

The Effect of Innovation and Digital Capital Adoption on MSME Performance Mediated by Competitive Advantage

**Mochammad Havid Rizqi Ramadhan^{1*}, Achmad Kautsar²,
Renny Sari Dewi³, Hujjatullah Fazlurrahman⁴**

¹⁻⁴Faculty of Economics and Business, Universitas Negeri Surabaya, Indonesia

Email: ¹⁾ mochammad.2177@mhs.unesa.ac.id, ²⁾ achmadkautsar@unesa.ac.id, ³⁾ rennydewi@unesa.ac.id,

⁴⁾ hujjatullahfazlurrahman@unesa.ac.id

Received : 24 December - 2025

Accepted : 31 January - 2026

Published online : 02 February - 2026

Abstract

Amid the accelerated advancement of digital technologies and the intensification of market rivalry, continuous enhancement of business performance among MSMEs has become imperative through innovation and digital transformation initiatives. Nevertheless, empirical investigations examining the contribution of digital capital adoption and innovation to MSME performance, particularly when competitive advantage functions as an intervening mechanism, remain relatively scarce, especially within regional MSME settings. This study is conducted to investigate the influence of innovation and digital capital adoption on MSME performance, with competitive advantage positioned as a mediating construct. A quantitative research design is employed, utilizing survey responses obtained from 90 MSME proprietors in Probolinggo Regency. The data that were gathered are processed and evaluated through PLS-SEM to assess both direct and indirect causal pathways among the examined variables. The results reveal that innovation is found to exert a significant positive effect on competitive advantage, which in turn is shown to significantly enhance MSME performance. On the other hand, there is no evidence that innovation directly affects the performance of MSMEs. However, adopting digital capital has been shown to have a big and positive effect on performance results. Moreover, the linkage between innovation and MSME performance is fully mediated by competitive advantage. These results suggest that innovation enhances MSME performance only when it is transformed into competitive advantage, whereas digital capital adoption directly contributes to performance improvement. Therefore, for MSME practitioners, strengthening innovation strategies oriented toward competitive differentiation and expanding the effective use of digital capital are essential to improve business performance.

Keywords: Competitive Advantage, Digital Capital Adoption, Emerging Economies, Innovation Capability, MSME Performance.

1. Introduction

Micro, Small, and Medium Enterprises (MSMEs) are a key part of Indonesia's economy. According to the Ministry of Cooperatives and SMEs, there were about 65.4 million MSMEs in business across the country as of 2019. These businesses gave jobs to about 123.3 million people. This substantial absorption of labor underscores the strategic significance of MSMEs, particularly in their role in alleviating unemployment and supporting economic stability in Indonesia. As independently operated business entities that are neither subsidiaries nor affiliates of larger corporations, micro, small, and medium enterprises (MSMEs) are often characterized by limited financial capacity, thereby necessitating greater capital infusion to enhance business performance. Referring to data released by the Ministry of Cooperatives and



SMEs, the expansion of People's Business Credit (KUR) reached IDR 192.59 trillion, or approximately 8.16%, in 2021, reflecting substantial governmental commitment to supporting MSME development in Indonesia (Ministry of Finance, 2023). In light of this policy support, it becomes particularly compelling to examine the implementation process and growth outcomes of MSMEs at the regional level, with specific attention given to East Java Province.

According to data from the Central Statistics Agency (BPS) for 2024, East Java has 824,473 micro-scale businesses and 101,512 small-scale businesses. These figures highlight the substantial contribution of the MSME sector to the economic dynamics and development of the region. The number of MSMEs varies across regencies, with Sidoarjo Regency having 151,000, Jember Regency having 95,000, and Probolinggo Regency having 82,000, with Probolinggo Regency having the lowest number. Because of this, it's crucial to learn more about what makes MSMEs in these areas more innovative and competitive.

Probolinggo Regency represents one of the areas in East Java that exhibits relatively strong economic performance, particularly within the micro, small, and medium enterprise (MSME) sector. Nevertheless, despite the presence of approximately 82,000 MSMEs operating across the regency, nearly 40,000 of these enterprises remain digitally illiterate, indicating a significant gap in digital capability among local MSMEs (Nuansa Jatim, 2025). Therefore, efforts are needed to strengthen innovation and utilize digital technology so that MSMEs in Probolinggo Regency can continuously improve their competitiveness and business performance. Therefore, the adoption of technology and innovation by MSMEs in Probolinggo Regency is expected to drive improved business performance.

Business performance is a measure of a company's success in achieving predetermined targets. In other words, business performance reflects how effectively a company operates and grows over a certain period. According to Soegihono and Yuniawan (2023) business performance can also be checked by looking at its internal factors, such as financial data or other reports that show how the company runs its production activities. In the context of micro, small, and medium enterprises (MSMEs), the concept of business performance is often interpreted as the performance of the MSME itself. MSME performance is part of making progress in business to achieve goals (Afifah & Triyanto, 2023). Farida et al. (2019) stated that developing MSME performance is not easy, due to the difficulty of measuring MSME performance. Within this framework, SME performance is conceptualized as the extent to which sustained growth and competitive capacity are achieved through efficient deployment of organizational resources and adaptive responses to evolving market conditions (Kusa et al., 2021). This perspective is further extended by Chege and Wang (2020), who argue that SME performance is closely associated with a firm's capacity to leverage innovation and technological resources to enhance efficiency, competitiveness, and long-term sustainability. Performance is the result of work that has a strong relationship with innovation (Hasna, 2020)

Innovation constitutes a key determinant of MSME performance, as it enables enterprises to establish distinctiveness and gain differentiation relative to competing firms. By innovating products or business processes, businesses can increase added value, which becomes a competitive advantage. Therefore, business owners must prepare innovation strategies for their businesses to create an advantage over competitors (Lestari et al., 2019). According to Fang et al. (2021) and Fu et al. (2021), firms operating in dynamic business environments need to continuously enhance products and services through innovation activities in order to create added value and improve performance. This is reinforced by the results of research conducted by Djou et al. (2025) and Soegihono and Yuniawan (2023) which stated a significant relationship between innovation and MSME performance. However, another study conducted by Anderson and Hidayah (2023) indicate that innovation exhibits a

positive yet statistically insignificant relationship with MSME performance. Consequently, in response to intensifying competition within the digital era, MSMEs are required to continuously leverage technological advancements and innovative practices in order to establish and sustain competitive advantage.

Competitive advantage makes MSMEs superior in attracting customers and maintaining market share, which ultimately positively impacts their business performance. Having a competitive edge can greatly help a firm do better. This condition signals to business actors the need to improve business performance (Husaeni, 2021). Competitive advantage enables firms to sustain superior competitive positions and improve performance outcomes (Wongsansukcharoen & Thaweepaiboonwong, 2023; Zahara, 2024). Competitive advantage gained through innovation needs to be strengthened by the use of digital technology so that MSMEs can improve business performance sustainably.

The use of digital technology helps MSMEs operate more efficiently, expand market reach, and improve overall business performance. Small businesses must be able to compete on equal footing with large corporations because digital capital will facilitate equal opportunities for success and fair and healthy competition (Saruchera & Mpunzi, 2023). Competition among MSMEs will increase every year. Therefore, they must highlight the uniqueness of their businesses and implement digital technology to compete with other MSMEs (Putri & Najib, 2024). Recent empirical evidence suggests that the adoption of digital capital facilitates improvements in operational efficiency, enhances customer interaction, and reinforces the competitive standing of MSMEs within progressively digitalized market environments (Badghish & Soomro, 2024; Salah & Ayyash, 2024)

Nevertheless, prior empirical investigations have yielded mixed results concerning the direct influence of innovation on MSME performance, while the mediating function of competitive advantage within this relationship remains underexplored, particularly in the context of regionally based MSMEs. MSMEs in Probolinggo Regency encounter particular obstacles stemming from low digital literacy, restricted innovation orientation, and inconsistent adoption of digital technologies. This study seeks to investigate the impact of innovation and the adoption of digital capital on the performance of MSMEs, with competitive advantage serving as a mediating variable, and to present empirical evidence from MSMEs in Probolinggo Regency, East Java.

This study offers a theoretical contribution by advancing the Resource-Based View through empirical validation of competitive advantage as a mediating mechanism linking innovation to MSME performance. Practically, this research provides insights for MSMEs in Probolinggo Regency on how innovation and digital capital adoption can be strategically leveraged to improve business performance.

2. Literature Review

2.1. RBV Theory

The Resource-Based View (RBV) posits that a firm's distinctiveness and competitive potential are primarily derived from its internal resources rather than from its market position or external environmental conditions. According to RBV, superior performance can be achieved when a firm possesses resources that satisfy four essential criteria, commonly referred to as VRIN. These VRIN attributes, valuable, rare, inimitable, and non-substitutable, constitute the foundational conditions through which the Resource-Based View explains sustained competitive advantage. These resources must be valuable, meaning they are capable of creating customer benefits or improving organizational efficiency; rare, in the sense that

they are not widely possessed by competitors; inimitable, indicating that they cannot be easily copied or replicated; and non-substitutable, meaning that no alternative resources can replace their strategic value or function.

The Resource-Based View (RBV) is an important way to know how MSMEs can gain a durable competitive edge by using their inventive skills and making the most of their best internal resources. This, in turn, improves business performance. For MSMEs in Probolinggo Regency, innovation skills and the use of digital capital are strategic resources that are useful, hard to copy, and can provide them a competitive edge, which can lead to better performance.

2.2. MSME Performance

Business performance represents the extent to which managerial decisions and the effective deployment of available resources enable the achievement of predetermined organizational objectives (Türkeş et al., 2024). MSME performance can be observed through both financial and non-financial outcomes, where customer satisfaction with products and services represents an important indicator of positive performance evaluation (Asheq, 2021). In addition, MSME performance encompasses sales growth, profitability, and market-related outcomes that indicate the firm's capability to sustain operations and respond to competitive market dynamics (Audretsch et al., 2023; Tiwasing, 2021). Accordingly, MSME performance in this study is assessed through variations in sales volume, levels of customer satisfaction, market share expansion, and profit generation (Saputra et al., 2025).

2.3. Innovation

Innovation originates from the productive output of human resources. Firm performance may be gauged through the inventiveness of ideas generated by the resources that drive innovation. This, in turn, influences organizational performance when innovation is undertaken and executed effectively (Suwandi et al., 2023). Innovation can also take the form of new methods to improve the quality of a new program or product (Pontoh et al., 2021). Innovation reflects a firm's capability to proactively generate and implement new ideas, take calculated risks, and pursue future-oriented strategies to enhance organizational performance (Salah & Ayyash, 2024). Innovation reflects organizational efforts to introduce novel ideas, practices, or solutions that enhance operational efficiency and create value in competitive markets (Almansoori et al., 2025). In this study, the innovation variable is operationalized through indicators of product innovation, process innovation, and market innovation (Saputra et al., 2025).

2.4. Digital Capital Adoption

Digital capital constitutes the foundational base that enables comprehensive engagement and interaction within the digital environment (Donaghy, 2021). Mishrif and Khan (2023) Digital capital is the combination of digital technologies and internal skills that let companies turn digital resources into operational and strategic benefits. It is seen as the collection of both the abilities people have inside themselves and the resources they use outside, related to digital tech (Clamor & Saloma, 2023). Digital Capital has two main parts called Digital Access and Digital Competence (Ragnedda et al., 2020). The digital capital adoption variable in this study was measured based on digital capability, digital orientation, and digital innovation (Surahman et al., 2023).

2.5. Competitive Advantage

Competitive advantage emerges from a firm's capacity to effectively mobilize and deploy its internal capabilities that enable superior cost efficiency, product quality, flexibility, and responsiveness compared to competitors (Kiyabo, 2020). Furthermore, Susanti et al. (2023) explain that competitive advantage reflects a firm's capability to deliver superior value through efficient operations, high-quality products or services, flexibility, and effective service delivery, which strengthen its competitive positioning. Accordingly, competitive advantage in this study is measured based on cost, flexibility, delivery, and quality (Saputra et al., 2025).

2.6. Influence between variables

2.6.1. The Impact of Innovation on Competitive Advantage

Numerous prior studies investigating the effect of innovation on competitive advantage have reported a positive association between the two variables. For example, the results of a study conducted by Djobo and Tawas (2014) entitled *"The Influence of Entrepreneurial Orientation, Product Innovation, and Competitive Advantage on the Marketing Performance of Yellow Rice Businesses in Manado City"* explain that a business capable of introducing innovation this can help lead the way and reduce the chance that competitors will come up with new ideas first. Other studies conducted by Lestari et al. (2020) and Fajrina (2021) show a positive relationship between innovation and competitive advantage. Recent studies further emphasize that innovation capability enables MSMEs to develop unique value propositions and operational efficiencies that support sustained competitive advantage (Ramdan et al., 2022; Zhang, 2022). Therefore, the better the innovation carried out by an MSME, the better its competitive advantage. Thus, innovation is expected to play a crucial role in strengthening MSMEs' competitive advantage. Based on this description, the following hypothesis is proposed:

H1: Innovation Influences Competitive Advantage

2.6.2. The Influence of Competitive Advantage on MSME Performance

Several past studies that looked at how competitive advantage affects small and medium businesses have found that there is a positive link between the two factors. For example, a study by Soegihono and Yuniawan (2023) entitled *"The Effect of Innovation on Business Performance Through Competitive Advantage in Sharia MSMEs in Semarang City"* explained that higher levels of competitiveness among MSMEs are associated with improved business performance. Supporting this view, studies conducted by Husaeni (2021) demonstrate a significant relationship between competitive advantage and MSME performance. Recent studies further confirm that competitive advantage significantly improves MSME performance by strengthening firms' market position, operational effectiveness, and ability to respond to competitive pressures (Rochayatun, 2023; Sharfaei et al., 2022). Therefore, the better an MSME's competitive advantage, the better its performance. Thus, competitive advantage is anticipated to be a crucial factor in enhancing MSME performance. In light of this description, the subsequent hypothesis is suggested:

H2: Competitive Advantage Influences MSME Performance

2.6.3. The Impact of Innovation on MSME Performance

Several previous studies examining the influence of innovation on MSME performance have shown a positive relationship between the two variables. For example, the results of a study conducted by Djou et al. (2025) entitled *"The Influence of Innovation Capacity on the Performance of Gorontalo MSMEs Mediated by the Business Environment"* explain that innovation is not merely a theory. However, it is a strategic approach that significantly impacts

the enhancement of the operational and financial performance of MSMEs. Other studies conducted by Soegihono and Yuniawan (2023); Hasna (2020) also showed positive and significant results. Therefore, stronger innovation efforts undertaken by MSMEs are expected to be associated with higher performance levels. Accordingly, innovation is anticipated to affect MSME performance, either directly or indirectly through supportive strategic mechanisms. Based on this rationale, the following hypothesis is formulated:

H3: Innovation Impacts MSME Performance

2.6.4. The Impact of Digital Capital Adoption on MSME Performance

Many prior studies examining the impact of digital capital adoption on MSME performance have demonstrated a favorable link between these variables. A study by Putri and Najib (2024) titled "The Influence of Digital Technology Adoption and Value Creation on SME Performance in MSME Cafes in Bandung City" elucidates that the adoption of digital technology significantly affects the development of economic and social value for MSMEs. Recent empirical studies further indicates that digital capital adoption can enhance MSME performance by improving operational efficiency, market access, and business responsiveness, particularly when digital resources are effectively utilized within organizational processes (Kallmuenzer et al., 2025; Ullah et al., 2023).

Another study conducted by Saruchera and Mpunzi (2023) reported no statistically significant association between digital capital adoption and MSME performance. Nevertheless, stronger digital capital endowment is assumed to be linked with improved performance outcomes among MSMEs. Consequently, the deployment of digital capital is anticipated to significantly improve MSME performance. In light of this reasoning, the subsequent hypothesis is posited:

H4: Digital Capital Adoption Impacts MSME Performance

2.6.5. The Mediating Role of Competitive Advantage Between Innovation and MSME Performance

A number of prior studies investigating the mediating function of competitive advantage in the relationship between innovation and MSME performance have indicated a positive correlation between innovation and MSME performance when competitive advantage acts as an intermediary variable. For example, a study by Soegihono and Yuniawan (2023) entitled "*The Effect of Innovation on Business Performance Through Competitive Advantage in Sharia MSMEs in Semarang City*" shows that having a competitive advantage helps MSMEs use their innovations more effectively, which then leads to better business results. Another study by Saputra et al. (2025) states that competitive advantage has been statistically substantiated as an intervening construct within the innovation-performance linkage. Accordingly, heightened innovative capacity among MSMEs cultivates differentiated market positioning, which subsequently manifests in superior performance outcomes. This denotes that competitive advantage constitutes an essential transmission mechanism through which innovation is converted into MSME performance. In accordance with this line of reasoning, the subsequent hypothesis is proposed:

H5: Competitive Advantage Can Mediate Innovation on MSME Performance

2.7. Research Model

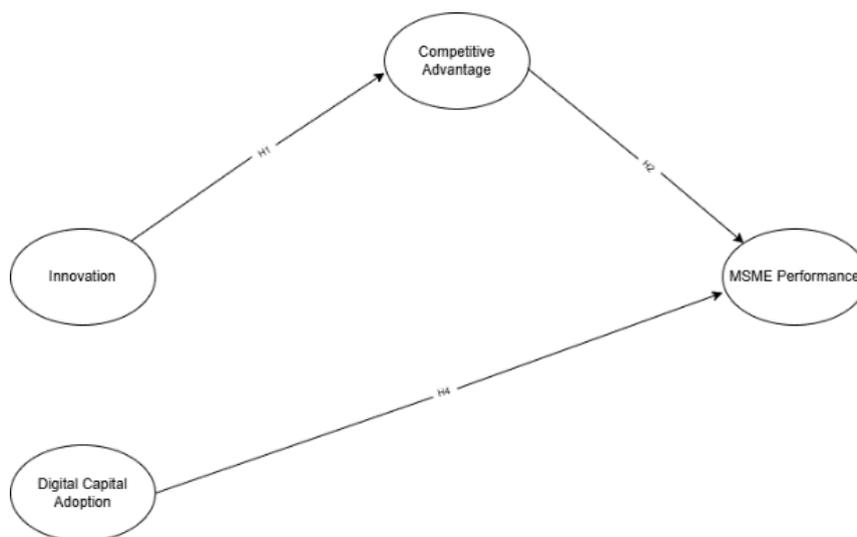


Figure 1. Conceptual Model

Figure 1 illustrates the conceptual framework of the study, in which competitive advantage is positioned as a full mediating variable linking innovation to MSME performance, The use of digital capital is identified as having a direct impact on MSME performance.

3. Methods

This study utilizes a quantitative research design. Sugiyono (2018) posits that quantitative research is based on positivist philosophy and is utilized to investigate certain populations or samples through research instruments, with data subjected to quantitative or statistical analysis to evaluate established hypotheses.

The population in this study includes all Micro, Small, and Medium Enterprises (MSMEs) in Probolinggo Regency that are still operating in 2025, with a total of approximately 82,000 business units. To determine the sample size, the author refers to the guidelines provided by Ferdinand and Killa (2014), which recommends a minimum sample size of five to ten times the number of indicators used in the study. Given that this research employs 14 indicators, the minimum required sample size was 70 respondents, and a total of 90 MSME owners were successfully collected and analyzed. Data collection was done in November 2025 by structured questionnaires administered to MSME owners and managers in Probolinggo Regency, both online and offline. The instruments were designed to capture measures of innovation, digital capital adoption, competitive advantage, and MSME performance.

The study employed a basic random sample method, whereby each MSME in the target population theoretically had an equal probability of being selected. Operationally, respondents were drawn from MSME proprietors recorded in the regional MSME registry as well as those demonstrating voluntary participation. As a result, although the sampling framework adhered to probabilistic principles, the execution of data acquisition was contingent upon respondent accessibility and willingness.

Empirical analysis was undertaken through Partial Least Squares–Structural Equation Modeling (PLS-SEM) utilizing the SmartPLS software to estimate both direct and mediated interrelationships among the constructs. The selection of PLS-SEM was justified by its robustness in prediction-oriented frameworks, accommodation of modest sample sizes, and capacity to model intricate latent-variable structures incorporating mediation effects.

The analytical method unfolded in two consecutive stages: evaluation of the measurement model (outer model) and analysis of the structural model (inner model). The evaluation of the measurement model included convergent validity, determined by standardized loading values greater than 0.70 and Average Variance Extracted (AVE) values exceeding 0.50; discriminant validity, assessed using the Fornell–Larcker criterion; and internal consistency reliability, confirmed through Composite Reliability (CR > 0.70) and Cronbach’s Alpha ($\alpha > 0.60$).

Structural model evaluation involved analysis of the coefficient of determination (R^2) to ascertain explanatory adequacy, predictive relevance (Q^2) to gauge forecasting capability, and effect magnitude (f^2). Hypothesis verification was conducted employing the bootstrapping resampling technique in SmartPLS, with statistical inference based on t-values exceeding 1.96 and p-values below 0.05 at the 5% significance level. Mediation effects were subsequently scrutinized to determine the intervening role of competitive advantage.

4. Results and Discussion

The analysis utilized data obtained from 90 MSME respondents who filled out the questionnaire. The dataset was analyzed using SmartPLS 3.0 to assess the validity and reliability of the measuring instruments and to estimate the interrelationships among variables in the structural model. Overall, the data demonstrates respondent characteristics relevant to the research context, as well as sufficient indicator values to proceed to the next stage of analysis.

4.1. Research Results

4.1.1. Respondent Characteristics

The characteristics of the respondents in this study are described as follows:

This study focused on MSMEs in Probolinggo Regency, so all respondents were MSME owners or managers domiciled and operating in the region. Based on the questionnaire distribution, the following information was obtained regarding respondent characteristics based on gender, age, type of business, and monthly turnover:

Table 1. Respondent Characteristics

Variables (N = 90)	Frequency	Percent
Gender		
Male	61	67,8%
Female	29	32,2%
Age (Years)		
< 20 Years	1	1,1%
20–30 Years (M)	5	5,6%
20–30 Years (F)	12	13,3%
30–50 Years (M)	47	52,2%
30–50 Years (F)	7	7,8%
> 50 Years (M)	9	10,0%
> 50 Years (F)	14	15,6%
Business Type		
Food and Beverage	64	71,1%
Snacks	8	8,9%
Handicraft	10	11,1%
Others	8	8,9%
Monthly Revenue		
< Rp 1.000.000	7	7,8%

Variables (N = 90)	Frequency	Percent
Rp 1.000.000 – Rp 5.000.000	26	28,9%
Rp 5.000.000 – Rp 10.000.000	21	23,3%
> Rp 10.000.000	22	24,4%
Not Specified	14	15,6%
Total	90	100%

Table 1 shows that most of the people who answered the survey are men, making up 67.8% of the sample. Most of the people who answered the question were between the ages of 30 and 50, which means that most MSME actors are of working age. The food and drink business was the most popular, with 71.1% of the votes. Crafts and snacks came in second. In terms of turnover, most of the people who answered (28.9%) were between IDR 1,000,000 and IDR 5,000,000 each month. The next most common ranges were IDR 5,000,000 and IDR 10,000,000. The results show that the MSME players who took part in the survey were mostly micro-enterprises with different levels of turnover.

4.1.2. Outer Model Test

Evaluation of the outer model is undertaken to ascertain the precision and robustness of the indicators in representing latent constructs, incorporating assessments of both validity and internal consistency reliability. This testing is essential to ensure that each indicator consistently and accurately represents the variables before proceeding to inner model analysis. This study's outer model assessment includes the evaluation of convergent validity, internal consistency reliability, and discriminant validity.

A. Measurement Model (Convergent Validity & Reliability)

The measurement model was evaluated using outer loadings, Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE) values. The relevant findings are displayed in the Outer Loading Table 2 below.

Table 2. Outer Loading

Construct	Item	Loading	α	CR	AVE
Innovation (INV)	My MSME product has a uniqueness that differentiates it from competitors' products.	0.815	0.917	0.936	0.709
	I use high-quality materials in making the MSME products that I own.	0.905			
	The production process in my business is designed to provide a better experience for customers.	0.843			
	In my MSME I have clear work procedures to maintain consistent product or service quality.	0.895			
	My MSME marketing strategy is quite effective in attracting consumer attention to my business products/services.	0.800			
	My MSME uses digital media (such as social media or marketplaces) as one of the main strategies in marketing my business products/services.	0.788			
Digital Capital Adoption (AMD)	I possess adequate skills and expertise in utilizing digital technologies to support and enhance my business operations.	0.646	0.929	0.945	0.744

Construct	Item	Loading	α	CR	AVE
Competitive Advantage (KB)	My business actively implements digital technologies, including social media platforms, e-commerce channels, and online applications.	0.890	0.968	0.973	0.816
	I am confident that the adoption of digital technologies can enhance both operational efficiency and overall business performance.	0.854			
	I actively seek opportunities to use digital technology in business products or services.	0.914			
	My business is developing new products or services by utilizing digital technology.	0.926			
	Digital technology helps my business create new ways of serving customers.	0.912			
	The prices of the MSME products that I offer are very competitive compared to other products.	0.899			
	The MSME products I sell provide good value for the price paid.	0.919			
	My MSME product ordering process is easy and/or fast.	0.899			
	My MSME products are always available in sufficient quantities.	0.822			
	The delivery time for my MSME products was as promised.	0.907			
MSME Performance (PU)	My MSME products always arrive in good condition and/or ready to serve.	0.942	0.956	0.963	0.764
	The taste of my MSME products is very satisfying and meets my expectations.	0.898			
	The materials used in my MSME products are high quality materials.	0.935			
	The sales volume of my MSME's products has experienced growth over the past few months.	0.884			
	The promotional activities implemented have contributed to an increase in the sales volume of my MSME's products.	0.890			
	My customers are satisfied with the MSME products that I offer.	0.893			
	My customers tend to repurchase my MSME products after trying them.	0.861			
	My MSME products have a significant market share in this area.	0.912			
	I believe that my MSME products are better known than competitors in the market.	0.811			
	The net profit from my MSME products has increased in the last year.	0.845			
My operational costs are relatively stable and do not affect the profitability of the MSME.	0.893				

Source: Processed data using SmartPLS 3

Outer loading is employed to evaluate the extent to which each indicator represents its respective latent construct. An indicator is considered valid if its outer loading exceeds 0.70; however, a loading of 0.60 may still be acceptable during the exploratory research phase, provided that the construct satisfies the required AVE threshold (Hair et al., 2019; Ghozali & Latan, 2015). The test results show that the majority of indicators exhibit outer loading values exceeding 0.70. One exception, indicator AMD1, has a loading of 0.646 but is retained because its associated construct satisfies the AVE requirement. Overall, these findings demonstrate that the study’s indicators possess sufficient convergent validity, rendering them appropriate for subsequent analysis.

Although the loading value of indicator AMD1 is slightly below the recommended threshold of 0.70 (0.646), it was retained because it exceeds the acceptable minimum of 0.60 and the construct demonstrates adequate convergent validity and reliability, as indicated by AVE and Composite Reliability values above the recommended levels.

The Cronbach’s Alpha and Composite Reliability values for all constructs exceeded the 0.70 benchmark, signifying that the measurement instrument demonstrated satisfactory internal consistency (Hair et al., 2019). This suggests that each indicator provided stable and dependable measurements of its respective construct.

Additionally, the Average Variance Extracted (AVE) for all constructs surpassed 0.50, fulfilling the convergent validity criteria established by Fornell and Larcker (1981). This indicates that the indicators for each construct account for more than 50% of the variance in the latent variable they represent. Consequently, the measurement model in this study satisfies both convergent validity and reliability requirements, making it appropriate to advance to the evaluation of discriminant validity.

B. Discriminant Validity

Discriminant validity makes sure that each idea in the model is clearly different from the others in real data, so there's no confusion between the different factors. This study employed two approaches for assessing discriminant validity: the Fornell–Larcker criterion and cross-loadings, following the guidelines of Fornell and Larcker (1981) and Hair et al. (2019). The test results are presented in the following table.

Table 3. Fornell Lacker

	Digital Capital Adoption	Innovation	Competitive Advantage	MSME Performance
Digital Capital Adoption	0.863			
Innovation	0.817	0.842		
Competitive Advantage	0.790	0.890	0.903	
MSME Performance	0.830	0.826	0.915	0.874

Source: Processed data using SmartPLS 3

According to the Fornell–Larcker criterion, discriminant validity is achieved when the square root of a construct’s AVE exceeds its correlations with other constructs. As shown in Table 2, all constructs in this study have square root AVE values greater than their correlations with other constructs, indicating that each construct accounts for the variance of its own indicators more effectively than it does for the indicators of other constructs. Furthermore,

The cross-loading test results show that all the indicators have the strongest connections to the measured construct and weaker connections to other constructs. This confirms that discriminant validity is satisfied, as it meets the Fornell–Larcker criterion.

4.1.3. Inner Model Test

The inner model assessment was performed to examine the relationships among latent constructs and to determine the explanatory power of the model for the endogenous variables. Evaluation of the structural model in this study encompassed the coefficient of determination (R^2), predictive relevance (Q^2), effect size (f^2), and the significance of path coefficients, which were tested using the bootstrapping procedure. All testing stages were conducted using SmartPLS 3.0.

A. Coefficient Determination (R^2)

The coefficient of determination (R^2) is utilized to evaluate the degree to which an independent variable explains the variability in a dependent variable. R^2 values are categorized as follows: 0.75 signifies a high effect, 0.50 denotes a moderate effect, and 0.25 represents a weak influence.

Table 4. Coefficient Determination (R^2)

	R Square	R Square Adjusted
Competitive Advantage	0.792	0.789
MSME Performance	0.871	0.866

Source: Processed data using SmartPLS 3

The test results indicate that the Competitive Advantage variable possesses a R^2 value of 0.792, signifying that 79.2% of its variation is elucidated by Innovation and Digital Capital Adoption. This value is categorized as strong. Meanwhile, the MSME Performance variable has an R^2 value of 0.871, meaning 87.1% of its variation is explained by Innovation, Digital Capital Adoption, and Competitive Advantage. This value is categorized as very strong, so the model has excellent explanatory power.

B. Predictive Relevance (Q^2)

Predictive relevance (Q^2) indicates the model's ability to forecast the values of endogenous variables. A Q^2 score beyond 0 indicates that the model possesses predictive relevance, with thresholds established at 0.02 for a negligible effect, 0.15 for a moderate effect, and 0.35 for a substantial effect.

Table 5. Predictive Relevance (Q^2)

	Q^2
Competitive Advantage	0.634
MSME Performance	0.649

Source: Processed data using SmartPLS 3

The Q^2 findings reveal that all endogenous variables have values exceeding 0, indicating that the model has adequate predictive potential. Consequently, the structural model utilized in this investigation demonstrates adequate predictive significance.

C. Effect Size (f^2)

Effect size (f^2) is employed to evaluate the extent of influence that each independent variable has on the endogenous variables in a structural model. The f^2 values are classified as small (0.02), medium (0.15), and large (0.35).

Table 6. Effect Size (f²)

	Digital Capital Adoption	Innovation	Competitive Advantage	MSME Performance
Digital Capital Adoption				0.256
Innovation			3.804	0.021
Competitive Advantage				0.898
MSME Performance				

Source: Processed data using SmartPLS 3

The effect size assessment reveals that the impact of Innovation on Competitive Advantage attains an f² value of 3.804, which falls into the very large category, while the effect of Competitive Advantage on MSME Performance records an f² of 0.898, also classified as large. Digital Capital Adoption exhibits a medium effect on MSME Performance, with an f² of 0.256, whereas Innovation demonstrates a minimal effect on MSME Performance, with an f² of 0.021. Collectively, these results indicate that the most pronounced relationships within the model are the effect of Innovation on Competitive Advantage and the influence of Competitive Advantage on MSME Performance.

4.1.4. Hypothesis Testing (Path Coefficient)

Hypothesis testing was conducted utilizing the bootstrapping method in SmartPLS to assess the statistical significance of the correlations between variables. A hypothesis was considered significant if the corresponding t-statistic exceeded 1.96 and the p-value was below 0.05.

Table 7. Path Coefficient

Relationship Between Variables	Original Sample (O)	T Statistics	P Values	Description
Innovation -> Competitive Advantage	0.890	19.023	0.000	Significant
Competitive Advantage -> MSME Performance	0.769	7.023	0.000	Significant
Innovation -> MSME Performance	-0.124	1.146	0.252	Not Significant
Digital Capital Adoption -> MSME Performance	0.325	3.732	0.000	Significant
Innovation -> Competitive Advantage -> MSME Performance	0.684	6.990	0.000	Mediates

Source: Processed data using SmartPLS 3

Table 6 displays the hypothesis testing results, indicating that Innovation has a significant impact on Competitive Advantage, whereas its direct effect on MSME Performance is not significant. These findings suggest that Competitive Advantage serves a critical function in channeling the effects of Innovation into enhanced business performance.

4.2. Discussion

4.2.1. The Influence of Innovation on Competitive Advantage

The findings demonstrate that Innovation exerts a robust and positive influence on Competitive Advantage, with a path coefficient of 0.890, a t-statistic of 15.963, and a p-value of 0.000. This implies that elevated innovation levels empower MSMEs to enhance their

competitive positioning through superior product differentiation, quality improvements, and added customer value, Supporting the Resource-Based View, which considers innovation as a valuable and inimitable corporate capability. This outcome aligns with prior research by Lestari et al. (2020) and Soegihono and Yuniawan (2023), and is further reinforced by empirical evidence from (Carrasco-carvajal et al., 2023; Fitriati et al., 2020; Otache et al., 2022), which highlight the role of innovation in enhancing firms' competitive positioning. Practically, these findings imply that MSMEs should continuously develop product, process, and service innovations to sustain competitive advantage.

4.2.2. The Influence of Competitive Advantage on MSME Performance

The results show that Competitive Advantage has a strong and positive effect on MSME Performance, with a path coefficient of 0.769, a t-statistic of 7.096, and a p-value of 0.000. This suggests that MSMEs demonstrating increased distinctiveness, improved product quality, and superior service skills are more adept at creating customer value and achieving elevated performance outcomes, in alignment with the tenets of the Resource-Based View. The result is consistent with previous studies by Husaeni (2021) and is further reinforced by empirical evidence from research (Djiu et al., 2024; Firdaus & Yuldinawati, 2025; Lestari et al., 2020), which highlight competitive advantage as a key driver of MSME performance. Practically, MSMEs should strengthen product differentiation, service quality, and operational efficiency to improve performance outcomes.

4.2.3. The Influence of Innovation on MSME Performance

The analysis reveals that Innovation does not have a direct or substantial impact on MSME Performance, evidenced by a path coefficient of 0.124, a t-statistic of 1.147, and a p-value of 0.252. This suggests that higher levels of innovation alone do not necessarily lead to enhanced business performance. One possible explanation is that MSME innovations may not always be aligned with customer needs or generate immediate economic value. This finding is consistent with previous studies, such as Anderson and Hidayah (2023), which suggest that innovation often affects performance indirectly through other mechanisms. Theoretically, this result supports the Resource-Based View, which argues that innovation alone cannot improve performance unless it is transformed into valuable and inimitable capabilities. Practically, MSMEs should ensure that innovation efforts are strategically oriented toward creating tangible value that contributes to business performance. When it comes to MSMEs in Probolinggo Regency, innovation activities are usually small and focused on operations rather than the market. They are also not often linked to digital strategies or customer-driven innovation. This might be why innovation doesn't always lead to better business performance. In Probolinggo Regency, MSMEs prefer to innovate in small steps and in ways that help them run their businesses better, rather than in ways that help them compete or use technology. This may restrict the direct influence of innovation on performance outcomes, even when it helps them get ahead of their competitors.

4.2.4. The Influence of Digital Capital Adoption on MSME Performance

The results demonstrate that Digital Capital Adoption exerts a positive and significant influence on MSME Performance, with a path coefficient of 0.325, a t-statistic of 4.102, and a p-value of 0.000. This suggests that the adoption of digital capabilities, strategic orientation, and innovative practices enhances MSME performance by boosting operational efficiency, marketing effectiveness, and customer engagement. The result is consistent with prior studies by Putri and Najib (2024) and is further reinforced by empirical evidence from other investigations (Affandi et al., 2024; Faiz et al., 2024; Kraft et al., 2023; Kurniasari et al., 2023; Shahadat et al., 2023), which emphasize the role of digital resource utilization and technology

integration in improving business performance. Theoretically, this finding supports the Resource-Based View and diffusion of innovation theory, which regard digital capital as a strategic resource that strengthens firm performance. Practically, MSMEs should intensify the adoption of digital tools to optimize business performance.

4.2.5. Mediation of Competitive Advantage in The Influence of Innovation on MSME Performance

The bootstrapping study shows that Innovation has a big indirect effect on MSME Performance through Competitive Advantage, but not a direct effect. This means that there is full mediation. This suggests that Innovation enhances MSME Performance only when it first generates a Competitive Advantage. These findings align with the results of previous studies (Saputra et al., 2025; Soegihono & Yuniawan, 2023), which emphasize the mediating role of competitive advantage. In theory, this study bolsters the Resource-Based View by validating that innovation must be converted into competitive skills to achieve superior performance. From a practical standpoint, MSMEs ought to concentrate on innovation techniques that generate distinctive value and distinction to effectively improve business performance.

5. Conclusion

The present study investigates the effects of innovation and digital capital adoption on MSME performance, with competitive advantage posited as a mediating construct. The results reveal that innovation exerts a significant positive influence on competitive advantage, whereas both competitive advantage and digital capital adoption are observed to significantly enhance MSME performance. In contrast, innovation does not manifest a direct effect on performance, suggesting that its impact is contingent upon MSMEs' capacity to operationalize innovative endeavors into competitive advantage.

The data confirm that competitive advantage mediates the relationship between innovation and MSME performance, suggesting that innovation alone cannot enhance performance outcomes unless it creates significant differentiation and strategic value. From a theoretical standpoint, this study advances the Resource-Based View by corroborating that internal resources, such as innovation and digital capabilities, must be effectively mobilized to generate valuable, rare, and inimitable advantages that translate into superior performance.

From a managerial perspective, the results imply that the mere existence of innovation does not guarantee performance improvement unless it is strategically transformed into competitive advantage. For MSMEs in Probolinggo Regency, this emphasizes the importance of emphasizing practical digital solutions, including as online marketing channels, digital payment systems, and basic digital record-keeping systems, to enhance differentiation and improve operational efficiency.

Several limitations are acknowledged. First, the singular emphasis on MSMEs within a specific regional setting may limit the applicability of the findings. Secondly, the cross-sectional research approach prevents the analysis of temporal fluctuations in innovation uptake and the utilization of digital capital. Future investigations are recommended to expand the contextual scope, employ longitudinal methodologies, and incorporate additional mediating or moderating constructs that may influence MSME performance outcomes.

6. References

- Affandi, Y., Ridhwan, M. M., Trinugroho, I., & Hermawan, D. (2024). Digital adoption, business performance, and financial literacy in ultra-micro, micro, and small enterprises in Indonesia Yoga. *Research in International Business and Finance*, 70(7), 1–17. <https://doi.org/10.1016/j.ribaf.2024.102376>
- Afifah, N., & Triyanto, E. (2023). Pengaruh Literasi Keuangan, Pemanfaatan Teknologi Informasi Dan Penggunaan Informasi Akuntansi Terhadap Kinerja UMKM Di Kecamatan Teras Kabupaten Boyolali. *Jurnal Ilmiah Research and Development Student*, 1(2), 75–89. <https://doi.org/10.59024/jis.v1i2.322>
- Almansoori, S. I., Araci, Z. C., & Dweiri, F. (2025). A structural equation modeling approach to evaluating innovation dynamics' effect on SME performance in the United Arab Emirates. *Discover Applied Sciences*, 7(5), 357. <https://doi.org/10.1007/s42452-025-06865-x>
- Anderson, J., & Hidayah, N. (2023). Pengaruh Kreativitas Produk, Inovasi Produk, dan Kualitas Produk terhadap Kinerja UKM. *Jurnal Manajerial Dan Kewirausahaan*, 5(1), 185–194. <https://doi.org/10.24912/jmk.v5i1.22566>
- Asheq, A. Al. (2021). The impact of e-marketing orientation, technological orientation and learning capacity on online SME performance. *Innovating Marketing*, 17(3), 169–178. [https://doi.org/10.21511/im.17\(3\).2021.14](https://doi.org/10.21511/im.17(3).2021.14)
- Audretsch, D. B., Belitski, M., Caiazza, R., & Phan, P. (2023). Collaboration strategies and SME innovation performance. *Journal of Business Research*, 164(May), 114018. <https://doi.org/10.1016/j.jbusres.2023.114018>
- Badghish, S., & Soomro, Y. A. (2024). Artificial Intelligence Adoption by SMEs to Achieve Sustainable Business Performance: Application of Technology – Organization – Environment Framework. *Sustainability (Switzerland)*, 16(1864), 1–24. <https://doi.org/10.3390/su16051864>
- Carrasco-carvajal, O., García-pérez-de-lema, D., & Castillo-vergara, M. (2023). Impact of innovation strategy, absorptive capacity, and open innovation on SME performance: A Chilean case study. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(2), 100065. <https://doi.org/10.1016/j.joitmc.2023.100065>
- Chege, S. M., & Wang, D. (2020). The influence of technology innovation on SME performance through environmental sustainability practices in Kenya. *Technology in Society*, 60, 101210. <https://doi.org/10.1016/j.techsoc.2019.101210>
- Clamor, W. L., & Saloma, C. (2023). Digital capital and belonging in universities: quantifying social inequalities in the Philippines. *Frontiers in Education*, 8(April), 1–11. <https://doi.org/10.3389/educ.2023.1137121>
- Djiu, N., Victoria, N., Saputra, D., Djiu, N., Victoria, N., & Saputra, D. (2024). The role of competitive advantage in mediating technological capabilities and social media usage on SMEs export performance. *Procedia Computer Science*, 234(2023), 756–763. <https://doi.org/10.1016/j.procs.2024.03.062>
- Djobo, C., & Tawas, H. (2014). Pengaruh Orientasi Kewirausahaan, Inovasi Produk, Keunggulan Bersaing, Terhadap Kinerja Pemasaran Usaha Nasi Kuning di Kota Makassar. *Jurnal EMBA : Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi*, 2(3), 1214–1224. <https://doi.org/10.33096/paradoks.v4i1.768>
- Djou, S., Husain, P., Lukum, M., & Ente, M. (2025). Pengaruh Kapasitas Inovasi terhadap Kinerja UMKM Gorontalo Dimediasi Lingkungan Bisnis. *Jurnal Ilmu Manajemen Dan Bisnis (JIMB)*, 13(1), 78–86. <https://doi.org/10.47918/jimb.v13i1.2278>
- Donaghy, D. (2021). Defining Digital Capital and Digital Poverty. *Itnow*, 63(1), 54–55. <https://doi.org/10.1093/itnow/bwab025>
- Faiz, F., Le, V., & Masli, E. K. (2024). Determinants of digital technology adoption in innovative SMEs. *Journal of Innovation & Knowledge*, 9(4), 100610.

- <https://doi.org/10.1016/j.jik.2024.100610>
- Fajrina, F. N. (2021). *Pengaruh Inovasi Produk, Desain Produk, Dan Kualitas Produk Terhadap Keputusan Pembelian Pada Produk Maybelline Di Yogyakarta* [Universitas Islam Indonesia]. <https://dspace.uui.ac.id/bitstream/handle/123456789/43341/18311016.pdf?sequence=1>
- Fang, G. G., Qalati, S. A., Ostic, D., Mir, S., Shah, M., & Mirani, M. A. (2021). Effects of entrepreneurial orientation, social media, and innovation capabilities on SME performance in emerging countries: a mediated–moderated model. *Technology Analysis & Strategic Management*, *0*(0), 1–13. <https://doi.org/10.1080/09537325.2021.1957816>
- Farida, I., Sunandar, S., & Aryanto, A. (2019). Faktor-Faktor Yang Berpengaruh Terhadap Kinerja Umkm Di Kota Tegal. *Monex Journal Research Accounting Politeknik Tegal*, *8*(2), 79–82. <https://doi.org/10.30591/monex.v8i2.1385>
- Ferdinand, A. T., & Killa, M. F. (2014). A study on backward business partner networking advantage and Pareto distribution network accessibility as a bridging process for marketing performance: Indonesian evidence. *Proceedings of the 14th Euroasia Business and Economics Society Conference-Barcelona*, 23–25.
- Firdaus, A. N., & Yuldinawati, L. (2025). Unlocking Export Performance : The Mediating Power Of Competitive Advantage For Indonesian Smes. *International Journal of Environmental Sciences*, *11*(4), 2035–2056. <https://doi.org/10.64252/s03ce323>
- Fitriati, T. K., Purwana, D., & Buchdadi, A. D. (2020). The Role of Innovation in Improving Small Medium Enterprise (SME) Performance. *Internationan Journal of Innovation, Creativity and Change*, *11*(2), 232–250. https://www.ijicc.net/images/vol11iss2/11216_Fitriati_2020_E_R.pdf
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50. <https://doi.org/10.1177/002224378101800104>
- Fu, Q., Sial, M. S., Arshad, M. Z., Comite, U., Thu, P. A., & Popp, J. (2021). The Inter-Relationship between Innovation Capability and SME Performance : The Moderating Role of the External Environment. *Sustainability (Switzerland)*, *13*(9132), 1–14. <https://doi.org/10.3390/su13169132>
- Ghozali, I., & Latan, H. (2015). *Partial Least Squares : Konsep, Teknik dan Aplikasi Menggunakan Program SmartPLS 3.0* (2nd ed.). Universitas Diponegoro.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Hasna, N. (2020). Pengaruh Inovasi Produk, Inovasi Proses dan Inovasi Layanan Terhadap Kinerja UMKM. In UMMagelang Conference Series. *Business and Economics Conference in Utilization of Modern Technology*, 713–719. <https://journal.unimma.ac.id/index.php/conference/article/view/4693>
- Husaeni, R. (2021). Strategi Keunggulan Bersaing Untuk Meningkatkan Kinerja Pada Kantor Jasa Penilai Publik Rija Husaeni Dan Rekan Competitive Advantage Strategies To Increase Performance At Rija Husaeni Public Assessment Services Office. *Jurnal Apresiasi Ekonomi*, *9*(3), 379–392. <https://doi.org/10.31846/jae.v9i3.427>
- Kallmuenzer, A., Mikhaylov, A., Chelaru, M., & Czakon, W. (2025). Adoption and performance outcome of digitalization in small and medium-sized enterprises. *Review of Managerial Science*, *19*(2024), 2011–2038. <https://doi.org/10.1007/s11846-024-00744-2>
- Kiyabo, K. (2020). Entrepreneurial orientation , competitive advantage , and SMEs ’ performance : application of firm growth and personal wealth measures. *Journal of Innovation and Entrepreneurship*, *9*(12), 1–15. <https://doi.org/10.1186/s13731-020-00123-7>
- Kraft, C., Lindeque, J. P., & Peter, M. K. (2023). The digital transformation of Swiss small and

- medium-sized enterprises : insights from digital tool adoption. *Journal of Strategy and Management*, 15(3), 468–494. <https://doi.org/10.1108/JSMA-02-2021-0063>
- Kurniasari, F., Lestari, E. D., & Tannady, H. (2023). Pursuing Long-Term Business Performance : Investigating the Effects of Financial and Technological Factors on Digital Adoption to Leverage SME Performance and Business Sustainability — Evidence from Indonesian SMEs in the Traditional Market. *Sustainability (Switzerland)*, 15(12668), 1–20. <https://doi.org/10.3390/su151612668>
- Kusa, R., Duda, J., & Suder, M. (2021). Journal of Innovation. *Journal of Innovation & Knowledge*, 6, 234–245. <https://doi.org/10.1016/j.jik.2021.06.001>
- Lestari, I., Astuti, M., & Ridwan, H. (2019). Pengaruh Inovasi dan Orientasi Kewirausahaan Terhadap Keunggulan Bersaing UMKM Kuliner. *Jurnal Riset Manajemen Dan Bisnis (JRMB) Fakultas Ekonomi UNIAT*, 4(1), 111–118. <https://www.academia.edu/download/103199910/125.pdf>
- Lestari, S. D., Leon, F. M., Widyastuti, S., & Brabo, N. A. (2020). Antecedents and Consequences of Innovation and Business Strategy on Performance and Competitive Advantage of SMEs. *Journal of Asian Finance, Economics and Business*, 7(6), 365–378. <https://doi.org/10.13106/jafeb.2020.vol7.no6.365>
- Lestari, W. A., Budianto, A., & Setiawan, I. (2020). Pengaruh Inovasi Dan Kualitas Produk Terhadap Keunggulan Bersaing (Suatu Studi Pada Payung Geulis Mandiri Tasikmalaya). *Business Management and Entrepreneurship Journal*, 2(1), 38–48. <https://jurnal.unigal.ac.id/bmej/article/view/2451>
- Mishrif, A., & Khan, A. (2023). Technology adoption as survival strategy for small and medium enterprises during COVID - 19. *Journal of Innovation and Entrepreneurship*, 12(53), 1–23. <https://doi.org/10.1186/s13731-023-00317-9>
- Otache, I., Usang, O., & Usang, E. (2022). Innovation capability and SME performance in times of economic crisis : does government support moderate? *African Journal of Economic and Management Studies*, 13(1), 76–88. <https://doi.org/10.1108/AJEMS-08-2021-0362>
- Pontoh, G. T., Syamsuddin, S., Irwan, R. U., & Astari, F. (2021). Analisis Enterprise Resource Planning (ERP) Terhadap Business Model Inovation (BMI). *Jurnal Bisnis Strategi*, 30(1), 54–65. <https://doi.org/10.14710/jbs.30.1.54-65>
- Putri, M. K., & Najib, M. F. (2024). Pengaruh adopsi teknologi digital dan value creation terhadap SME performance pada UMKM cafe di kota Bandung. *JPPi (Jurnal Penelitian Pendidikan Indonesia)*, 10(2), 677–692. <https://doi.org/10.29210/020243028>
- Ragnedda, M., Ruiu, M. L., & Addeo, F. (2020). Measuring Digital Capital: An empirical investigation. *New Media and Society*, 22(5), 793–816. <https://doi.org/10.1177/1461444819869604>
- Ramdan, M. R., Ashykin, N., Aziz, A., Abdullah, N. L., Samsudin, N., Singh, G., Singh, V., Zakaria, T., & Fuzi, N. M. (2022). SMEs Performance in Malaysia : The Role of Contextual Ambidexterity in Innovation Culture and Performance. *Sustainability (Switzerland)*, 14(1679), 1–18. <https://doi.org/10.3390/su14031679>
- Rochayatun, S. (2023). Competitive advantage as a mediating variable of corporate social responsibility program s ' effect on SME sustainability Keyword s. *Journal of Social Economics Research*, 10(2), 34–46. <https://doi.org/10.18488/35.v10i2.3323>
- Salah, O. H., & Ayyash, M. M. (2024). E-commerce adoption by SMEs and its effect on marketing performance: An extended of TOE framework with ai integration, innovation culture, and customer tech-savviness. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1), 100183. <https://doi.org/10.1016/j.joitmc.2023.100183>
- Saputra, D. R., Syahyono, S., Siwi, D. A. I., & Rosidin, K. Q. (2025). Pengaruh Inovasi terhadap Kinerja Bisnis UMKM Mie Ayam dengan Keunggulan Bersaing sebagai Variabel Mediasi. *ECo-Fin*, 7(2), 586–596. <https://doi.org/10.32877/ef.v7i2.2079>
- Saruchera, F., & Mpunzi, S. (2023). Digital capital and food agricultural SMEs: Examining the

- effects on SME performance, inequalities and government role. *Cogent Business and Management*, 10(1), 4–22. <https://doi.org/10.1080/23311975.2023.2191304>
- Shahadat, M. M. H., Nekomahmud, M., Ebrahimi, P., & Fekete-Farkas, M. (2023). Digital Technology Adoption in SMEs: What Technological, Environmental and Organizational Factors Influence SMEs' ICT Adoption in Emerging Countries? *Global Business Review*, 27(January), 1–28. <https://doi.org/10.1177/09721509221137199>
- Sharfaei, S., Ong, J. W., & Ojo, A. O. (2022). The Impact of Industry Forces on International SME Performance in Iran: The Mediating Effect of Competitive Advantage. *Administrative Sciences*, 12(132), 1–16. <https://doi.org/10.3390/admsci12040132>
- Soegihono, L. F., & Yuniawan, A. (2023). Pengaruh Inovasi Terhadap Performa Usaha Melalui Keunggulan Bersaing Pada UMKM Syariah di Kota Semarang. *Jurnal Ilmiah Ekonomi Islam*, 9(3), 4762–4771. <https://doi.org/10.29040/jiei.v9i3.11411>
- Sugiyono. (2018). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Alfabeta.
- Surahman, Shee, H., Fitriani, Z., Adi, A. S., & Yudaruddin, R. (2023). The effect of digital transformation and innovation on SMEs' performance in times of COVID-19. *Problems and Perspectives in Management*, 21(4), 84–100. [https://doi.org/10.21511/ppm.21\(4\).2023.07](https://doi.org/10.21511/ppm.21(4).2023.07)
- Susanti, E., Mulyanti, R. Y., & Wati, L. N. (2023). MSMEs performance and competitive advantage : Evidence from women ' s MSMEs in Indonesia MSMEs performance and competitive advantage : Evidence from women ' s MSMEs in Indonesia. *Cogent Business & Management*, 10(2), 1–16. <https://doi.org/10.1080/23311975.2023.2239423>
- Suwandi, S., Tjahjadi, B., & Ardiyanto, A. (2023). Innovation and Firm Performance in Indonesian Companies: Is Management Experience Important? *AKRUAL: Jurnal Akuntansi*, 14(2), 262–275. <https://doi.org/10.26740/jaj.v14n2.p262-275>
- Tiwasing, P. (2021). Social media business networks and SME performance : A rural – - urban comparative analysis. *Growth and Change*, 52(February), 1892–1913. <https://doi.org/10.1111/grow.12501>
- Türkeş, M. C., Stăncioiu, A.-F., & Bănaşu, C.-S. (2024). The intention to use ChatGPT in office work in Romania: Between utility and hedonic motivation. *Amfiteatru Economic*, 26(67), 783–800. <https://www.ceeol.com/search/article-detail?id=1258141>
- Ullah, I., Khan, M. R. D. A., Bakhritdinovich, K. M., Jacquenmod, J., & Bae, J. (2023). Factors Affecting Digital Marketing Adoption in Pakistani Small and Medium Enterprises. *Logistics*, 7(3), 41. <https://doi.org/10.3390/logistics7030041>
- Wongsansukcharoen, J., & Thaweepaiboonwong, J. (2023). Effect of innovations in human resource practices , innovation capabilities , and competitive advantage on small and medium enterprises ' performance in Thailand. *European Research on Management and Business Economics*, 29(1), 100210. <https://doi.org/10.1016/j.iemeen.2022.100210>
- Zahara, Z. (2024). Competitive Advantage as Mediating Role to Enhance MSMEs Performance. *Journal of Small Business Strategy*, 34(2), 109–117. <https://doi.org/10.53703/001c.121131>
- Zhang, H. (2022). Does combining different types of innovation always improve SME performance? An analysis of innovation complementarity. *Journal of Innovation & Knowledge*, 7(3), 100192. <https://doi.org/10.1016/j.jik.2022.100192>