International Journal of Economics, Business and Accounting Research (IJEBAR)
Peer Reviewed – International Journal
Vol.10, Issue-2, 2026 (IJEBAR)
E-ISSN: 2614-1280 P-ISSN 2622-4771
https://jurnal.stie-aas.ac.id/index.php/IJEBAR

THE ROLE OF INNOVATION CAPABILITY IN ENHANCING SME COMPETITIVE ADVANTAGE: EVIDENCE FROM INDONESIA'S DIGITAL ECONOMY

Bangun Prajadi Cipto Utomo[1*], Tri Djoko Santosa[2], Ilham Sentosa[3]
Universitas Duta Bangsa Surakarta, Indonesia[1,2]
Universiti Business School, Kuala Lumpur, Malaysia[3]
Email: bangun_prajadi@udb.ac.id[1]

Abstract: The rapid advancement of digital technologies has intensified competition among Small and Medium Enterprises (SMEs), requiring firms to continuously innovate, respond effectively to market changes, and leverage organizational knowledge to sustain competitive advantage. Although previous studies have examined these factors independently, limited research has investigated the integrated effects of open innovation, market orientation, and knowledge management on competitive advantage through innovation capability, particularly in emerging economies. This study examines the direct and indirect relationships among these variables using survey data collected from 200 Indonesian SMEs operating in manufacturing, trade, and service sectors. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results indicate that open innovation (β = 0.284), market orientation (β = 0.317), and knowledge management (β = 0.298) positively and significantly influence innovation capability. Furthermore, innovation capability significantly enhances competitive advantage (β = 0.412) and partially mediates the effects of the three antecedent variables. The model explains 68.4% of the variance in innovation capability and 74.1% of the variance in competitive advantage. These findings highlight innovation capability as a strategic mechanism that transforms knowledge resources, external collaboration, and market intelligence into sustainable competitive advantage in an increasingly digital economy.

Keywords: Open Innovation; Market Orientation; Knowledge Management; Innovation Capability; Competitive Advantage.

Submitted: 2026-06-08; Revised: 2026-06-12; Accepted: 2026-06-20

1. Introduction

Small and Medium Enterprises (SMEs) play a vital role in promoting economic growth, generating employment opportunities, fostering innovation, and improving social welfare. In Indonesia, SMEs represent more than 99% of all business establishments and make significant contributions to both national output and job creation. However, the rapid expansion of digital technologies has created new challenges, including intensified competition, evolving customer expectations, and ongoing digital transformation. The growing adoption of e-commerce, artificial intelligence, digital platforms, and data-driven business practices has fundamentally reshaped how organizations create and deliver value. To remain competitive and achieve sustainable growth, SMEs must continuously strengthen their

strategic capabilities, adapt to technological changes, and respond effectively to shifting market demands in an increasingly complex and dynamic business environment ((Rusminah & Purnomo, 2024; Al-Zubaidi et al., 2025: Ngo, 2023).

Among the strategic approaches that have gained significant attention, open innovation has emerged as an important mechanism through which firms access external knowledge, technologies, and collaborative networks to accelerate innovation and improve organizational performance. Through cooperation with customers, suppliers, universities, research institutions, and other stakeholders, SMEs can overcome internal resource constraints and enhance their ability to develop innovative products, services, and business processes (Ta'Amnha et al., 2023; Asad et al., 2023; Chesbrough, 2019). Simultaneously, market orientation enables organizations to identify customer needs, monitor competitor actions, and respond effectively to environmental changes, thereby improving innovation outcomes and business performance (Indrawati et al., 2026). Furthermore, knowledge management supports the acquisition, integration, sharing, and utilization of organizational knowledge, allowing firms to transform information into strategic assets that foster innovation, organizational learning, and sustainable competitiveness (Castro-pardo & Ruiz, 2023; Hafeez et al., 2025; Munte et al., 2025).

The importance of strategic capabilities is supported by several theoretical perspectives. The Resource Based View (RBV) suggests that sustainable competitive advantage arises from unique and difficult-to-imitate resources (Barney, 1991). Similarly, Knowledge Based Theory (KBT) identifies knowledge as a critical asset for enhancing organizational value and performance (Grant, 1998). Dynamic Capability Theory further emphasizes an organization's ability to adapt by integrating and reconfiguring resources in response to environmental changes. From these perspectives, innovation capability can be viewed as a strategic competence that enables firms to transform knowledge, market insights, and external collaboration into innovative outcomes that enhance competitive advantage (Febriyantoro et al., 2023; Lee, 2022).

Despite extensive research on SME competitiveness, several important gaps remain. First, previous studies have largely examined Open Innovation, Market Orientation, and Knowledge Management independently, resulting in limited understanding of their integrated effects on competitive advantage. Second, empirical findings remain inconsistent, with prior studies reporting significant, indirect, and context-dependent relationships among these variables. Third, although Innovation Capability has been recognized as a strategic organizational capability, its mediating role in transforming strategic resources into competitive advantage remains insufficiently explored. Fourth, most empirical evidence originates from developed economies, while studies in emerging digital economies such as Indonesia remain scarce. Finally, prior studies predominantly focus on direct relationships and provide limited insight into the underlying mechanisms linking strategic resources and competitive outcomes. Therefore, this study proposes an integrated framework that examines the mediating role of Innovation Capability in the relationship between Open Innovation, Market Orientation, Knowledge Management, and Competitive Advantage among Indonesian SMEs.

Table 1. Research Gap Analysis

Gap Type	Previous Studies	Research Limitation	Contribution of the Current Study
Theoretical Gap	Ngo (2023); Martín-de-Castro et al. (2023)	Open Innovation, Market Orientation, and Knowledge	Integrates Open Innovation, Market

		Management have largely been examined as separate constructs, resulting in limited theoretical integration.	Orientation, and Knowledge Management within a unified framework.
Empirical Gap	Previous empirical studies report mixed and inconsistent findings regarding the determinants of Competitive Advantage.	The relationships between strategic resources and Competitive Advantage remain inconclusive and context-dependent.	Examines both direct and indirect effects on Competitive Advantage
Mediating Gap	Existing studies provide limited evidence regarding the mediating role of Innovation Capability.	The mechanism through which strategic resources are transformed into Competitive Advantage remains insufficiently explained.	Positions Innovation Capability as a central mediating mechanism.
Contextual Gap	Most studies have been conducted in developed economies with mature innovation ecosystems.	Empirical evidence from emerging economies, particularly Indonesia, remains limited.	Focuses on Indonesian SMEs operating in a rapidly evolving digital economy.
Methodological Gap	Previous studies predominantly employ direct-effect models and conventional analytical approaches.	Limited attention has been given to mediation-based structural relationships.	Utilizes a PLS-SEM mediation model to examine complex direct and indirect relationships.

To address these research gaps, this study proposes and empirically validates an integrated framework that investigates how open innovation, market orientation, and knowledge management influence competitive advantage through innovation capability among Indonesian SMEs. The study offers three key contributions. First, it combines three strategic determinants that have often been examined separately in prior research. Second, it conceptualizes innovation capability as the primary mechanism through which organizational resources are translated into competitive advantage. Third, it extends the application of the Resource-Based View, Knowledge-Based Theory, and Dynamic Capability Theory within the context of SMEs operating in a rapidly evolving digital economy.

This research contributes to the strategic management and innovation literature by providing a more comprehensive understanding of the drivers of SME competitiveness. Practically, the findings offer valuable insights for business owners, managers, and policymakers in developing innovation-oriented strategies that enhance competitiveness and long-term sustainability. Accordingly, this study examines the direct effects of open innovation, market orientation, and knowledge management on innovation capability and competitive advantage, while also evaluating the mediating role of innovation capability in strengthening the competitive position of Indonesian SMEs.

2. Literature Review

2.1 Open Innovation and Innovation Capability

In increasingly dynamic and technology-driven business environments, firms can no longer rely solely on internal resources to generate innovation. Open innovation enables

organizations to access external knowledge, technologies, expertise, and collaborative networks that complement internal capabilities and accelerate innovation processes. Through strategic interactions with customers, suppliers, universities, research institutions, and industry partners, firms gain access to diverse knowledge sources that stimulate creativity, learning, and experimentation.

Recent studies suggest that open innovation contributes significantly to innovation capability by facilitating knowledge exchange, reducing innovation costs, and improving organizational adaptability (Zan et al., 2023; Yusuf & Hartono, 2024; Nuaimi et al., 2024). From the perspective of Dynamic Capability Theory, open innovation allows firms to sense opportunities, seize external resources, and transform them into innovative outputs. SMEs, in particular, often face resource constraints that limit internal research and development activities. Consequently, collaboration with external stakeholders becomes an essential mechanism for enhancing innovation capability and sustaining competitiveness.

Empirical evidence consistently demonstrates that firms actively engaged in open innovation practices tend to exhibit higher levels of innovation capability than firms relying exclusively on internal knowledge resources. Therefore, open innovation is expected to strengthen SMEs' ability to develop new products, services, and business processes.

H1: Open innovation positively influences innovation capability.

2.2 Market Orientation and Innovation Capability

Market orientation reflects an organization's commitment to understanding customer needs, monitoring competitor behavior, and responding effectively to market changes. In highly competitive digital markets, firms that continuously collect and utilize market intelligence are better positioned to identify emerging opportunities and anticipate shifts in customer preferences.

According to Resource-Based View, market knowledge represents a valuable strategic resource that supports organizational decision-making and innovation activities. Market-oriented firms are more likely to transform customer insights into innovative products and services because they possess a deeper understanding of market demands and competitive dynamics. Recent studies indicate that market orientation significantly enhances innovation capability by encouraging firms to align innovation initiatives with customer expectations and market opportunities (Ayu et al., 2025; Indrawati et.al, 2026).

Moreover, market-oriented organizations tend to develop stronger learning mechanisms that facilitate the continuous generation and implementation of innovative ideas. Consequently, firms with higher levels of market orientation are expected to demonstrate superior innovation capability.

H2: Market orientation positively influences innovation capability.

2.3 Knowledge Management and Innovation Capability

Knowledge has increasingly been recognized as a strategic organizational asset that drives innovation and long-term competitiveness. Knowledge management refers to the systematic processes through which organizations acquire, create, share, store, and apply knowledge to achieve strategic objectives.

Knowledge-Based Theory argues that organizational knowledge constitutes the most important source of sustainable competitive advantage because it is difficult for competitors to imitate. Effective knowledge management enhances innovation capability by facilitating organizational learning, improving knowledge integration, and supporting problem-solving

activities. Organizations that successfully manage knowledge resources are better equipped to generate innovative solutions and adapt to environmental changes.

Recent empirical studies have confirmed that knowledge management significantly improves innovation performance, organizational agility, and innovation capability (Hasanein, 2026; Chen et al., 2025; Elistia et al., 2024). Through continuous knowledge sharing and learning processes, firms can transform accumulated knowledge into innovative products, services, and operational improvements.

Therefore, effective knowledge management is expected to strengthen innovation capability among SMEs.

H3: Knowledge management positively influences innovation capability.

2.4 Competitive Advantage

Competitive advantage refers to a firm's ability to achieve superior performance and create greater value than its competitors through the effective utilization of strategic resources and capabilities. According to Porter & Porter (1985), competitive advantage originates from two primary sources: cost advantage and differentiation advantage(Porter & Porter, 1985). Cost advantage enables firms to operate more efficiently and offer products or services at lower costs than competitors, while differentiation advantage allows firms to provide unique features, superior quality, innovative solutions, or enhanced customer experiences that are perceived as valuable by customers. These strategic positions enable firms to achieve superior market performance, customer loyalty, and profitability. In increasingly dynamic and technology-driven markets, competitive advantage is no longer determined solely by tangible resources but also by organizational capabilities that facilitate continuous adaptation and value creation (Barney, 1991).

The concept of sustainable competitive advantage extends beyond temporary market superiority and emphasizes a firm's ability to maintain its advantageous position over time despite environmental changes and competitive pressures. From the Resource-Based View (RBV), sustainable competitive advantage emerges when organizational resources and capabilities are valuable, rare, inimitable, and non-substitutable (Barney, 1991). Complementing this perspective, Dynamic Capability Theory argues that firms must continuously integrate, build, and reconfigure internal and external resources to sustain competitiveness in rapidly changing environments (Teece et al., 1997), Consequently, innovation capability becomes a critical strategic capability that enables organizations to develop differentiated offerings, improve operational efficiency, respond to evolving customer needs, and maintain long-term competitiveness. Recent studies have confirmed that firms with stronger innovation capability are more likely to achieve sustainable competitive advantage through enhanced flexibility, market responsiveness, and continuous value creation (Otache, 2026; Dukhaykh & Alangri, 2026; Febrianto & Rufaidah, 2026).

2.5 Innovation Capability and Competitive Advantage

Innovation capability represents an organization's ability to continuously develop and implement new ideas, products, services, and business processes in response to environmental changes. In rapidly evolving markets, innovation capability serves as a critical mechanism through which firms maintain competitiveness and create superior customer value.

Dynamic Capability Theory suggests that innovation capability enables firms to reconfigure resources and adapt to changing market conditions more effectively than

competitors. Firms with strong innovation capability are better positioned to introduce differentiated products, improve operational efficiency, and respond quickly to customer needs.

Recent studies consistently indicate that innovation capability contributes significantly to competitive advantage by enhancing product differentiation, organizational flexibility, and market responsiveness (Paovangsa et al., 2025; (Paovangsa et al., 2025)Prajadi et al., 2024). As a result, firms possessing superior innovation capability are more likely to achieve sustainable competitive advantage.

H4: Innovation capability positively influences competitive advantage.

2.6 Open Innovation and Competitive Advantage

Open innovation provides organizations with access to external resources and knowledge that can improve organizational performance and competitiveness. By leveraging collaborative networks and external expertise, firms can accelerate innovation processes and reduce uncertainty associated with technological change.

Previous studies demonstrate that open innovation positively affects competitive advantage through improved product development, enhanced customer value, and stronger organizational adaptability (Annamalah et al., 2025; Yulianto & Supriono, 2023). Firms that successfully utilize external knowledge are more capable of differentiating themselves from competitors and sustaining superior market positions. Therefore, open innovation is expected to contribute directly to competitive advantage.

H5: Open innovation positively influences competitive advantage.

2.7 Market Orientation and Competitive Advantage

Market-oriented organizations possess superior abilities to identify customer needs and respond effectively to competitive pressures. This capability enables firms to create value propositions that better satisfy customers and strengthen market performance.

Several studies indicate that market orientation enhances competitive advantage by improving customer satisfaction, customer loyalty, and market responsiveness(Sinaga, 2024; Kirca et al., 2005). Firms that consistently align their strategies with market requirements are more likely to achieve superior competitive positions.

H6: Market orientation positively influences competitive advantage.

2.8 Knowledge Management and Competitive Advantage

Knowledge management supports organizational competitiveness by improving decision-making quality, operational efficiency, and innovation outcomes. Firms that effectively manage knowledge resources can develop unique capabilities that are difficult for competitors to replicate.

Recent empirical evidence confirms that knowledge management contributes directly to competitive advantage through enhanced organizational learning and strategic flexibility (Cheng et al., 2024; Faraz et al., 2025). Therefore, firms with strong knowledge management practices are expected to achieve higher levels of competitive advantage.

H7: Knowledge management positively influences competitive advantage.

2.9 The Mediating Role of Innovation Capability

While open innovation, market orientation, and knowledge management provide valuable strategic resources, these resources do not automatically translate into competitive

advantage. Their effectiveness largely depends on an organization's ability to transform them into innovative outputs. Innovation capability serves as a strategic mechanism that converts external knowledge, market intelligence, and organizational learning into products, services, and processes that create value for customers.

From the perspectives of RBV, KBT, and Dynamic Capability Theory, innovation capability acts as an internal transformation mechanism that enables firms to exploit strategic resources effectively. Previous studies suggest that innovation capability partially mediates the relationship between strategic resources and organizational performance (Kareem et al., 2024; Munte et al., 2025).

Based on the theoretical arguments and empirical evidence, innovation capability is proposed as a key mediating mechanism through which strategic organizational resources contribute to competitive advantage. Accordingly, the following hypotheses are formulated:
H8: Innovation capability mediates the effect of open innovation on competitive advantage.
H9: Innovation capability mediates the effect of market orientation on competitive advantage.
H10: Innovation capability mediates the effect of knowledge management on competitive advantage.

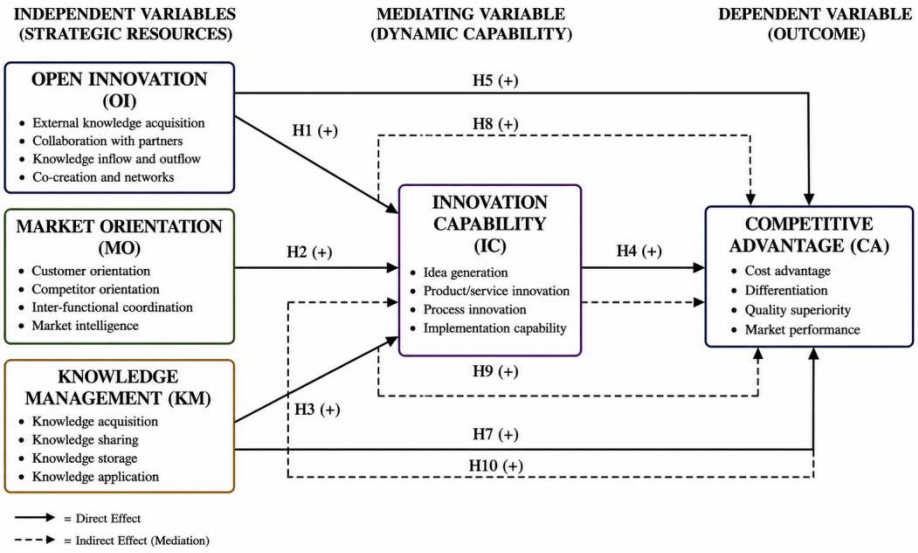


Figure 1. Research Framework

3. Research Method

All constructs were measured using multiple indicators adapted from previous studies and assessed on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Open Innovation (OI) was measured through external knowledge acquisition, collaboration with external partners, and utilization of external ideas. Market Orientation (MO) was assessed through customer orientation, competitor orientation, and interfunctional coordination. Knowledge Management (KM) comprised knowledge acquisition, knowledge sharing, and knowledge application. Innovation Capability (IC) was measured through product innovation, process innovation, and organizational innovation. Competitive Advantage (CA) was assessed through product uniqueness, market responsiveness, and superior business performance.

The target population comprised SMEs operating in the manufacturing, trade, and service sectors. Using purposive sampling, the study selected business owners and managers involved in strategic decision-making and digital business implementation. A total of 200 respondents participated in the survey, meeting the recommended sample size requirements for Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis (Hair et al., 2024; (Hair et al., 2024; Sarstedt et al., 2024).

Primary data were collected through structured questionnaires distributed via online and offline channels. All constructs were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Measurement indicators were adapted from established and validated studies related to innovation, market orientation, knowledge management, and competitive advantage (Abou-moghli, 2025; Zhang, 2024).

Data analysis was conducted using SmartPLS 4. PLS-SEM was chosen due to its suitability for complex predictive models, mediation analysis, and non-normal data distributions (Hair et al., 2024; Ringle, C. M., Wende, S., & Becker, 2024). The analytical procedure involved evaluating the measurement model and structural model. Measurement quality was assessed through convergent validity, discriminant validity, and reliability using outer loadings, Average Variance Extracted (AVE), Composite Reliability (CR), Cronbach's Alpha, and the Heterotrait-Monotrait Ratio (HTMT). The structural model was evaluated using path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and standardized root mean square residual (SRMR).

Hypothesis testing was performed using a bootstrapping procedure with 5,000 resamples. Relationships were considered significant when the t-statistic exceeded 1.96 and the p-value was below 0.05. The mediating effect of Innovation Capability was assessed through indirect effect analysis to determine its role in translating open innovation, market orientation, and knowledge management into sustainable competitive advantage among Indonesian SMEs (Ringle & Sinkovics, 2004).

4. Result and Discussion

4.1 Results

Respondent Profile

A total of 200 valid responses were obtained from SME owners and managers representing the manufacturing, trade, and service sectors in Indonesia. Participants were purposively selected based on their active involvement in strategic decision-making and their experience in adopting digital technologies to support business operations.

Table 2. Respondent Profile

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	118	59.0
	Female	82	41.0
Age	< 30 years	42	21,0
	30 – 40 years	78	39,0
	41 – 50 years	56	28,0
	> 50 years	24	12,0
Sector	Manufacturing	54	27,0
	Trade	82	41,0
	Services	64	32,0
Business Age	3 – 5 years	58	29,0
	6 – 10 years	81	40,5
	> 10 years	61	30,5

Education Level	High School	52	26,0
	Diploma	38	19,0
	Bachelor's Degree	89	44,5
	Posgraduate Degree	21	10,5
Number of Employees	1–10 Employees	96	48,0
	11–25 Employees	57	28,5
	26–50 Employees	29	14,5
	> 50 Employees	18	9,0
Annual Revenue	< IDR 500 million	48	24,0
	IDR 500 million–2.5 billion	86	43,0
	IDR 2.5–10 billion	44	22,0
	> IDR 10 billion	22	11,0

Table 4.1 presents the respondent profile. The majority of SME owners and managers were male (59.0%) and aged between 30–40 years (39.0%), representing the most productive entrepreneurial group. Most respondents operated in the trade sector (41.0%) and had managed their businesses for 6–10 years (40.5%), indicating relatively established business operations. In terms of educational background, most respondents held a bachelor's degree (44.5%). Furthermore, the majority of SMEs employed 1–10 employees (48.0%) and generated annual revenues of IDR 500 million–2.5 billion (43.0%). These characteristics suggest that the sample adequately represents Indonesian SMEs actively engaged in digital business activities and innovation-driven competition.

Measurement Model Assessment

Before examining the structural relationships among the constructs, the measurement model was assessed to verify the adequacy of its reliability and validity. This evaluation ensured that the latent variables were measured accurately and consistently, providing a sound basis for subsequent structural analysis

Convergent Validity

Table 3. Outer Loading Assessment

Construct	Indicator Range
Open Innovation	0.782–0.903
Market Orientation	0.791–0.918
Knowledge Management	0.804–0.926
Innovation Capability	0.817–0.934
Competitive Advantage	0.786–0.912

All measurement indicators demonstrated factor loadings above the recommended threshold of 0.70, indicating a strong association with their respective constructs and confirming that the indicators effectively captured the intended latent variables.

Table 4. Convergent Validity and Reliability

Contruct	AVE	CR	Cronbach Alpha
Open Innovation	0.721	0.911	0.886
Market Orientation	0.734	0.919	0.895
Knowledge Management	0.748	0.925	0.902
Innovation Capability	0.756	0.931	0.913
Competitive Advantage	0.739	0.917	0.891

All AVE values exceeded 0.50, while Composite Reliability and Cronbach's Alpha value were above 0.70, confirming satisfactory convergent validity and reliability.

Discriminant Validity

Table 5. HTMT Ratio

Variable	Highest HTMT Value
OI-MO	0.721
OI-KM	0.687
MO-KM	0.744
IC-CA	0.847

All HTMT values remained below the recommended threshold of 0.90, confirming satisfactory discriminant validity. These results indicate that each construct is conceptually distinct and captures a unique dimension of the theoretical model.

Common Method Bias Assessment

Table 6. Full Collinearity VIF Assessment

Construct	**VIF**
Open Innovation (OI)	2.145
Market Orientation (MO)	2.286
Knowledge Management (KM)	2.193
Innovation Capability (IC)	2.547
Competitive Advantage (CA)	2.618

To assess the potential presence of common method bias, a full collinearity assessment was conducted following Kock (2020). As shown in Table 4.5, all VIF values are below the recommended threshold of 3.3, indicating the absence of multicollinearity and potential common method bias. Therefore, the structural relationships among the constructs can be considered statistically reliable.

Structural Model assesment

Coeffisient of Determination (R^2)

Table 7. R-Square Results

Endogenous Variable	R^2
Innovation Capability (IC)	0.684
Competitive Advantage (CA	0.741

The results indicate that Open Innovation, Market Orientation, and Knowledge Management collectively explain 68.4% of the variance in Innovation Capability. Meanwhile, 74.1% of the variance in Competitive Advantage is explained by Open Innovation, Market Orientation, Knowledge Management, and Innovation Capability.
According to Hair et al. (2024), these values indicate substantial explanatory power.

Effect Size (F^2)

Table 8. Effect Size

Relationship	F^2
OI → IC	0.182
MO → IC	0.226
KM → IC	0.194
IC → CA	0.287

As presented in Table 4.7, the strongest structural relationship was observed between Innovation Capability and Competitive Advantage. This finding suggests that innovation capability serves as a critical strategic driver of SME competitiveness, enabling firms to

translate organizational resources, knowledge, and market insights into superior competitive performance.

Predictive Relevance

Table 9. Predictive Relevance

Variable	Q^2
Innovation Capability	0.492
Competitive Advantage	0.536

All Q^2 values exceeded zero, indicating strong predictive relevance.

Model Fit

Table 10. Model Fit Assesment

Indicator	Value
SRMR	0.067
NFI	0.918

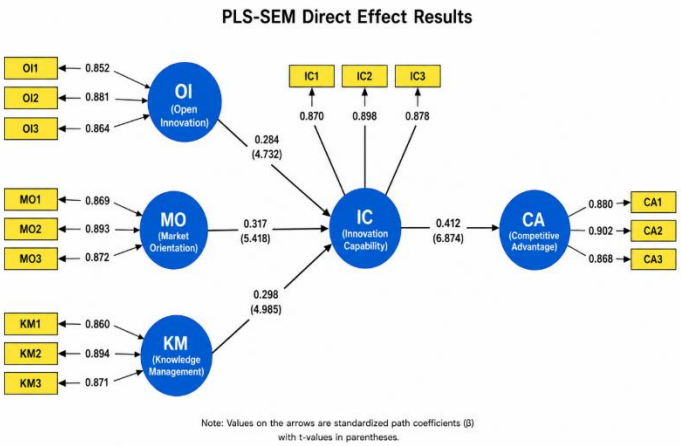
As shown in Table 4.9, the structural model exhibits a satisfactory fit to the data. The SRMR value of 0.067 is below the recommended threshold of 0.08, while the NFI value of 0.918 exceeds 0.90, indicating that the proposed model has an acceptable level of goodness-of-fit and is suitable for further hypothesis testing.

Direct Effects Testing

Table 11. Direct Effects

Path	β	T	P
OI → IC	0.284	4.732	0.000
MO → IC	0.317	5.418	0.000
KM → IC	0.298	4.985	0.000
IC → CA	0.412	6.874	0.000
OI → CA	0.152	2.756	0.006
MO → CA	0.168	2.981	0.003
KM → CA	0.184	3.114	0.002

Table 11. indicates that all direct effects are positive and significant. Open Innovation (β = 0.284; p < 0.001), Market Orientation (β = 0.317; p < 0.001), and Knowledge Management (β = 0.298; p < 0.001) significantly enhance Innovation Capability. Innovation Capability significantly improves Competitive Advantage (β = 0.412; p < 0.001) and represents the strongest relationship in the model. Open Innovation also directly affects Competitive Advantage (β = 0.152; p = 0.006), although its effect is weaker than that of Innovation Capability. These findings support all proposed direct hypotheses and highlight Innovation Capability as a key driver of SME competitive advantage.



Indirect Effects Testing

Table 12. Indirect Effects

Path	β	T	P
OI → IC → CA	0.117	3.821	0.000
MO → IC → CA	0.131	4.165	0.000
KM → IC → CA	0.123	3.974	0.000

The results confirm that Innovation Capability significantly mediates the effects of Open Innovation, Market Orientation, and Knowledge Management on Competitive Advantage.

The strongest indirect effect was found in the Market Orientation pathway, suggesting that SMEs that effectively understand market needs and competitive dynamics are more capable of converting market intelligence into innovative capabilities that ultimately strengthen competitive advantage.

Mediation Analysis

Table 13. Mediation Type Analysis

Relationship	Direct Effect	Indirect Effect	Mediation Type
OI → IC → CA	Significant	Significant	Partial
MO → IC → CA	Significant	Significant	Partial
KM → IC → CA	Significant	Significant	Partial

The mediation results indicate partial mediation across all relationships. This finding suggests that Open Innovation, Market Orientation, and Knowledge Management contribute directly to Competitive Advantage while simultaneously enhancing competitiveness through Innovation Capability.

These findings demonstrate that innovation capability serves as a strategic transformation mechanism that converts external collaboration, market intelligence, and organizational knowledge into sustainable competitive advantage within the digital economy.

Table 14. Hypothesis Testing Summary

Hypothesis	Path	Result
H1	OI → IC	Supported
H2	MO → IC	Supported
H3	KM → IC	Supported
H4	IC → CA	Supported
H5	OI → CA	Supported
H6	MO → CA	Supported
H7	KM → CA	Supported
H8	OI → IC → CA	Supported
H9	MO → IC → CA	Supported
H10	KM → IC → CA	Supported

Table 14. summarizes the results of hypothesis testing. All proposed hypotheses are supported, indicating significant direct and indirect relationships among the studied variables. The findings confirm that Innovation Capability plays a crucial mediating role in transforming Open Innovation, Market Orientation, and Knowledge Management into Competitive Advantage among Indonesian SMEs.

4.2 Discussion

The findings demonstrate that Open Innovation, Market Orientation, and Knowledge Management significantly enhance Innovation Capability among Indonesian SMEs. These results indicate that strategic resources alone are insufficient to generate superior performance; firms must possess the capability to transform those resources into innovative outputs. This finding supports the Resource-Based View (RBV), which emphasizes that competitive advantage depends not only on resource ownership but also on the effective utilization of strategic resources (Barney, 1991).

Open Innovation was found to significantly improve Innovation Capability, suggesting that SMEs benefit from collaboration with customers, suppliers, universities, and other external partners. Access to external knowledge broadens learning opportunities and accelerates the development of innovative products and services. This result is consistent with Open Innovation Theory and previous studies highlighting the importance of external collaboration in enhancing organizational innovation and adaptability (Liu et al., 2024) ; Yulianto & Supriono, 2023).

Market Orientation exhibited the strongest effect on Innovation Capability, indicating that customer understanding and market intelligence are critical drivers of innovation. SMEs that continuously monitor customer needs and competitor actions are better able to identify opportunities and develop market-oriented innovations. This finding supports prior studies suggesting that market-oriented firms achieve higher innovation performance because they effectively transform market information into strategic actions (Kirca et al., 2005; Ngo, 2023).

Knowledge Management also significantly strengthened Innovation Capability, confirming the central role of organizational knowledge in fostering innovation. Effective knowledge acquisition, sharing, and utilization enable SMEs to improve learning processes, generate new ideas, and enhance adaptability. This finding supports Knowledge-Based Theory, which views knowledge as a key source of sustainable competitiveness (Castro-pardo & Ruiz, 2023); Hafeez et al., 2025).

Furthermore, Innovation Capability demonstrated the strongest direct effect on Competitive Advantage. This result indicates that SMEs capable of continuously introducing innovative products, services, and processes are more likely to achieve differentiation, responsiveness, and superior market performance. The finding is consistent with Dynamic Capability Theory, which emphasizes the importance of resource reconfiguration in sustaining competitiveness under changing market conditions (Teece et al., 1997; Otache, 2026).

The mediation analysis revealed that Innovation Capability partially mediates the relationships between Open Innovation, Market Orientation, Knowledge Management, and Competitive Advantage. This finding suggests that strategic resources contribute to competitiveness both directly and indirectly through innovation. Therefore, innovation capability functions as a strategic transformation mechanism that converts external knowledge, market intelligence, and organizational learning into sustainable competitive advantage. These results strengthen the integration of RBV, Knowledge-Based Theory, and Dynamic Capability Theory in explaining SME competitiveness within the digital economy.

From a practical perspective, SME managers should prioritize investments in innovation capability by strengthening collaborative networks, market intelligence systems, and knowledge-sharing practices. Policymakers can also support SME competitiveness through innovation ecosystems, digital transformation programs, and knowledge-based development

initiatives. Overall, the findings confirm that Innovation Capability serves as a strategic bridge between organizational resources and sustainable Competitive Advantage in the digital era.

Theoretical Implications

This study advances the strategic management literature by combining the Resource-Based View, Knowledge-Based Theory, and Dynamic Capability Theory into a comprehensive analytical framework. The findings highlight the pivotal role of innovation capability as a strategic enabler that transforms organizational resources and knowledge into sustainable competitive advantage. Moreover, the study enriches current understanding by providing empirical evidence of the applicability of these theoretical perspectives to SMEs operating in rapidly evolving digital and emerging market environments

Managerial Implications

The results of this study offer valuable practical insights for SME owners, business managers, and policymakers seeking to enhance organizational competitiveness and sustainability in an increasingly digital business environment. The results indicate that sustainable competitive advantage is not determined solely by the possession of strategic resources but by an organization's ability to transform those resources into innovation through strong innovation capability. Therefore, SMEs should prioritize investments in innovation-oriented activities by strengthening external collaborations with customers, suppliers, universities, and business partners to facilitate knowledge exchange and accelerate innovation processes. In addition, managers should enhance market intelligence capabilities through continuous monitoring of customer needs, competitor strategies, and emerging market trends to support more responsive and market-driven innovations. Effective knowledge management practices, including knowledge acquisition, sharing, and utilization, should also be institutionalized to foster organizational learning and improve innovation performance. Furthermore, policymakers are encouraged to develop supportive innovation ecosystems through digital transformation programs, collaborative networks, business incubation initiatives, and technology transfer support that enable SMEs to strengthen innovation capability and achieve long-term competitiveness in increasingly dynamic and technology-driven markets.

5. Conclusion

This study examined the relationships among Open Innovation, Market Orientation, Knowledge Management, Innovation Capability, and Competitive Advantage within Indonesian SMEs operating in the digital economy. The findings reveal that Open Innovation, Market Orientation, and Knowledge Management significantly enhance Innovation Capability. Furthermore, Innovation Capability significantly strengthens Competitive Advantage and partially mediates the relationships between the three strategic antecedents and Competitive Advantage.

The study confirms that Innovation Capability plays a central role in transforming strategic resources into sustainable competitive advantage. While Open Innovation, Market Orientation, and Knowledge Management directly contribute to organizational competitiveness, their impact becomes substantially stronger when translated into innovative products, services, and business processes. These findings provide empirical support for the Resource-Based View, Knowledge-Based Theory, and Dynamic Capability Theory by

demonstrating that organizational resources generate value only when effectively leveraged through innovation capability.

From a theoretical perspective, this study enriches the strategic management and innovation literature by examining Open Innovation, Market Orientation, and Knowledge Management within an integrated framework while highlighting Innovation Capability as a central mediating construct. The findings provide deeper insights into the mechanisms through which strategic resources enhance organizational competitiveness, particularly in the context of rapidly evolving digital economies.

Practically, the results suggest that SME owners and managers should focus not only on acquiring external knowledge and understanding market needs but also on building organizational systems that facilitate knowledge utilization and innovation development. Strengthening innovation capability can help SMEs improve adaptability, create customer value, and sustain competitive advantage in increasingly dynamic markets.

Despite its contributions, this study has several limitations that should be acknowledged. First, the research focused exclusively on Indonesian SMEs, which may limit the applicability of the findings to different national or industrial contexts. Second, the use of a cross-sectional research design restricts the ability to capture dynamic changes and causal developments over time. Future studies are encouraged to employ longitudinal designs, examine broader geographical settings, and incorporate additional factors such as digital transformation capability, organizational agility, artificial intelligence adoption, and entrepreneurial orientation. These extensions may provide a more comprehensive understanding of the drivers of SME competitiveness in an increasingly digital and dynamic business environment.

Acknowledgements

The authors would like to express their sincere gratitude to all SME owners and managers who participated in this study and generously shared their time, experiences, and valuable insights. Their contributions were essential to the successful completion of this research.

The authors sincerely thank colleagues, reviewers, and institutional partners for their valuable feedback and support throughout the research process. Their contributions helped enhance the quality, rigor, and overall relevance of this study. The authors also appreciate the support provided by their respective institutions, whose resources and academic environment were instrumental in the successful completion of this research.

Special appreciation is extended to all SME owners and managers who participated in the survey and generously shared their time, experiences, and insights. Their involvement provided the empirical foundation for this study. The authors further acknowledge all parties who contributed, directly or indirectly, to the completion of this research and the dissemination of its findings.

References

Abou-moghli, A. A. (2025). The interplay between knowledge management and organizational performance measurement through the mediating effect of innovation capability. *Knowledge and Performance Management*. https://doi.org/10.21511/kpm.09(1).2025.04

Al-Zubaidi, R., Ali Ateeq, Akram Abdulsamad, Siddig Balal Ibrahim, Hadi R. H. A. Ahmed, & Marwan Milhem. (2025). *Market Orientation and SMEs Performance:*

Unraveling the Mediating Effects of Innovation Capability Amidst Environmental Uncertainty (Vol. 2). Tech Fusion in Business and Society. https://doi.org/https://doi.org/10.1007/978-3-031-84636-6_77

Annamalah, S., Aravindan, K. L., & Ahmed, S. (2025). *Driving open innovation in SMEs : the role of organizational and strategic dynamics*. https://doi.org/https://doi.org/10.1186/s13731-025-00588-4

Ayu, H. H., Endang, S. A., Andriani, K., & Mohammad, I. (2025). The nexus between entrepreneurial and market orientation on digital marketing capabilities and marketing performance of SMEs in emerging markets. *Cogent Business & Management*, *12*(1). https://doi.org/10.1080/23311975.2025.2526150

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Castro-pardo, D., & Ruiz, F. (2023). *Socio-Economic Planning Sciences A multi reference point based index to assess and monitor European water policies from a sustainability approach*. *89*(April 2022). https://doi.org/10.1016/j.seps.2022.101433

Chen, S., Huang, L., & Zhou, A. (2025). How Knowledge Management Capability Drives Sustainable Business Model Innovation : A Combination of Symmetric and Asymmetric Approaches. *Sustainability*, 1–18. https://doi.org/https://doi.org/10.3390/su17156714

Cheng, C., Li, M., Tang, B., & Cheng, Y. (2024). administrative sciences The Impact of Knowledge Management and Organizational Learning Promotion in Small and Medium Enterprises on the Implementation of Industry 4 . 0 and Competitiveness. *Administrative Sciences*. https://doi.org/https://doi.org/10.3390/admsci14080161

Chesbrough, H. (2019). *Open Innovation Results: Going Beyond the Hype and Getting Down to BusinessGoing Beyond the Hype and Getting Down to Business*. https://doi.org/DOI:10.1093/oso/9780198841906.001.0001

Dukhaykh, S., & Alangri, N. (2026). Dynamic Capabilities and Sustainable Competitive Advantage in SMEs : The Roles of Innovation and Organizational Learning. *Sustainability*, 1–21.

Elistia, Dedi Purwana, & Sofwan, K. D. S. M. (2024). *View of The Role of Knowledge Management and Dynamic Capabilities on Sustainable Competitive Advantage in Indonesian Private Higher Education.pdf*. https://doi.org/https://doi.org/10.48161/qaj.v4n3a701

Faraz, M., Jucevicius, G., Shabbir, M., Petraite, M., Ghobakhloo, M., & Evans, R. (2025). Strategic foresight , knowledge management , and open innovation : Drivers of new product development success. *Journal of Innovation & Knowledge*, *10*(2), 100654. https://doi.org/10.1016/j.jik.2025.100654

Febrianto, A., & Rufaidah, P. (2026). Analysing the role of innovation capability and environmental uncertainty on firms ' competitive advantage : a systematic literature review. *Cogent Business & Management*. https://doi.org/10.1080/23311975.2026.2619230

Febriyantoro, M. T., Suyoto, Y. T., Saputra, F., & Suleman, D. (2023). The Effect of Innovation Capability on Market Performance Mediated by External Collaboration on SMEs. *KnE Social Sciences*, *2023*, 249–262. https://doi.org/10.18502/kss.v8i12.13675

Grant, R. M. (1998). Toward a Knowledge-Based Theory Of The Firm. *Strategic Management Journal*.

Hafeez, S., Shahzad, K., Helo, P., & Faraz, M. (2025). *Knowledge management and SMEs ' digital transformation : A systematic literature review and future research agenda*. *10*(October 2024). https://doi.org/https://doi.org/10.1016/j.jik.2025.100728

Hair, J. F., Ringle, C. M., & Liengaard, B. D. (2024). Going beyond the untold facts in PLS – SEM and moving forward. *European Journal of Marketing*, *58*(13), 81–106. https://doi.org/10.1108/EJM-08-2023-0645

Hasanein, A. M. (2026). Turning Knowledge into Innovation : The Systemic Role of Knowledge Management Capability , Intellectual Capital , and Knowledge Utilization. *System*, 1–25. https://doi.org/https://doi.org/10.3390/systems14020179

Indrawati, M., & Et.al. (2026). The role of innovation capability in mediating the effect of customer relationship management and market orientation on SME performance. *Problems and Perspectives in Management*. https://doi.org/10.21511/ppm.24(1).2026.19

Kareem, M. A., Kummitha, H. R., & Kolloju, N. (2024). The Mediating Role of Innovation Capabilities on the Relationship between Dynamic Capabilities and Firm Competitive Performance. *Sciendo*, *57*(1). https://doi.org/10.2478/orga-2024-0004

Kirca, A. H., Jayachandran, S., & Bearden, W. O. (2005a). Market Orientation : A Meta-Analytic Review and Assessment of Its Antecedents and Impact on. *Journal of Marketing*, *69*(April), 24–41.

Lee, M. J. (2022). Dynamic Capabilities and an ESG Strategy for Sustainable Management Performance. *Frontiers in Psychology*, *May*. https://doi.org/10.3389/fpsyg.2022.887776

Liu, K. P., Chung, K. W., Chiu, W., & Chen, G. (2024). Digital Transformation Driving SME Business Model Innovation : *Journal of Global Information Management*, *32*(1). https://doi.org/10.4018/JGIM.350191

Munte, E. D., Sinaga, S., & Tarigan, L. L. (2025). The Influence Of Knowledge Management And Innovation Capability On Small Business Performance Through Competitive Advantage Mechanism 1. *Jurnal Ilmiah Manajemen Kesatuan*, *13*(2), 1273–1286. https://doi.org/10.37641/jimkes.v13i2.2953

Ngo, Q. H. (2023). The effectiveness of market orientation in the logistic industry: A focus on SMEs in an emerging country. *Heliyon*, *9*(7), e17666. https://doi.org/10.1016/j.heliyon.2023.e17666

Nuaimi, A., Fatima Mohamed Saif, Singh, Sanjay Kumar, Ahmad, & Syed Zamberi. (2024). Open Innovation in SMEs : A dynamic capabilities perspective. *University of Dundee*. https://doi.org/10.1108/JKM-11-2022-0906

Otache, I. (2026). Innovation capability , strategic flexibility and SME performance : the roles of competitive advantage and competitive intensity. *African Journal of Economic and Management Studies*, *June*. https://doi.org/10.1108/AJEMS-06-2023-0221

Paovangsa, S., Kamil, M., & Aaqil, M. (2025). Assessing Innovation Capability , Innovation types , and Its Impact on Innovation Performance in FDI Enterprises : Configurational Recipes for. *Original Research*, *September*, 1–20.

https://doi.org/10.1177/21582440251365311

Prajadi, B., Utomo, C., Sentosa, I., Osman, S., & Djoko, T. (2024). The influence of Intellectual Capital , Learning Capability , and Technological Orientation on the Innovation Capability and Sustainable Competitive Advantage of Batik SMEs in Indonesia. *Journal of Information and Visualization*, *5*(2). https://doi.org/https://doi.org/10.35877/454RI.jinav3277

Ringle, C. M., Wende, S., & Becker, J. M. (2024). The Influence of National Culture Dimension on the ESG Results of Countries. *American Journal of Industrial and Business Management*.

Ringle, C. M., & Sinkovics, R. R. (2004). *THE USE OF PARTIAL LEAST SQUARES PATH MODELING IN INTERNATIONAL MARKETING*. *20*(2009), 277–319. https://doi.org/10.1108/S1474-7979(2009)0000020014

Rusminah, S., & Purnomo, N. (2024). The Impact of Digital Transformation on The Competitiveness of SMEs Centers in Lamongan Regency With Innovation As A Mediation Variable. *Journal of Humanities and Social Studies*, *08*(03), 825–829. https://doi.org/https://doi.org/10.33751/jhss.v8i3.10737

Sarstedt, M., Richter, N. F., Hauff, S., & Ringle, C. M. (2024). Combined importance – performance map analysis (cIPMA) in partial least squares structural equation modeling (PLS – SEM): a SmartPLS 4 tutorial. *Journal of Marketing Analytics*, 746–760. https://doi.org/10.1057/s41270-024-00325-y

Sinaga, G. J. M. (2024). *Social Media and Market Orientation in SMEs Performance_ Competitive Advantage as Mediating Factor.pdf*. https://doi.org/10.24002/kinerja.v29i1.9519

Ta'Amnha, M. A., Magableh, I. K., Asad, M., & Al-Qudah, S. (2023). Open innovation: The missing link between synergetic effect of entrepreneurial orientation and knowledge management over product innovation performance. *Journal of Open Innovation: Technology, Market, and Complexity*, *9*(4), 100147. https://doi.org/10.1016/j.joitmc.2023.100147

Teece, D. J., Pisano, G., & Shuen, A. M. Y. (1997). Dynamic Capabilities and Straategic Management. *Strategic Management Journal*, *18*(April 1991), 509–533.

Yulianto, & Supriono. (2023). Effect of open innovation on firm performance through type of innovation : Evidence from SMES in Malang City , East Java , Indonesia Effect of open innovation on firm performance through type of innovation : Evidence from SMES in Malang City , East Java ,. *Cogent Business & Management*, *1975*. https://doi.org/10.1080/23311975.2023.2262671

Yusuf, M., & Hartono, A. (2024). Investigating the Role of Innovation Capabilities and the Impact of Knowledge Transfer and Open Innovation Implementation on SME Performance in Yogyakarta. *Asian Journal of Economics, Business and Accounting*, *24*(2), 70–91. https://doi.org/10.9734/AJEBA/2024/v24i21221

Zan, F., Leong, Y. C., Ismail, N. A., Chu, M., Saif, A. N. M., & Islam, K. M. A. (2023). Knowledge sharing and innovation performance : The mediating role of open innovation. *EMPIRICA L A RTICLE*. https://doi.org/10.1002/joe.22235

Zhang, Z. (2024). Exploring the green edge: the role of market orientation and knowledge management in achieving competitive advantage through creativity. *HUMANITIES AND SOCIAL SCIENCES COMMUNICATION*, 1–16. https://doi.org/10.1057/s41599-024-03174-3