implementation of AI remains constrained by real-world limitations.

One of the primary challenges identified is the low digital literacy among MSME actors. Many business owners lack fundamental knowledge of digital technologies, let alone advanced systems such as artificial intelligence (AI). This limitation hinders their ability to fully understand and utilize AI tools in business operations. Additionally, the absence of continuous training exacerbates this issue. Thus, improving digital literacy is an urgent priority.

Another significant barrier is the limited access to digital infrastructure and technology. Not all MSMEs have access to adequate digital devices or stable Internet connectivity. This restricts their ability to adopt AI-based solutions effectively. Moreover, the cost of technology investment remains a major concern for small firms. Therefore, structural inequalities in technology access continue to persist.

The lack of understanding of AI integration into daily business processes also presents a critical challenge. Many MSME actors are unfamiliar with practical methods for incorporating AI into their operational workflows. This indicates the need for more application-oriented training programs. Continuous mentoring and technical assistance are essential for the successful implementation of this program. Thus, knowledge transfer must be accompanied by practical guidance.

This phenomenon clearly illustrates the gap between AI's potential as a market intelligence tool and the actual capacity to adopt it. This highlights a key issue in the broader discourse on digital transformation. This gap also reflects the need for stronger policy support and digital ecosystem development. Therefore, a multidimensional approach is required to address these issues.



Figure 1



Figure 2

This gap opens up analytical opportunities to explore the factors influencing the success or failure of AI implementation. Factors such as organizational readiness, government support, and resource accessibility play critical roles. This indicates that AI adoption is not merely a technical issue but also a social and institutional concern. Therefore, understanding these complexities is essential for effective implementation.

The existence of these challenges reinforces the relevance of this study in examining both the opportunities and barriers to AI utilization in MSME market intelligence. These findings provide a strong empirical foundation for further research. They also offer insights into developing strategic interventions to support MSMEs. Thus, this study contributes significantly to both academic and policy discussions on the subject.



Figure 3



Figure 4

Table of Research Findings

No	Category	Key Findings	Description	Implications
1	Transformation	Shift to AI-based approach	From intuition to data-driven decision-making	Improved decision accuracy
2	Consumer Behavior	AI-based analysis	Identification of patterns and preferences	More effective marketing
3	Market Prediction	AI forecasting	Trend analysis using predictive models	Proactive strategy development

4	Data Utilization	Data as an asset	Transformation into strategic insights	Increased competitiveness
5	Knowledge Transfer	Global collaboration	International perspectives and learning	Accelerated technology adoption
6	Internalization	Mindset change	Increased digital awareness	MSME transformation
7	Implementation Gap	AI adoption gap	Difference between potential and practice	Need for assistance
8	Digital Literacy	Low capability	Limited technological understanding	Training required
9	Technology Access	Limited infrastructure	Lack of tools and internet access	Policy support needed
10	AI Integration	Not optimal	Lack of practical implementation knowledge	Development of applied models

DISCUSSION

Transformation of MSME Market Intelligence

The research findings indicate that the transformation of market intelligence among MSMEs in Bekasi Regency is not merely an empirical phenomenon but can also be theoretically explained through the *Resource-Based View* (RBV) and Dynamic Capabilities frameworks (Tarihóran et al., 2023). Based on triangulated data from observations of community service activities, program documentation, and direct interactions between participants and speakers, a clear shift can be observed from intuition-based decision-making to data-driven approaches. This is consistent with the argument that competitive advantage stems from the ability to manage strategic resources, including data. In this context, *Artificial Intelligence* (AI) functions as a tool that transforms data into high-value resources. Therefore, the transformation observed is supported by strong empirical evidence and theoretical foundations (Peretz-Andersson et al., 2024).

Sánchez-Rodríguez et al. (2025) suggests that AI plays a crucial role in enhancing the quality of market intelligence through more advanced analytical capabilities. Field findings demonstrating the use of AI for consumer behavior analysis and market trend prediction reinforce this concept are also available. Triangulation between observational data and existing literature shows consistency in that AI significantly improves decision-making accuracy. This is also supported by Ayoub and Sopuru (2026), who emphasized the importance of data-driven decision-making in modern organizations. Thus, the integration of AI among MSMEs in Bekasi reflects the adoption of global business practices.

From the perspective of Dynamic Capabilities, this transformation also reflects the ability of MSMEs to sense, seize, and transform in response to market opportunities (Saeedikiya et al., 2024). Through community service activities, MSME actors have

begun to identify market changes more rapidly using data. This indicates an increase in adaptive capacity (Engelmann, 2024). Data triangulation showed that this understanding was not only conceptual but had also begun to be applied in practice. Therefore, AI acts as a catalyst for the development of dynamic capabilities.

The keynote speakers' presentations, which emphasized the transformation of data into strategic insights, can also be explained through the knowledge-based view. AI enables the conversion of data into actionable knowledge (Cheng et al., 2026). These findings are reinforced by participant interactions that demonstrate an increased understanding of the value of data. This indicates the internalization of knowledge management concepts by the employees. Therefore, AI functions not only as a technological tool but also as an instrument for organizational learning.

The integration of AI in digital marketing is relevant to theories of customer engagement and personalization (Acatrinei et al., 2025). Data triangulation shows that MSME actors are beginning to understand the importance of data-driven segmentation. This enhances marketing effectiveness. Consequently, AI contributes to improving customer relationships.

This transformation is still at an early stage, and therefore requires strengthening of the digital ecosystem. Theoretical dialogue with Held et al. (2026) indicates that digital transformation requires supportive infrastructure and adaptive business models. Research findings show that although understanding has improved, implementation remains limited. Thus, this transformation is gradual. This discussion demonstrates that the transformation of MSME market intelligence through AI is complex and multidimensional. Data triangulation and theoretical dialogue strengthened the validity of the findings. Therefore, this study contributes to bridging the gap between theory and practice.

Knowledge Transfer and AI Internalization

The findings indicate that the process of knowledge transfer through international collaboration within the community service program is not merely informative but also transformative in shaping the cognitive and strategic capacities of MSME actors. Based on data triangulation from program observations, documentation, and direct interactions between participants and speakers, MSMEs demonstrated a significant improvement in their understanding of *Artificial Intelligence* (AI). This process can be explained through the knowledge transfer theory, which emphasizes that effective learning occurs through intensive and sustained social interaction (Held et al., 2026). The presence of international academics introduced new epistemic dimensions that expanded the cognitive horizons of MSME actors. Therefore, international collaboration is a strategic medium for accelerating the diffusion of technology-based knowledge.

Theoretical dialogue with the concept of absorptive capacity Bedoya-Villa et al. (2023) suggests that the ability to absorb new knowledge depends heavily on their prior knowledge base and the intensity of learning interactions. The findings show that MSMEs, which initially had limited technological understanding, gradually developed the ability to comprehend AI concepts after participating in the community service program. This indicates that the learning process successfully enhanced their absorption capacity. Data triangulation further confirmed that this understanding

evolved through two-way interactive dialogue rather than one-way knowledge transmission. Consequently, the program not only increased knowledge but also strengthened the technological adaptability of the participants.

The integration of global and local perspectives within the program can be analyzed through the lens of glocalization, in which global knowledge is adapted to specific local contexts. Abdisamad Abdirahman Omar provided global insights into AI practices in developing countries, while M. Yani Syafei contextualized these insights within the realities of MSMEs in Bekasi. This combination resulted in a more applicable and relevant understanding for the participants. Triangulated data indicate that MSMEs found it easier to grasp AI concepts when linked to real-world practices aligned with their experiences. Thus, a glocal approach becomes a key determinant of effective knowledge transfer (Sievers et al., n.d.).

The shift in MSMEs' perception of data as a strategic asset can be explained by the concept of a digital mindset (Hassan et al., 2024). Prior to the program, most MSMEs viewed data as mere administrative records; however, after participation, they began to recognize its strategic value in decision-making processes. AI plays a critical role in transforming such data into actionable and economically valuable information (Alghamdi & Al-Baity, 2022). Triangulated evidence from interviews and observations confirmed a significant cognitive shift among the participants. Therefore, AI internalization occurs not only at the technical level but also at the mindset transformation level.

The internalization process also reflects behavioral changes, which can be explained through Kolbs (1984) experiential learning theory, where learning is achieved through direct experience (Villarroel Henríquez et al., 2025). Active interaction between participants and speakers during community service activities enabled MSMEs to learn through practice, discussion and reflection. This strengthened their understanding of AI concepts in a more practical manner. Triangulation findings show that participants not only understood the concepts but also began to consider their implementation in business contexts. Thus, experiential learning is a key factor in technology internalization.

International collaboration can also be viewed as part of an innovation ecosystem that supports technology adoption processes (Faiz et al., 2024). This ecosystem involves interactions among academics, practitioners, and institutions that mutually reinforce each other. Triangulated data indicate that the success of the community service program was influenced not only by the content delivered but also by the quality of interaction among stakeholders. These interactions create a conducive environment for innovation and learning. Therefore, cross-country collaboration strengthens the learning ecosystem of MSMEs (Marinelli et al., 2024).

This discussion demonstrates that the internalization of AI among MSMEs is the result of a collective learning process involving multiple actors and contexts. Theoretical dialogue and empirical findings consistently show that effective knowledge transfer requires interactive, contextual and collaborative approaches (Audretsch et al., 2023). Data triangulation reinforces the validity of these findings. Thus, international collaboration accelerates technology adoption and builds long-term digital capacity among MSMEs in facing digital transformation.

The Gap between AI Potential and Implementation

The findings reveal a significant gap between the vast potential of Artificial Intelligence (AI) as a market intelligence tool and the actual capacity of MSMEs to implement it effectively (Abdul Wahab & Radmehr, 2024). Based on triangulated data from observations, interactive discussions, and program documentation, it is evident that although MSMEs show high enthusiasm for AI adoption, they still encounter substantial challenges in its application. This phenomenon can be explained by the digital divide theory, which highlights disparities in access to and capabilities in utilizing technology. These disparities are not only technical but also encompass social and economic dimensions (Muhammad et al., 2025). Therefore, the gap between potential and implementation represents a complex structural problem.

The low level of digital literacy identified in this study can be analyzed through human capital theory, which emphasizes the importance of skills and knowledge in enhancing productivity (Shatila et al., 2025). Many MSME actors lack basic competencies in digital technology, making it difficult for them to understand and apply AI in their business processes (Oldemeyer et al., 2025). Data triangulation indicates that short-term training programs are insufficient to address these issues. This suggests that capacity development must be continuous and sustainable. Thus, investment in human capital is a critical factor in MSME digital transformation.

Limited access to digital infrastructure and technology further exacerbates gaps in education. Theoretical dialogue with World Bank (2022) findings emphasizes that access to the Internet, digital devices, and technological platforms is a fundamental prerequisite for AI adoption (Cirera et al., 2022). Empirical findings show that many MSMEs lack adequate access to these resources. Triangulated data highlight that economic constraints are the primary barriers to technological investment. Therefore, this gap is systemic in nature and requires comprehensive policy interventions.

The lack of understanding regarding AI integration into daily business processes reflects an implementation gap as described in the diffusion of innovation theory (Sánchez et al., 2025). MSMEs often understand AI conceptually but struggle to apply it in practice. Triangulated findings indicate that MSMEs require not only training but also continuous technical assistance and mentoring. This underscores the importance of implementation-oriented approaches in community service programs. Therefore, bridging the gap between knowledge and practice is essential.

This gap can also be analyzed through institutional theory, which emphasizes the role of external environments in shaping organizational behavior (Balzano et al., 2024). The lack of supportive policies, regulations, and incentives is a barrier to AI adoption among MSMEs. Triangulated data confirm that MSMEs require external support to implement technology effectively. This indicates that digital transformation cannot be achieved individually and must be supported collectively. Thus, the institutional roles are critically important.

From an organizational perspective, internal readiness is another key factor influencing AI adoption, as explained by the dynamic capabilities theory (Arroyabe et al., 2024). The findings reveal that most MSMEs lack sufficient capabilities to integrate new technologies into their operations. Triangulated data suggest that organizational transformation requires time, learning, and adaptation. This highlights that AI

adoption is an evolutionary process rather than an instantaneous one. Therefore, a phased and strategic approach is necessary for this purpose.

This gap reinforces the relevance of this study in both academic and practical contexts. Theoretical dialogue and empirical evidence demonstrate that technology adoption is a multidimensional process involving technical, social, economic, and institutional factors. Data triangulation confirmed the complexity of this phenomenon. Therefore, this study significantly contributes to understanding the challenges of MSME digital transformation in developing countries such as Indonesia.

CONCLUSION

This study demonstrates that the utilization of Artificial Intelligence (AI) has driven a significant transformation in market intelligence practices among MSMEs in Bekasi Regency, although it remains at an early stage. This transformation is characterized by a paradigm shift from intuition-based decision-making to data-driven approaches, enabling business actors to understand consumer behavior and market dynamics more accurately and systematically. The integration of AI in consumer behavior analysis, market trend prediction, and digital marketing strategies highlights its substantial potential to enhance the quality of business decision making. Furthermore, the findings confirm that AI acts as an enabler in strengthening MSMEs' dynamic capabilities, particularly in responding to market changes adaptively and proactively.

This study reveals that knowledge transfer through international collaboration in Community Service activities plays a strategic role in accelerating AI internalization among MSMEs. Interactions between global and local academics not only enrich business actors' perspectives but also foster a shift in mindset regarding the importance of data as a strategic asset. The learning process, which is interactive, contextual, and experience-based, has proven effective in enhancing MSMEs' absorptive capacity for new technologies. Therefore, cross-country collaboration is a critical factor in building a learning ecosystem that supports AI-driven digital transformation.

The study also identifies a significant gap between the potential of AI and its actual implementation in MSMEs. This gap is driven by several factors, including low digital literacy levels, limited access to technology, and insufficient practical understanding of AI integration in business processes. Institutional factors such as the lack of policy support and digital infrastructure further hinder technology adoption. Therefore, AI-driven digital transformation among MSMEs requires not only technological intervention but also a multidimensional approach encompassing social, economic, and institutional aspects of the workforce. Hence, this study emphasizes that successful AI implementation depends on the overall readiness of the ecosystem.

SUGGESTIONS

Based on these findings, it is recommended that governments and policymakers strengthen the MSME digital ecosystem by providing more equitable access to technological infrastructure and implementing continuous digital literacy programs. Policy interventions should focus on offering incentives for MSMEs to adopt AI-based

technologies, including subsidies for digital tools and access to analytical platforms. Furthermore, training programs should be designed to be both theoretical and practical, enabling MSMEs to understand how to implement AI in their daily business activities. Thus, the gap between technological potential and practical implementation can be systematically reduced.

Higher education institutions and research organizations are encouraged to expand technology-based Community Service initiatives through collaborative and international approaches. Partnerships among academics, practitioners, and global stakeholders should be strengthened to enhance knowledge transfer and innovation. Community Service programs should also be designed with long-term mentoring models to ensure effective internalization of technology. Moreover, experiential learning approaches should continue to be developed to ensure that learning remains contextual and directly applicable to MSME practices. Thus, the role of academia as a driver of digital transformation can be maximized.

MSME actors are encouraged to develop internal organizational readiness for AI adoption in terms of human resources and organizational culture. They should increase their awareness of data as a strategic asset and begin integrating digital recording systems into their business operations. In addition, collaboration among MSMEs should be strengthened to facilitate the sharing of experiences and best practices in the utilization of technology. Through a gradual and adaptive approach, micro, small, and medium enterprises (MSMEs) can build the dynamic capabilities required to compete in the digital economy. Consequently, AI-based market intelligence transformation can become a sustainable strategy for enhancing MSME competitiveness at the local and global levels.

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