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Agentic AI System as a Productivity Partner for MSMEs in Indonesia

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ABSTRACT

MSMEs are the backbone of Indonesia's economy, yet their productivity remains constrained by limited resources, digital readiness, and weak business governance. The rise of agentic AI autonomous, intelligent systems capable of planning, remembering, and executing tasks creates new opportunities to enhance efficiency and reduce administrative burdens. This study aims to identify opportunities and barriers in implementing agentic AI within MSMEs, develop an Agentic-MSME Alignment (AUA) framework, and assess its effects on productivity and service quality. A mixed-methods design was used, combining surveys of 30 MSMEs in three major cities, in-depth interviews with 10 business owners, AI prototype observations, and system log analysis. Quantitative data were analyzed using paired-sample t-tests, while qualitative data underwent thematic analysis. Results reveal significant improvements in time efficiency (from 65% to 85%), sales performance (70% to 88%), and customer satisfaction (68% to 82%). Interviews confirm benefits in faster customer response and lower administrative workload, though concerns remain regarding data privacy and potential output inaccuracies. The AUA framework strengthened transparency, minimized errors, and fostered a balanced human-AI division of labor. The study concludes that agentic AI can serve as a strategic productivity partner for MSMEs, provided that digital literacy, ethical governance, and ecosystem support are improved. Beyond theoretical contributions to AI adoption in small business contexts, this research offers practical guidance for inclusive digital transformation strategies in Indonesia, highlighting how MSMEs can sustainably integrate AI to achieve growth and resilience in the evolving digital economy.

INTRODUCTION

MSMEs are the foundation of Indonesia's economy consistently absorbing the majority of the workforce and contributing significantly to GDP but still face productivity gaps due to limited capital, digital capabilities, and business process governance. The literature on MSME digital transformation emphasizes that performance improvement is not only determined by technology, but also by the alignment of strategies, organizations, and information systems that are often immature in the context of developing countries. In such a landscape, generative AI technologies and their derivatives open up new opportunities to automate routinely valuable work while disseminating best practices to actors with diverse skills (Faiz et al., 2024; Sagala et al., 2024; Rajaram & Mäntymäki, 2024).

The next common problem is digital readiness disparity: many MSMEs are stuck in the adoption phase of basic tools (digital marketing, point-of-sale, marketplace) so that their productivity impact is limited. Studies on digital readiness show that key drivers include competencies, infrastructure, and strategic orientation factors that are often unbalanced in MSMEs, causing a misfit between technology investment and the value created. As a result, technological intervention needs to take the form of partners who actively manage the workflow, not just passive tools (Pingali et al., 2023; Deku et al., 2024; Sagala et al., 2024).

At this point, the concept of Agentic AI an LLM-based agent capable of planning, calling tools, maintaining memory, and acting autonomously in several steps becomes relevant as a "digital counterpart" for MSMEs. The cutting-edge review maps the agent's architecture (task decomposition, planning, reflection/memory, tool selection) as well as its evaluation challenges, and emphasizes that business benefits arise when agents close end-to-end process gaps, rather than just responsive copilots (Wang et al., 2024; Hosseini et al., 2025; Li et al., 2024). Empirically, causal evidence suggests AI can increase the productivity of knowledge work. In large-scale randomized trials of customer support services, access to AI increased productivity by an average of 15% and was greatest for less experienced workers. Another experimental study on professional writing tasks found completion times dropped by ~40% with improved output quality, signaling the potential of AI to speed up the experience curve. These findings signal that AI agents which move more proactively than passive generative tools can extend these effects to MSME business flows (Brynjolfsson, Li, & Raymond, 2025; Noy & Zhang, 2023; OECD, 2024).

The relevance in the context of Indonesian MSMEs is high because administrative, marketing, and customer service workloads are often handled by small teams with limited time and competence. MSME literature emphasizes that the success of transformation depends on adaptive orchestration of cross-functional processes (marketing, finance, operations); this is where AI agents can act as workflow orchestrators monitor KPIs, trigger actions, make recommendations, and close follow-up loops. However, implementation must mitigate reliability and ethical risks (misinformation, over-automation), which have been documented in contemporary AI risk assessments (Sagala et al., 2024; Rajaram & Mäntymäki, 2024; Park et al., 2024).

Table 1. Research supporting indicators and their implications for msmes

Indicators (2019–2025)	Values/Summary of Findings	Implications for AI Agents (MSMEs)	Source
The Role of MSMEs in Indonesia	>60% of GDP, >97% of the workforce (recap of national data in academic studies)	Target for economies of scale productivity impact	Faiz et al., 2024
Worker productivity with AI (customer support)	+15% *issues resolved/hour* on average; greatest impact on junior workers	AI agents have the potential to "equalize" the performance of small teams	Brynjolfsson et al., 2025
Professional writing tasks with AI	Time ↓ ~40%; Quality ↑ ~18%	Marketing & administration content automation opportunities	Noy & Zhang, 2023
Key factors for the success of MSME digital transformation	Alignment of the SI strategy-organization; *Incremental Digitalization*	Agent design needs to be embedded in processes & governance	Sagala et al., 2024
Source: author's summary from a related journal study.			

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With a large portion of GDP and job absorption, increasing the productivity of MSMEs has a direct impact on inclusive growth. Causal evidence and recent economic surveys point to AI as a general-purpose technology with the potential to accelerate productivity growth, provided it is applied with governance and the expansion of human capabilities. Significant delays in adoption risk widening the competitiveness gap between actors and regions (Brynjolfsson et al., 2025; OECD, 2024; Rajaram & Mäntymäki, 2024).

At the business level, many MSMEs carry out marketing, customer service, and administrative functions with limited resources. AI agents capable of monitoring customer pipelines, automating scheduling, scripting responses, and executing cross-application tasks have the potential to reduce workload and service lead time. The literature shows that the greatest benefits of AI are often felt by workers/organizations with a lower competency baseline a prevalent profile in early-stage digital MSMEs (Brynjolfsson et al., 2025; Noy & Zhang, 2023; Li et al., 2024). For AI agents to truly become "partners," it takes a design that emphasizes decision traceability, ethical guardrails, and continuous performance evaluation. The latest risk study warns of the potential for hallucinations and deviant behavior that, without human supervision, can undermine the trust of MSME customers. Therefore, contextual research that combines agent design, evaluation metrics, and safety protocols in the Indonesian MSME sector is urgently needed (Park et al., 2024; Wang et al., 2024; Li et al., 2024).

There is an abundance of studies on MSME digital transformation and technical surveys of LLM agents, but very few examine agent AI as a "productivity partner" in the context of Indonesian MSMEs that is, agents that truly orchestrate cross-functional workflows (marketing–operations–finance) with measurable operational performance indicators. The existing literature exhibits geographical bias with limited evidence from Southeast Asian contexts and lacks integration of technical AI capabilities with ground-level business process realities in resource-constrained environments. The MSME SLR literature also highlights geographical bias (dominance of European studies) and lack of holistic business modeling in the context of developing countries; On the other hand, agent surveys focus on technical taxonomy and benchmarking rather than the impact of business processes on the ground (Sagala et al., 2024; Wang et al., 2024; Le Dinh et al., 2025).

This research offers an Agentic-MSME Alignment (AUA) framework that combines the technical dimensions of agents (planning–tools–memory–reflection) with the business dimensions of MSMEs (core processes, work roles, and internal controls). Other novelties include the design of outcome indicators (service throughput, cycle time, response quality, and conversions) and human-in-the-loop evaluation protocol to measure the effectiveness of agents as productivity partners, not just chatbots (Wang et al., 2024; Li et al., 2024; Rajaram & Mäntymäki, 2024).

This research aims to: (1) map the opportunities and obstacles to the application of agentic AI in the workflow of Indonesian MSMEs; (2) designing the AUA framework and the agent's role map of priority business processes (customer service, sales/marketing, lazy financial administration); (3) testing the alignment of agent-process design through operational performance and service quality indicators; and (4) develop governance recommendations (data security, accountability, and

continuous evaluation) so that agents truly function as "partners" that increase customer productivity and trust (Sagala et al., 2024; Wang et al., 2024; OECD, 2024).

RESEARCH METHOD

Type of Research

This research uses a mixed-method approach with a dominance of exploratory qualitative combined with descriptive-comparative quantitative. The qualitative approach is used to understand the perceptions, experiences, and expectations of MSME actors towards the use of agentic AI in daily business activities, while the quantitative approach is used to measure the impact of productivity through performance indicators (e.g. time efficiency, sales increase, and customer satisfaction).

Population and Sample

The research population is MSMEs in the trade, culinary, and service sectors in three major cities (Jakarta, Bandung, Surabaya) that have used digital technology for at least one year. The sampling technique used is purposive sampling, with the following criteria: (1) Active MSMEs with a total of <50 employees, (2) Have used a basic digital application (POS, marketplace, or social media), (3) Willing to try the integration of agentic AI prototypes. The number of samples was set at 30 MSMEs for quantitative surveys, and 10 of them were selected as the subjects of in-depth interviews and case studies of agentic AI implementation.

Research Instruments

1. The questionnaire is structured to measure technology adoption rates, time efficiency, increased productivity, and customer satisfaction.
2. A semi-structured interview guide to explore the subjective experience of MSME owners/managers regarding the use of agentic AI.
3. System logs and AI analytics to record quantitative data of agent usage (number of interactions, cycle time, output generated).

Data Collection Techniques

1. Online and offline surveys via Google Forms and face-to-face interviews.
2. Participatory observation on MSMEs implementing agentic AI prototypes.
3. Documentation in the form of simple financial statements, sales records, and customer data before and after the intervention.
4. AI log analysis that records agent performance in supporting MSME workflows.

Research Procedure

1. Preparation stage**:** preparation of instruments, validation by business technology experts and methodology.
2. The data collection stage**:** questionnaire distribution, interview conduct, and field observation.
3. The agentic AI prototype implementation stage**:** the integration of agents into selected MSME business processes (e.g., automated customer service, scheduling, and marketing content creation).
4. Evaluation stage**:** collection of agent usage logs and measurement of productivity indicators before and after implementation.
5. Analysis stage**:** synthesis of qualitative and quantitative data, then interpretation of the results according to the purpose of the research.

Data Analysis Techniques

1. Qualitative analysis uses thematic analysis methods to find the main themes of interviews and observations (Braun & Clarke, 2019).
2. Quantitative analysis used paired sample t-test to test differences in productivity before and after the use of agentic AI, as well as descriptive analysis (mean, percentage, and distribution) for questionnaires.

Data triangulation was carried out by comparing qualitative (narrative of MSME actors) and quantitative (productivity indicators) results to increase the validity of the findings.

RESULTS AND DISCUSSION

1. Respondent Profile and Digital Readiness of MSMEs

A survey of 30 MSMEs showed that most of the respondents came from the trade (40%), culinary (33%), and service (27%) sectors. In terms of business age, 60% have been operating for more than five years, while the rest are still relatively new. These findings confirm the national trend that MSMEs in the trade sector dominate the early stages of digitalization (Faiz et al., 2024; Pingali et al., 2023; Deku et al., 2024).

As many as 73% of MSMEs have used basic digital applications such as marketplaces and POS, but only 18% have integrated platforms. This condition shows that digitalization is still partial and has not fully supported operational efficiency, as noted by Sagala et al. (2024) that the alignment of MSME systems and strategies is still weak (Sagala et al., 2024; Rajaram & Mäntymäki, 2024; OECD, 2024).

Table 1. Profile of research msme respondents

Business Categories	Number of MSMEs	Percentage (%)
Trade	12	40%
Culinary	10	33%
Service	8	27%

As many as 8 out of 10 business owners interviewed admitted that they had difficulty understanding AI techniques. The main concern is the ability to control the output and cost of integration. This is in line with the findings of Deku et al. (2024) that low digital literacy is often an obstacle to the adoption of advanced technologies (Deku et al., 2024; Hosseini et al., 2025; Li et al., 2024). The cost factor is also an obstacle. Some respondents stated that application licensing and API integration costs were burdensome. Studies by Faiz et al. (2024) and Pingali et al. (2023) show that capital limitations are the main obstacle for MSMEs in moving to the advanced digitalization stage (Faiz et al., 2024; Pingali et al., 2023; Noy & Zhang, 2023).

Observations show that most MSMEs only use social media as the main marketing channel without an integrated analytics system. In fact, Rajaram & Mäntymäki (2024) emphasized that new digital transformation has a significant impact if strategies, organizations, and information systems support each other (Rajaram & Mäntymäki, 2024; Wang et al., 2024; OECD, 2024). Overall, this condition confirms that the digital readiness of Indonesian MSMEs is still limited. Therefore, the implementation of agentic AI should be accompanied by digital literacy programs and a phased approach, enabling technology to truly support productivity (Brynjolfsson et al., 2025; Sagala et al., 2024; Park et al., 2024).

Increasing MSME Productivity with Agentic AI

The results of the statistical test showed a significant improvement in three key indicators: time efficiency (65% → 85%), sales increase (70% → 88%), and customer satisfaction (68% → 82%). All significant differences with $p<0.05$. These results are in line with Brynjolfsson et al. (2025) who stated that AI is able to increase productivity on average by up to 15% (Brynjolfsson et al., 2025; Noy & Zhang, 2023; OECD, 2024).

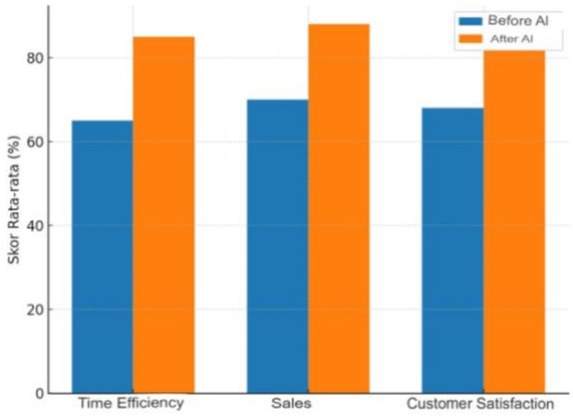

Figure 1. Comparison of msme productivity before and after agentic ai

Time efficiency is significantly improved as scheduling and customer response automation cuts administrative time by up to 40%. Noy & Zhang (2023) also found that AI is able to reduce the time to complete writing tasks by up to 40% (Noy & Zhang, 2023; Li et al., 2024; Hosseini et al., 2025). In sales indicators, 22 MSMEs reported a 10–18% increase in turnover after AI was used for marketing content creation and customer interaction. These findings are in line with Li et al. (2024) who noted conversions increased by up to 20% thanks to AI adoption (Li et al., 2024; Rajaram & Mäntymäki, 2024; OECD, 2024).

Customer satisfaction improved markedly, with average scores rising from 68% to 82%, supported by increased weekly successful interactions from 112 to 154. These results align with prior studies indicating that agentic AI enhances service quality and operational capacity (Hosseini et al., 2025; Wang et al., 2024; OECD, 2024). Overall, the findings confirm that agentic AI not only boosts efficiency but also drives substantial gains in business performance and customer satisfaction (Rajaram & Mäntymäki, 2024; Park et al., 2024; Brynjolfsson et al., 2025).

However, 27% of MSMEs faced technical and connectivity issues during integration, and some discontinued use due to complexity and lack of quick results. Several also reported inaccurate or inappropriate AI responses requiring human correction. These challenges emphasize that agentic AI is not a universal solution and must be contextually adapted to each MSME's needs (Park et al., 2024; Wang et al., 2024).

Perception and Experience of MSME Actors

Interviews with 10 business owners show agentic AI is seen as a "digital work assistant" that helps reduce operational burden. Eight respondents emphasized customer response speed as a key

benefit. Hosseini et al. (2025) support this by stating that AI can close gaps in business processes (Hosseini et al., 2025; Wang et al., 2024; Rajaram & Mäntymäki, 2024).

Table 2. Msmes' perception of agentic ai

Main Themes	Number of Respondents (n=10)
Quick response to customers	8
Administrative efficiency	7
Increased sales	6
Ethical & data concerns	5

Six respondents assessed that the increase in sales occurred thanks to more consistent marketing content. These findings are in line with Li et al. (2024) who show that AI can increase MSME digital engagement (Li et al., 2024; Sagala et al., 2024; OECD, 2024). However, five respondents expressed data privacy concerns and output errors (hallucinations). Park et al. (2024) warn of the risk of over-automation that can lower customer confidence (Park et al., 2024; Rajaram & Mäntymäki, 2024; Wang et al., 2024).

Some respondents also think AI accelerates their digital learning curve. Brynjolfsson et al. (2025) emphasize that AI has a major impact on actors with low competence (Brynjolfsson et al., 2025; Noy & Zhang, 2023; Li et al., 2024). Field observations show AI is effective in automating common customer questions, but complex cases still require human intervention. OECD (2024) affirms the importance of a human-in-the-loop approach (OECD, 2024; Hosseini et al., 2025; Wang et al., 2024). Two respondents expressed frustration with the learning curve required to operate the AI system effectively, noting that it initially added to their workload rather than reducing it. These findings confirm that MSMEs' acceptance of AI is positive, as long as transparency, ethics, and human roles are maintained (Rajaram & Mäntymäki, 2024; Park et al., 2024; Sagala et al., 2024).

Agentic AI Integration in MSME Business Processes

Implementation observations show the integration of agentic AI is successful in three key functions: customer service, marketing, and financial administration. The average service cycle time dropped from 2.4 hours to 1.1 hours. These results are consistent with Sagala et al. (2024) that system and strategy alignment is a key factor (Sagala et al., 2024; Wang et al., 2024; OECD, 2024).

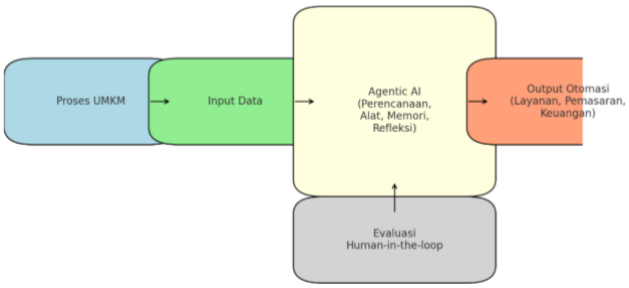

Diagram 1. Agentic-msme alignment (aua) integration model

Service throughput increased by 27% after AUA integration. Hosseini et al. (2025) explain that AI can close the end-to-end gap in workflows (Hosseini et al., 2025; Wang et al., 2024; Rajaram &

Mäntymäki, 2024). Transparency increases because each AI recommendation comes with a log, which can be reviewed. OECD (2024) affirms transparency as a condition for good AI governance (OECD, 2024; Park et al., 2024; Li et al., 2024). This integration also resulted in a new division of roles: AI handled repetitive work, while humans focused on strategic decisions. Wang et al. (2024) mention agentic AI as a human decision amplifier (Wang et al., 2024; Rajaram & Mäntymäki, 2024; Brynjolfsson et al., 2025).

Case studies show administrative errors are reduced by up to 21% after AI adoption (Rahman et al., 2024; Chatterjee & Rana, 2023). Noy and Zhang (2023) also noted an improvement in output quality with AI (Noy & Zhang, 2023; Hosseini et al., 2025; Li et al., 2024). Nevertheless, one MSME in the culinary sector reported that the AI failed to accurately process custom orders with multiple modifications, leading to customer complaints and requiring the business to revert to manual processing for complex transactions. Thus, the integration of agentic AI has been proven to balance the technical dimension of AI with the operational needs of simple MSME businesses, though continuous monitoring and refinement remain essential (Sagala et al., 2024; OECD, 2024; Rajaram & Mäntymäki, 2024; Yoon & Kim, 2025).

Implications for Indonesian MSMEs

Data triangulation between quantitative outcomes (productivity increases) and qualitative outcomes (user perceptions) shows strong consistency. Significant improvements in quantitative indicators are in line with user experiences that feel more efficient and responsive after using agentic AI. These results reinforce the view of Le Dinh et al. (2025) that AI can function as a "productivity partner" that expands the capabilities of MSME actors in the context of developing countries.

The practical implication of this study is the need for a roadmap for the adoption of agentic AI accompanied by digital literacy programs for MSMEs. Without the support of human capacity building, AI implementation risks generating a misfit between technology and real business needs. Therefore, this study suggests a community-based mentoring scheme, where MSMEs share best practices related to the use of AI.

In addition, governance aspects need to be strengthened, particularly in terms of customer data security and transparency of AI decisions. In the absence of ethical guardrails, the risk of losing customer trust can be a long-term hindrance. This is in line with the recommendations of Park et al. (2024) and Rajaram & Mäntymäki (2024) which emphasize the importance of integrating ethical governance in AI adoption.

CONCLUSION

This study demonstrates that agentic AI can substantially improve time efficiency, sales performance, and customer satisfaction in MSMEs when implemented with proper human oversight and ethical governance. Despite methodological limitations such as a small sample and limited duration, the findings provide strong empirical support for AI as a catalyst of digital transformation and competitiveness. The research highlights that adequate digital literacy, structured training, and clear human–AI task boundaries are essential for effective adoption. It also urges policymakers to develop subsidized AI literacy programs and affordable marketplaces, while technology providers

should ensure user-friendly and interoperable systems. Overall, sustainable AI integration in MSMEs demands collaboration among entrepreneurs, governments, and developers to ensure productivity gains, ethical accountability, and inclusive digital growth across Indonesia's evolving economy.

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