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Generative Artificial Intelligence Productivity in Indonesian Micro, Small, and Medium Enterprises

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ABSTRACT

Research Originality: This study integrates organizational capabilities and productivity outcomes to explain how generative artificial intelligence enhances productivity in Indonesian enterprises.

Research Objectives: The study aims to analyze the effects of perceived usefulness, technological readiness, and organizational support on Generative AI (GenAI) adoption intensity, and evaluate the effect of GenAI adoption intensity on MSME productivity in Indonesia.

Research Methods: This study used data from a quantitative cross-sectional survey of 200 Indonesian MSMEs with PLS-SEM to examine relationships among proposed variables in the model.

Empirical Results: Perceived usefulness and technological readiness were found to significantly increase the intensity of GenAI adoption. Perceived usefulness and organizational support were also found to positively influence MSME productivity, while GenAI adoption intensity and technological readiness did not show a direct influence.

Implications: MSME development programs should strengthen artificial intelligence literacy, workflow integration, managerial support, and responsible standards to generate measurable productivity gains.

Keywords:

digital economic; genAI; MSME productivity; structural equation modeling-partial least square; technological readiness

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INTRODUCTION

Micro, small, and medium enterprises (MSMEs) play a substantial role in employment creation, poverty reduction, and inclusive economic growth in Indonesia. The role of MSMEs in the Indonesian economy and the need for digital transformation. They contribute 60% to gross domestic product (GDP) and absorb approximately 97% of the national workforce (Sinha et al., 2024). In recent years, Indonesia has supported the acceleration of digital economic transformation through digitalization programs, the expansion of financial technology, and the development of technology-based entrepreneurship (Widarni et al., 2020). This transformation has increased digital capability, innovation, and technology adoption as key determinants of MSME competitiveness and long-term business sustainability (Purnomo et al., 2024). They highlight the digital transformation of Indonesian MSMEs across market reach, efficiency, customer experience, and resource/competency challenges.

Generative AI (GenAI) helps automate content generation, customer interactions, administrative processes, coding assistance, and data analysis using adaptive machine learning systems. It can improve productivity, decision quality, and operational efficiency across various organizational activities (Brynjolfsson et al., 2025; Noy & Zhang, 2023). Adopting GenAI allows MSMEs to access advanced technological capabilities without requiring substantial investment in physical infrastructure or specialized human resources. GenAI serves as a strategic mechanism for strengthening innovation capability, operational flexibility, and competitiveness within the digital economy ecosystem (Rajaram & Tinguely, 2024). However, not all MSMEs in developing countries such as Indonesia adopt GenAI in their business operations due to limitations in digital infrastructure, technological readiness, organizational capability, and employees' digital skills (Anatan & Nur, 2023). They position the digital transformation of Indonesian MSMEs as a critical readiness issue. In Indonesia, some MSMEs implement GenAI only in basic activities such as digital marketing and content creation, rather than integrating it into their operational systems to sustain productivity (Purnomo et al., 2024). Without organizational capability and digital readiness, technological adoption alone cannot improve business productivity.

Several researchers have studied AI adoption, digital transformation, and technology acceptance among SMEs. Arroyabe et al. (2024), for instance, emphasized that digital capability and innovation significantly influence AI adoption among European SMEs. Arroyabe et al. (2024) found digital capabilities and innovation capabilities to be important for AI adoption in SMEs, while Badghish & Soomro used TOE to explain AI adoption and sustainable performance. In comparison, Maroufkhani et al. (2023) highlighted the importance of organizational and technological factors in the implementation of digital technology. In the Indonesian context, Lupiyoadi et al. (2025) revealed that perceived intelligence and performance expectations are important determinants of AI adoption among MSMEs and startups. According to Himmati et al. (2025), the adoption of GenAI by MSMEs needs to be supported by equal distribution of digital infrastructure.

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A research gap emerges because studies on AI adoption in SMEs have primarily focused on technology acceptance, adoption intention, and digital transformation, rather than on how the intensity of GenAI adoption influences MSME productivity (Maroufkhani et al., 2023; Arroyabe et al., 2024). In developing countries such as Indonesia, evidence on GenAI's influence on productivity remains limited, despite its ability to improve knowledge-task and service-work performance (Noy & Zhang, 2023; Brynjolfsson et al., 2025). Only a few studies have integrated technological readiness, organizational support, and organizational readiness into a single AI-enabled productivity framework (Raisch & Krakowski, 2021). To address this research gap, this study examines the intensity of GenAI adoption and MSME productivity in developing countries, focusing on MSMEs in Indonesia.

This study integrates technology adoption theory, the technology-organization-environment (TOE) framework, and the resource-based view to explain how GenAI adoption influences MSME productivity in Indonesia. Unlike previous studies that mainly focused on technology acceptance behavior, this study specifically investigates the role of GenAI adoption intensity and organizational readiness in improving MSME productivity. The literature is not fully unanimous: some studies emphasize perceived usefulness and performance expectancy, while others emphasize readiness, digital capability, TOE factors, managerial support, and implementation maturity. At the same time, this study examines whether the intensity of GenAI use is truly related to productivity outcomes in Indonesian MSMEs.

This study focuses on Indonesia's digital economic transformation and the increasing adoption of AI technologies among MSMEs. MSMEs are expected to adopt digital technologies and transform this adoption into measurable productivity improvement and sustainable business performance. Policymakers, business practitioners, and MSME support institutions should consider both GenAI adoption and productivity outcomes in designing effective AI capability-building strategies, digital literacy programs, and organizational development policies.

This study aims to examine: (1) the effects of perceived usefulness, technological readiness, and organizational support on GenAI adoption intensity; (2) the effect of GenAI adoption intensity on MSME productivity; (3) the direct effects of perceived usefulness, technological readiness, and organizational support on MSME productivity; and (4) the moderating role of organizational readiness in the relationship between GenAI adoption intensity and MSME productivity. The findings are expected to contribute to the literature on AI-driven digital transformation and provide practical implications for strengthening MSME competitiveness within Indonesia's digital economy.

This study integrates UTAUT, TOE, and capability-based perspectives to explain GenAI's shift from experimentation to business value. UTAUT emphasizes perceived performance benefits, TOE highlights technological and organizational readiness, while capability views show that routines and support systems convert technology into productivity (Venkatesh & Thong, 2016). For Indonesian MSMEs, adoption depends on value and readiness, whereas productivity requires operational embedding and governance (Arroyabe et al., 2024; Lupiyoadi et al., 2025).

Perceived usefulness reflects MSME decision makers' belief that GenAI improves performance, efficiency, speed, and decision quality. Technology acceptance theory suggests firms intensify use when technology offers tangible value, especially SMEs facing resource constraints and seeking productivity gains (Maroufkhani et al., 2023; Firdaus, 2026). In Indonesia, performance expectations encourage the use of GenAI for content, service, analysis, and administration (Lupiyoadi et al., 2025).

Organizational support reflects MSME leaders' commitment, encouragement, policy direction, and training that legitimize the use of GenAI in daily operations. AI value depends on balancing automation with human augmentation, while SME adoption is shaped by digital and organizational capabilities (Raisch & Krakowski, 2021). Thus, support signals GenAI as a strategic capability, reduces uncertainty, and encourages adoption in decision-making, customer interaction, and operational learning (Badghish & S., 2024; Oldemeyer et al., 2025). GenAI adoption intensity reflects the breadth, frequency, and routinization of GenAI use across MSME processes, including content creation, customer service, information synthesis, administration, and data-based decisions (Noy & Zhang, 2023). Evidence shows that GenAI improves productivity and quality in knowledge tasks and structured service work (Brynjolfsson et al., 2025). Thus, GenAI supports MSME productivity when embedded in recurring, repetitive, information-intensive, and customer-facing workflows across core operations (Gao & Feng, 2023).

Perceived usefulness strengthens MSME productivity by helping owner-managers recognize, prioritize, and operationalize GenAI in economically meaningful tasks (Rajaram & Tinguely, 2024; Lupiyoadi et al., 2025). When firms identify concrete use cases, GenAI supports task-technology alignment, resource allocation, and workflow redesign. Therefore, decision-makers who perceive GenAI as improving speed, efficiency, and decision quality are more likely to deploy it to achieve measurable productivity gains (Maroufkhani et al., 2023). Technological readiness improves MSME productivity because digital infrastructure, system compatibility, skills, and technical confidence help firms extract value from GenAI after adoption (Arroyabe et al., 2024). In AI-driven contexts, readiness reduces implementation friction, improves experimentation, and stabilizes AI-assisted work. Readiness is not only an adoption precondition but a productivity-enabling capability that converts GenAI into time savings, process efficiency, and higher-quality outputs (Oldemeyer et al., 2025; Calvino et al., 2025).

Organizational support contributes to MSME productivity through managerial commitment, guidance, training, and policy clarity that coordinate the use of GenAI within firms. AI value emerges when organizations design complementary human–machine roles, while supportive organizational conditions help translate AI adoption into sustainable performance (Raisch & Krakowski, 2021; Badghish & Soomro, 2024). Although GenAI can be used informally, productivity gains require routines, usage standards, and continuous learning, transforming experimentation into coordinated practice that strengthens efficiency, reliability, and competitiveness (Oldemeyer et al., 2025; Wahab & Radmehr, 2024).

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Organizational readiness, as a moderating mechanism, is a higher-order capability that combines technological readiness and organizational support, reflecting MSMEs' ability to integrate, govern, and scale the use of GenAI (Arroyabe et al., 2024; Oldemeyer et al., 2025). As a complementarity mechanism, readiness strengthens productivity when infrastructure, skills, governance, and learning routines support adoption. AI produces stronger SME growth when combined with digital assets and organizational mechanisms that transform assimilation into business performance (Ardito et al., 2025).

This study aims to examine how perceived usefulness, technological readiness, and organizational support influence the intensity of generative artificial intelligence adoption among Indonesian micro, small, and medium enterprises. It also evaluates whether adoption intensity improves enterprise productivity and whether organizational readiness strengthens the relationship between generative artificial intelligence adoption and productivity. By addressing these objectives, this study provides empirical evidence on how the adoption of artificial intelligence can support productivity improvements and digital economic transformation in developing economies.

METHODS

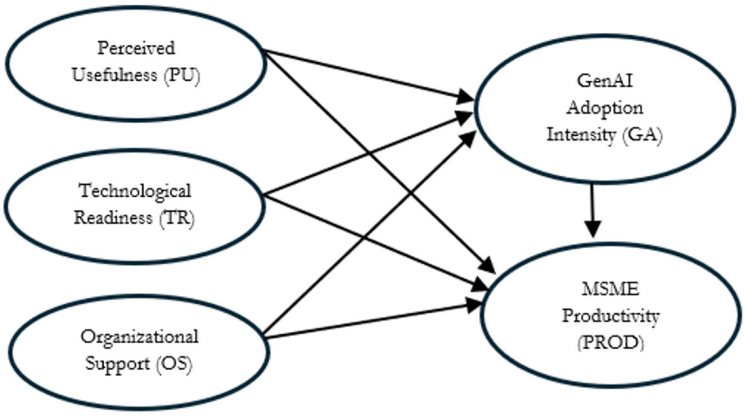
This study employed a quantitative explanatory design, using cross-sectional survey data to examine how perceived usefulness, technological readiness, organizational support, and GenAI adoption intensity explain MSME productivity in Indonesia, consistent with recent research on SME digital transformation and AI adoption (Anatan & Nur, 2023; Arroyabe et al., 2024). The unit of analysis was the MSME firm. In contrast, the unit of response was the owner, manager, or senior decision-maker because these actors usually understand technology adoption, workflow change, and productivity consequences in small firms (Badghish & Soomro, 2024; Lupiyoadi et al., 2025).

Respondents were selected through purposive sampling with three criteria: the firm operated as an Indonesian MSME, the respondent was involved in business decision-making, and the firm had used or evaluated GenAI tools for business activities (Oldemeyer et al., 2025). Respondents were owners/managers/senior decision-makers of Indonesian MSMEs who had used or evaluated GenAI for business activities. After screening 203 returned questionnaires, three observations were excluded because they did not meet the MSME criterion, resulting in a final sample of 200 firms, which is adequate for prediction-oriented PLS-SEM with several latent constructs and structural paths, particularly for sample size, measurement model, and structural model (Hair et al., 2019; Laroibafih, 2025; Firdaus, 2026).

All constructs were measured reflectively using a five-point Likert scale from 1 = strongly disagree to 5 = strongly agree, following recent studies that treated technology perceptions, readiness, organizational support, adoption, and productivity as latent managerial constructs (Maroufkhani et al., 2023; Wahab & Radmehr, 2024). The research framework integrates technology acceptance, technology–organization–environment, and capability-based perspectives by modeling perceived usefulness, technological readiness,

and organizational support as antecedents of GenAI adoption intensity and MSME productivity (Arroyabe et al., 2024; Lupiyoadi et al., 2025). Operational definitions of variables are presented in Table 1.

Figure of the conceptual model



Source: Data processed using SEM PLS, 2026

Table 1. Operational Definitions of Variables

Construct	Operational definition	Indicators
Perceived Usefulness (PU)	Belief that GenAI improves performance and efficiency.	PU1–PU4
Technological Readiness (TR)	Availability of infrastructure, compatibility, and digital skills for GenAI.	TR1–TR4
Organizational Support (OS)	Leadership commitment, policies, encouragement, and training for GenAI.	OS1–OS4
GenAI Adoption Intensity (GA)	Breadth and routinization of GenAI use across business processes.	GAI1–GAI4
MSME Productivity (PROD)	Perceived improvement in output and efficiency attributable to GenAI use.	PROD1–PROD4

Source: Adapted from prior validated scales and the present survey instrument

Organizational readiness was specified as a higher-order capability combining technological readiness and organizational support, because AI productivity depends on complementary infrastructure, skills, managerial support, and workflow integration (Badghish & Soomro, 2024; Calvino et al., 2025).

The empirical structural equations were specified as follows:

$GA = \beta_0 + \beta_1 PU + \beta_2 TR + \beta_3 OS + \varepsilon$ and

$PROD = \alpha_0 + \alpha_1 PU + \alpha_2 TR + \alpha_3 OS + \alpha_4 GA + \alpha_5 (GA \times OR) + \xi$

The reflective measurement model was expressed as $x_{ij} = \lambda_j \eta_i + \delta_{ij}$

where x_{ij} represents each observed indicator, λ_j is the indicator loading, η_i is the latent construct, and δ_{ij} is measurement error (Hair et al., 2019).

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Convergent validity was evaluated using indicator loadings, Cronbach's alpha, composite reliability, and average variance extracted, with $AVE = \Sigma\lambda^2/n$ and $CR = (\Sigma\lambda)^2/[(\Sigma\lambda)^2 + \Sigma(1 - \lambda^2)]$. The structural model was estimated using SmartPLS 4 with a PLS algorithm and bootstrapping to assess path coefficients, *t*-values, *p*-values, R^2, f^2, and the moderation effect of organizational readiness (Hair et al., 2019). The study used cross-sectional and self-reported data; all relationships were interpreted as associative rather than strictly causal, while future studies are encouraged to apply longitudinal designs and objective productivity indicators (Calvino et al., 2025; Permana, 2026).

RESULT AND DISCUSSION

After excluding three non-MSME observations (large firms), the final sample comprises 200 Indonesian MSMEs, dominated by trade (n=109) and services (n=42), followed by manufacturing/industry (n=16) and information technology (n=13) (Survey data, 2026). The sample includes micro (n=68), small (n=80), and medium-sized firms (n=52), reflecting heterogeneous MSME conditions within Indonesia's digital transformation context and providing a balanced empirical basis for examining GenAI adoption across enterprise scales nationally (Anatan & Nur, 2023). All indicator loadings exceed 0.70 except TR3 (0.709), which remains acceptable for exploratory work. Composite reliability ranges from 0.886 to 0.920 and AVE from 0.661 to 0.742, as shown in Table 2, supporting convergent validity (Hair et al., 2019; Laroibafih, 2025).

Table 2. Indicator Loadings (Outer Model)

Construct	Item	Loading	Information
PU	PU1	0.853	Valid
PU	PU2	0.841	Valid
PU	PU3	0.847	Valid
PU	PU4	0.898	Valid
TR	TR1	0.852	Valid
TR	TR2	0.833	Valid
TR	TR3	0.709	Valid
TR	TR4	0.848	Valid
OS	OS1	0.848	Valid
OS	OS2	0.873	Valid
OS	OS3	0.851	Valid
OS	OS4	0.812	Valid
GA	GAI1	0.834	Valid
GA	GAI2	0.837	Valid
GA	GAI3	0.907	Valid
GA	GAI4	0.866	Valid
PROD	PROD1	0.878	Valid
PROD	PROD2	0.834	Valid
PROD	PROD3	0.862	Valid
PROD	PROD4	0.837	Valid

Findings suggest that Indonesian MSMEs must not only adopt GenAI but also build capabilities to convert adoption into sustained performance. GenAI productivity depends on task features, worker expertise, and organizational adaptation, while SME AI implementation is constrained by capability gaps, governance issues, and immaturity (Calvino et al., 2025). Indonesia's MSME digital transformation should prioritize capability-building beyond technology access (Purnomo et al., 2024). Government, universities, and support institutions should strengthen AI literacy, workflow integration, and digital governance so GenAI becomes a productivity engine rather than an experimental tool (Murniati et al., 2021; Rajaram & Tinguely, 2024).

Table 3. Descriptive Statistics of Latent Constructs

Construct	Mean	Standard Deviation (SD)
PU	4.182	0.846
TR	4.003	0.850
OS	3.937	0.908
GA	3.834	0.961
PROD	4.072	0.840

Source: Survey data (n=200)

Table 3 presents descriptive statistics of the latent constructs and shows that perceived usefulness has the highest mean, followed by productivity, technological readiness, organizational support, and GenAI adoption intensity (Rajaram & Tinguely, 2024). This indicates that Indonesian MSMEs already perceive GenAI as relevant and beneficial, although routinization and workflow integration remain less mature. Thus, MSMEs may recognize GenAI's promise before developing routines, skills, and governance needed for systematic productivity gains (Oldemeyer et al., 2025; Calvino et al., 2025).

The measurement model shows adequate reliability and convergent validity for analyzing GenAI adoption and MSME productivity in a future-oriented digital business context. Most indicator loadings exceed 0.70, composite reliability ranges from 0.886 to 0.920, and AVE ranges from 0.661 to 0.742, meeting PLS-SEM criteria, as shown in Table 4 (Hair et al., 2019). TR3 is considered acceptable because construct reliability and AVE are satisfactory, though they are near the recommended threshold.

Table 4. Construct Reliability and Convergent Validity

Construct	Cronbach's α	Composite reliability	AVE
PU	0.882	0.919	0.740
TR	0.827	0.886	0.661
OS	0.868	0.910	0.716
GA	0.882	0.920	0.742
PROD	0.873	0.914	0.728

Source: Data processed using SEM PLS, 2026

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Table 5. Discriminant Validity: Fornell–Larcker Criteria

Construct	PU	TR	OS	GA	PROD
PU	0.860	0.719	0.725	0.653	0.832
TR	0.719	0.813	0.750	0.685	0.712
OS	0.725	0.750	0.846	0.642	0.758
GA	0.653	0.685	0.642	0.861	0.657
PROD	0.832	0.712	0.758	0.657	0.853

Source: Data processed using SEM PLS, 2026

Table 5 shows that each construct shares greater variance with its indicators than with other constructs, supporting discriminant validity among perceived usefulness, technological readiness, organizational support, GenAI adoption intensity, and MSME productivity (Hair et al., 2019). However, the close link between perceived usefulness and productivity suggests future studies should refine items and include objective indicators, such as output per worker, sales per employee, transaction speed, or error reduction (Hair et al., 2019). Table 6 indicates moderate-to-substantial explanatory power: adoption is driven by usefulness and readiness, while productivity is strengthened by usefulness, support, routines, and AI-enabled workflows (Arroyabe et al., 2024; Oldemeyer et al., 2025).

Table 6. Effect Sizes (f^2)

Endogenous construct	R^2
GA	0.534
PROD	0.751

Source: Data processed using SEM PLS, 2026

Table 6 shows that the proposed model explains 53.4% of the variance in GenAI adoption intensity (R^2 = 0.534) and 75.1% of the variance in MSME productivity (R^2 = 0.751), indicating moderate and substantial explanatory power (Hair et al., 2019). The adoption result suggests that AI-enabled routines are influenced by readiness and perception, while the productivity result shows that the model captures key mechanisms of future business performance. Robust measurement quality and conceptual clarity further support the interpretation of GenAI as a strategic productivity engine for MSMEs.

This section reports the f^2 effect sizes, indicating each predictor's practical contribution to GenAI adoption intensity and MSME productivity (Hair et al., 2019). Perceived usefulness has the strongest effect on productivity (f^2 = 0.432), showing that GenAI creates greater value when firms recognize its relevance for efficiency, decision-making, and operational improvement (Rajaram & Tinguely, 2024). Technological readiness contributes most to adoption intensity (f^2 = 0.104), while organizational support also strengthens productivity (f^2=0.096), confirming the importance of infrastructure, digital skills, and

managerial guidance (Arroyabe et al., 2024; Oldemeyer et al., 2025). Weaker effects of PU on adoption, OS on adoption, GA on productivity, and TR on productivity suggest that GenAI use requires organizational capabilities and workflow integration (Hair *et al.*, 2019).

Table 7. Extended Model: Readiness and Complementarity Test

Predictor	Endogenous	f^2
PU	GA	0.060
TR	GA	0.104
OS	GA	0.026
PU	PROD	0.432
TR	PROD	0.007
OS	PROD	0.096
GA	PROD	0.017

Source: Data processed using SEM PLS, 2026

Table 8. Hypothesis Testing Results

Hypothesis	Path	B	Standard Error (SE)	*t*-value	*p*-value	Sig.
H1	PU → GA	0.263	0.110	2.393	0.018	0.018
H2	TR → GA	0.360	0.149	2.410	0.017	0.017
H3	OS → GA	0.181	0.116	1.570	0.118	0.118
H4	GA → PROD	0.095	0.062	1.538	0.126	0.126
H5	PU → PROD	0.531	0.084	6.296	0.000	0.000
H6	TR → PROD	0.071	0.082	0.860	0.391	0.391
H7	OS → PROD	0.259	0.076	3.389	0.001	0.001
H8	GA × OR →PROD	-0.039	0.059	-0.664	0.507	0.507

Source: Data processed using SEM PLS, 2026

This study shows that GenAI adoption intensity in Indonesian MSMEs is driven by perceived usefulness and technological readiness, whereas productivity depends on perceived usefulness and organizational support, rather than on adoption intensity alone (see Table 8). GenAI creates value when decision makers understand its benefits and firms provide guidance, training, and workflow support (Rajaram & Tinguely, 2024). The insignificant adoption–productivity effect suggests frequent use becomes productive only when embedded in structured tasks, human AI collaboration, and routines (Noy & Zhang, 2023). Organizational readiness is an enabler, not a moderator (Arroyabe et al., 2024).

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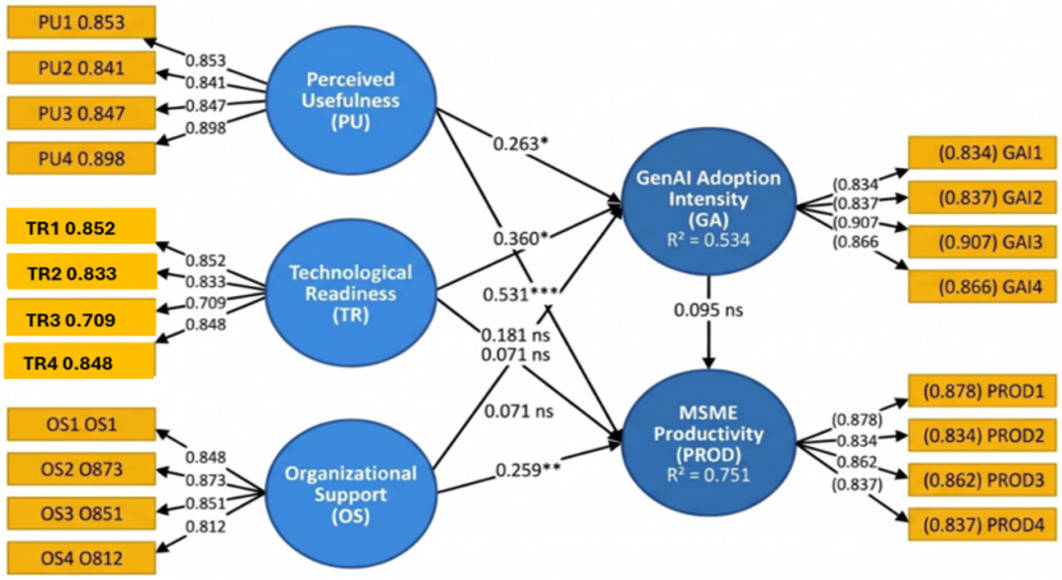
Figure 2. Structure and Measurement Model Result



Source: Data processed using SEM PLS (2026)

The extended model, as shown in Table 8, shows that organizational readiness, combining technological readiness and organizational support, significantly improves GenAI adoption intensity (β = 0.507; p = 0.000) and MSME productivity (β = 0.296; p = 0.000), but does not moderate the adoption–productivity relationship (Hair et al., 2019; Arroyabe et al., 2024). The findings imply that public policy should prioritize AI capability-building, digital literacy, and institutional support to strengthen MSME productivity and competitiveness in Indonesia's digital economy (Oldemeyer et al., 2025; Purnomo et al., 2024).

The data analysis found that perceived usefulness and technological readiness drive the intensity of GenAI adoption. MSMEs will use GenAI more routinely if the business benefits are clear and the infrastructure/skills are adequate. The next finding is that productivity is more influenced by perceived usefulness and organizational support, not adoption intensity alone, but according to workflow integration needs. The third finding is that organizational readiness is better understood as a direct enabling capability rather than a moderator. Moreover, the final finding of insignificant results is not a weakness but a theoretical insight that easily accessible GenAI does not automatically increase productivity without governance, SOPs, training, and task redesign.

Determinants of GenAI adoption intensity among Indonesian MSMEs show that perceived usefulness and technological readiness significantly increase adoption intensity, whereas organizational support has no direct effect in the baseline model (Lupiyoadi et al., 2025). Perceived usefulness encourages MSMEs to intensify GenAI use when the technology is seen as improving efficiency, speed, and decision quality, consistent with evidence that performance beliefs and perceived intelligence drive AI adoption in Indonesian MSMEs and startups. GenAI is also adopted more actively when linked

to concrete business use cases (Rajaram & Tinguely, 2024). Technological readiness, including infrastructure, compatibility, and digital skills, reduces experimentation costs and supports routine integration into workflows and operational decisions (Arroyabe et al., 2024; Oldemeyer et al., 2025)

Organizational support, by contrast, does not significantly affect the intensity of GenAI adoption in the baseline model. Badghish & Soomro (2024) reported that organizational factors can support AI adoption and sustainable business performance in SMEs, while Oldemeyer et al. (2025) emphasized that management support and internal capability development remain important for overcoming implementation challenges. The present result may reflect the distinctive reality of Indonesian MSMEs, where GenAI can be tried informally through accessible applications before formal policies, structured training, or managerial governance are established. As Raisch & Krakowski (2021) suggested, the managerial challenge of AI lies in balancing automation and augmentation, which means that organizational support may become more decisive after firms move from experimentation toward coordinated value capture.

The second research question investigates whether the intensity of GenAI adoption and readiness-related variables improve MSME productivity. The results indicate that perceived usefulness and organizational support have significant positive effects on productivity, whereas technological readiness and GenAI adoption intensity do not have statistically significant direct effects. Rajaram & Tinguely (2024) argued that GenAI creates value in SMEs when firms identify high-frequency use cases and align the technology with concrete operational needs, while Calvino et al. (2025) emphasized that GenAI productivity gains depend on task fit, user capability, and human-AI collaboration. Thus, usefulness matters because it shapes the quality, purpose, and strategic direction of AI use, allowing MSMEs to move from simple tool adoption toward future-ready value creation. Technological readiness does not directly improve productivity, meaning infrastructure and digital skills alone are insufficient for performance gains (Wahab & Radmehr, 2024). It becomes productive only through complementary mechanisms such as absorptive capacity, customer agility, IoT, big data analytics, routines, data-informed processes, complementary investments, and adaptive organizational learning (Ardito et al., 2025).

Organizational support has a significant positive effect on MSME productivity, indicating that managerial commitment, internal guidance, encouragement, and training are crucial for transforming GenAI into reliable business outcomes. Badghish and Soomro (2024) highlighted that organizational conditions are important for converting AI adoption into sustainable business performance, while Oldemeyer et al. (2025) showed that SMEs often struggle not only with technical readiness, but also with managerial coordination, governance, and workforce preparation. These results suggest that GenAI may be easy to access but harder to monetize effectively unless firms build supportive routines, learning cultures, and clear standards for AI-assisted work.

The direct effect of GenAI adoption intensity on productivity is positive but not statistically significant, indicating that more frequent GenAI use does not automatically

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lead to firm-level productivity gains among Indonesian MSMEs. According to Noy and Zhang (2023), GenAI can improve productivity and output quality in professional writing tasks, while Brynjolfsson et al. (2025) reported substantial productivity improvements among customer-support workers using GenAI assistance. The different result in this study is substantively meaningful because MSMEs often use GenAI across heterogeneous, less structured, and still-emerging business activities. As Calvino et al. (2025) argued, the productivity effect of GenAI depends on how the technology is embedded into tasks, human expertise, and organizational adaptation, not merely on the intensity of use.

Organizational readiness and complementarity mechanisms show that organizational readiness, shaped by technological readiness and organizational support, positively affects GenAI adoption intensity and productivity, confirming its role in translating experimentation into business value (Arroyabe et al., 2024; Oldemeyer et al., 2025). However, the insignificant adoption–readiness interaction, as shown in Table 8, indicates no moderating effect, suggesting that Indonesian MSMEs lack the maturity to become productivity multipliers (Wahab & Radmehr, 2024). GenAI use remains focused on simple tasks, so complementarity may emerge once stronger routines, governance, data discipline, and learning mechanisms are in place (Anatan & Nur, 2023).

Taken together, the findings indicate that the main challenge for Indonesian MSMEs is not simply to adopt GenAI, but to develop the internal capabilities required to convert adoption into sustained business performance. Calvino emphasized that GenAI productivity depends on task characteristics, worker expertise, and organizational adaptation, while Oldemeyer et al. (2025) showed that capability gaps, governance issues, and limited implementation maturity constrain SME AI implementation.

The findings imply that Indonesia's MSME digital transformation agenda should move beyond access to technology and emphasize capability-building policies (Purnomo et al., 2024). Government agencies, universities, and MSME support institutions should provide AI literacy programs, workflow integration training, and digital governance support to ensure that GenAI adoption produces measurable productivity gains. From a future-oriented economic development perspective, this study shows that AI-based MSME upgrading is not merely a technology diffusion agenda (Murniati et al., 2021), as emphasized by Rajaram & Tinguely (2024). Rather, it is a capability-building journey in which usefulness, readiness, support, and strategic integration determine whether GenAI becomes a productivity engine or remains an experimental tool. This study has several limitations. First, the data are cross-sectional and rely on self-reported productivity measures. Second, the sample focuses on Indonesian MSMEs and may not fully represent other developing economies.

CONCLUSION

This study examined how perceived usefulness, technological readiness, organizational support, GenAI adoption intensity, and organizational readiness explain MSME productivity in Indonesia's digital economy. The findings address the research objectives by showing

that perceived usefulness and technological readiness significantly increase the intensity of GenAI adoption, whereas organizational support does not directly affect adoption intensity. Regarding productivity, perceived usefulness and organizational support have significant positive effects, whereas technological readiness and GenAI adoption intensity do not directly improve it. Organizational readiness functions more as a direct enabling capability than as a moderator of the adoption–productivity relationship. These results indicate that GenAI adoption alone is insufficient to produce measurable productivity gains unless MSMEs integrate AI into workflows, improve employee skills, and receive managerial support. Policy should prioritize AI literacy training, workflow-integration assistance, digital infrastructure support, and practical guidelines for responsible GenAI use. Future research should employ longitudinal designs, objective productivity indicators such as sales per employee, transaction speed, error reduction, or output per worker, and comparative cross-country analysis to strengthen causal interpretation.

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