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The Impact of the Digital Economy on Sme Business Performance: The Moderating Role of Digital Capability and the Mediating Role of Value Creation

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ABSTRACT

This study investigates the impact of the digital economy on the performance of micro, small, and medium enterprises (MSMEs) in West Java, Indonesia, by integrating the roles of digital capabilities and value creation. This research develops and assesses a cohesive framework that links the digital economy, digital capacity, and value creation inside a singular structural model, unlike other studies that analyze these components independently. Analysis of survey data from 127 MSMEs employing structural equation modeling (SEM) reveals that digital competency does not influence the relationship between the digital economy and value creation. The Sobel test confirms that value creation fully mediates the impact of the digital economy on business success. This integration significantly demonstrates that the adoption of the digital economy enhances performance only when transformed into concrete value-creation processes—through value networking, business model enhancement, coopetition, and digital innovation—highlighting strategic pathways for MSMEs in evolving digital economies.

1. INTRODUCTION

The COVID-19 pandemic accelerated the transition toward digitalization. As a critical catalyst for business innovation, digitalization opens promising opportunities for firms—both small and large—to create new value and drive growth. Rising digital capabilities further stimulate value creation (Chen, 2025). The growing availability of digital technologies and products facilitates business expansion by broadening customer reach and speeding up the acquisition of feedback (Golinelli et al., 2020; Parida, Sjödin, & Reim, 2019).

Amid the broader shift to a digital economy, micro, small, and medium enterprises (MSMEs) must leverage digital advances effectively to remain competitive. Digital adoption enables firms to craft new value propositions and enhance performance. Digital capabilities accelerate the acquisition, integration, and use of information, thereby fostering continuous innovation. Consequently, digitalization and digital capabilities offer substantial opportunities to improve multiple dimensions of performance (Papadopoulos, Baltas, & Balta, 2020; Verhoef et al., 2021).

Despite notable progress in research on digital capabilities and business-model innovation, a clear gap remains (Prakasa & Jumani, 2024). The concept of digital capability continues to evolve, yet there is no consensus on its operational definition, measurement, or performance dynamics. At the same time, to understand the effect of the digital economy on firm performance—particularly for MSMEs—it is essential to examine the role of value creation: does it act as a full or partial mediator in explaining the impact of the digital economy on performance?

Prior studies have rarely integrated the digital economy, digital capability, value creation, and firm performance within a single, comprehensive theoretical framework. This paper addresses that gap by: (1) reconceptualizing the digital economy as a higher-order construct comprising three dimensions—infrastructure, digital ecosystem, and e-commerce—as a basis for assessing its mechanisms; (2) analyzing the effect of the digital economy on MSME performance in Indonesia by positioning value creation as a mediator; and (3) extending the scope of research on digital

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capability by specifying its role as a moderator that may strengthen or weaken the influence of the digital economy on value creation.

Specifically, the study tests how the dimensions of the digital economy affect performance through the value-creation pathway, while assessing whether digital capability—as a bundle of resources and competencies (e.g., digital skills, investment, and digital marketing practices)—enhances the effectiveness of leveraging the digital economy to generate value. In doing so, the proposed theoretical framework and model clarify the mechanisms linking the digital economy to value creation and firm performance, and emphasize digital capability as a critical enabler for MSMEs seeking to maximize the impact of digital transformation.

Finally, this study focuses on answering the question: Does value creation mediate the impact of the digital economy on SME performance?

2. LITERATURE REVIEW

2.1 Digital Economy and Business Performance

The digital economy encompasses all economic activities enabled by the interconnection of individuals, businesses, devices, data, and operations through digital technologies. It is underpinned by three core components—digital infrastructure, which provides the technological foundation; digital ecosystems, which facilitate interactions among users, platforms, and institutions; and e-commerce, which represents the transactional dimension of digital activity. Together, these elements drive online transactions across diverse sectors supported by the internet, mobile technologies, big data analytics, and information and communication technologies (ICT) (Javaid et al., 2024; Wan, 2025).

The rise of the internet has fundamentally transformed how value is created, exchanged, and consumed, giving rise to a digital economy that reshapes commerce and everyday life. Within this context, firms—particularly micro, small, and medium enterprises (MSMEs)—can improve productivity and performance by expanding market reach, optimizing processes, and making data-driven decisions. At the same time, competitive intensity, regulatory effectiveness, intellectual property protection, and privacy compliance play critical roles in determining how successfully firms perform in the digital economy (Chen, 2020). The digital economy can strengthen long-term performance through human-capital accumulation and improved innovation capability, although short-run adjustment costs and competitive pressures may adversely affect some small, technology-intensive firms. Recent evidence further indicates that blockchain contributes to the circular economy and positively affects environmentally oriented activities—such as manufacturing, recycling, and remanufacturing—which, in turn, correlate with firm performance, particularly among established firms (Watanabe et al., 2018; Papadopoulos et al., 2020; Wu et al., 2023; Rehman Khan et al., 2022).

2.2 Digital Economy and Value Creation

How do firms create value? In the digital economy, digital transformation operates as a central mechanism. Empirical work shows that digital tools drive business-model innovation, open new distribution channels, and introduce novel ways to create and deliver value—for example, among MSMEs in the food, fashion, and furniture sectors in Italy (Matarazzo et al., 2021). Research on the sharing economy proposes a taxonomy of 13 business models and a conceptual framework for assessing each model's potential for sustainable value creation (Laukkanen & Tura, 2020). Theory-informed reviews indicate that AI-based technologies reshape value co-creation in tourism by altering customer roles and digitalizing touchpoints (Qiao et al., 2024). To navigate the "digitalization paradox," firms are advised to adopt agile approaches to co-creation that accelerate digital service innovation (Sjödin et al., 2020; Solakis et al., 2022).

2.3 Digital Capability and Value Creation

Digital capabilities are closely grounded in the Resource-Based View (RBV) (Barney, 1991) , which posits that firms achieve sustained competitive advantage through resources that are valuable, rare, inimitable, and non-substitutable. In the context of micro, small, and medium enterprises (MSMEs), digital capability represents a strategic resource that enables firms to integrate digital technologies, manage data effectively, and develop innovative business processes.

Complementing this perspective, the Dynamic Capabilities Theory (Teece, Pisano, & Shuen, 1997) emphasizes a firm's ability to sense digital opportunities and threats, seize them by mobilizing resources and designing adaptive business models, and transform internal structures and processes in response to environmental changes. Together, these theories frame digital capability not merely as a static asset but as a dynamic enabler of continuous renewal and competitive advantage.

Drawing on the RBV, digital capability is conceptualized as a strategic resource that enables firms to integrate, coordinate, and renew their digital assets to achieve sustainable competitive advantage. Specifically, digital capability is operationalized through three interrelated dimensions—integration, data management, and innovation—which together reflect a firm's ability to embed digital technologies, manage information effectively, and continuously enhance its business processes. From the perspective of Dynamic Capabilities Theory, these dimensions collectively represent the organization's capacity to sense opportunities, seize them through resource mobilization, and transform internal structures in response to technological and market changes. This theoretical alignment underscores that digital capability functions not only as a valuable resource but also as a dynamic mechanism for value creation in the digital economy.

Empirical research supports this conceptualization. Lenka, Parida, and Wincent (2017) identify three core digitalization capabilities—intelligence, connectivity, and analytics—that enhance customer value creation through deep understanding of customer needs and rapid, proactive responsiveness. Similarly, Chen (2025) finds that digital platform capabilities, specifically integration and reconfiguration, positively affect digital transformation performance, with co-creation partially mediating this relationship. These findings highlight that digital capabilities drive performance by enabling firms to co-create value and adapt effectively in the digital economy.

2.4 Value Creation and Business Performance

A study of 281 digital startups in China finds that both technology orientation and customer orientation in value creation and business-model design independently enhance startup performance; however, pursuing both orientations

simultaneously can be counterproductive, suggesting a strategic trade-off that requires prioritization (Guo et al., 2020). Using data from 785 firms operating on a major e-commerce platform in China, related evidence shows that big data analytics—both inside-out (leveraging internal data for external capabilities) and outside-in (absorbing external data to enrich internal processes)—and their interaction are positively associated with sales performance on the platform, thereby enriching the understanding of value creation through multiple BDA functions (Liu et al., 2022). In the Indonesian context, evidence from a delivery-service company in Makassar indicates that human-resource quality and organizational culture affect competitive advantage indirectly via value creation; value creation itself strengthens competitive advantage, while business processes become impactful only when mediated by value creation (Firman et al., 2023).

3. METHODOLOGY

3.1 Research Method

This study adopts a confirmatory descriptive research design with the primary objective of verifying whether the digital economy affects firm performance directly or indirectly through value creation. Specifically, it investigates whether value creation acts as a partial or full mediator in explaining the association between the digital economy and business performance, with a particular focus on micro, small, and medium enterprises (MSMEs). To achieve these objectives, an online survey was administered, yielding responses from 127 MSMEs across various sectors in West Java, Indonesia. During data collection, this study adhered to standard ethical principles of social science research involving human participants. All data were collected anonymously, and informed consent was obtained from each respondent prior to participation. Data collection was facilitated through a carefully constructed questionnaire grounded in the following variable operationalizations:

Figure 1 illustrates the conceptual framework that explains the relationships among the main variables of the study.

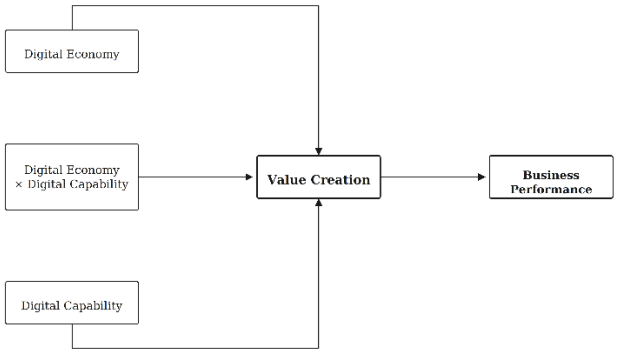

Fig. 1. Conceptual Diagram

Table 1. Operationalization of the Variables of Interest

Variable	Dimension	Indicator Code	Indicator (English)
Digital Economy	Infrastructure	X1	The expansion of the internet network has become evenly distributed across Indonesia.
		X2	Current internet speed is adequate and facilitates business actors' access to e-commerce.
	Digital Ecosystem	X3	The digital ecosystem is now well established, enabling MSME business actors to adopt technology more quickly, build an integrated business environment, and manage systems and operating costs.
		X4	Financial inclusion remains relatively low, as evidenced by the limited number of people with accounts at financial institutions and the limited incidence of online purchases.
	E-commerce	X5	Although e-commerce has grown rapidly, only a small share of businesses are leveraging digital technology to sell across multiple e-commerce platforms.
		X6	Local e-commerce sellers currently face difficulties in selling their products; the most common obstacles include low demand, lack of capital, shortage of skilled labor, limited internet access, limited delivery services, and fraud during transactions.
Digital Capability	Digital Skill	M1	Limited digital skills are a barrier to accelerating the digital economy in Indonesia, particularly in West Java.
		M2	The digital skill domains MSME business actors in Indonesia need to apply the digital economy include: digital technology, data science, and digital marketing.
	Investment	M3	MSME business actors are able to invest in production facilities.
		M4	MSME business actors are able to invest through alliances and partnerships.
		M5	MSME business actors are able to invest in risk-mitigation mapping.
	Marketing	M6	MSME business actors are able to develop a customer database.
		M7	MSME business actors are able to set customer segmentation to deliver the right value for each segment.
		M8	MSME business actors are able to build a strong brand.

Variable	Dimension	Indicator Code	Indicator (English)
Value Creation	Value Networking	Y1	In implementing the digital economy, value networks have provided clear benefits to MSME business actors.
	Business Model	Y2	MSME business actors have adopted a digital business model to provide the best services and improve performance.
	Coopetition	Y3	Through the digital economy, MSME business actors benefit from collaboration with competitors operating in the same business layer.
	Digital Innovation	Y4	The digital economy stimulates MSME business actors to innovate and create new products/services.
Business Performance	Profit Growth	Z1	Through the digital economy, MSME business actors have achieved their targeted profit growth.
	Productivity Growth	Z2	Through the digital economy, MSME business actors have improved productivity (meeting targets efficiently and effectively).
	Revenue Growth	Z3	Through the digital economy, MSME business actors have achieved their targeted revenue growth.

All indicators were measured on a five-point Likert scale ranging from 1 to 5 (1 = strongly disagree, 5 = strongly agree)

3.2 Statistical Analysis

Covariance-Based Structural Equation Modeling (CB-SEM) was employed to assess the overall fit of the theoretical model and the causal relations simultaneously. The analysis followed a two-step procedure. First, the measurement model was evaluated using confirmatory factor analysis (CFA) to establish unidimensionality, reliability (e.g., composite reliability), and convergent and discriminant validity (e.g., AVE and the Fornell–Larcker/HTMT criteria). Second, the structural model was estimated to obtain path coefficients, coefficients of determination, and global goodness-of-fit indices (e.g., χ^2/df, CFI, TLI, RMSEA, SRMR) and to test the significance of the hypothesized causal links. Mediation was examined via estimates of indirect effects (preferably with bootstrapping), while moderation was assessed using either latent interactions or an equivalent two-step approach. This framework enables a rigorous test of the mediating role of value creation between the digital economy and business performance (see, e.g., Hair, Black, Babin, & Anderson, 2019; Kline, 2016).

3.3 Measurement Model

The measurement model specifies the relationships between observed variables and their latent constructs and distinguishes between reflective and formative specifications. In reflective models, the latent construct causes variation in the indicators; in formative models, the indicators collectively form the construct. In this study, all constructs were modeled reflectively; that is, the observed indicators are treated as manifestations of their underlying latent variables.

$$\begin{aligned} \mathrm{x}_h &= \lambda_h^x \xi_1 + \delta_h;\ h = 1, \dots, H \\ \mathrm{m}_k &= \lambda_k^x \xi_2 + \delta_k;\ k = 1, \dots, K \\ \mathrm{y}_j &= \lambda_j^y \eta_1 + \varepsilon_j;\ j = 1, \dots, J \\ \mathrm{z}_l &= \lambda_l^z \eta_l + \varepsilon_l;\ l = 1, \dots, L \end{aligned} \quad (1)$$

where λ represents the factor loadings used to assess indicator validity.

3.4 Structural Model

The structural model describes the interconnections among constructs, which may include dependent (endogenous) and independent (exogenous) variables. The specification of the structural model is as follows:

$$\begin{aligned} \eta_1 &= \gamma_{11}\xi_1 + \gamma_{12}\xi_2 + \gamma_{13}\xi_1 \times \xi_2 + \zeta_1 \\ \eta_2 &= \gamma_1\xi_1 + \beta_1\eta_1 + \zeta_2 \end{aligned} \quad (2)$$

The full path diagram is presented in Fgure 2.

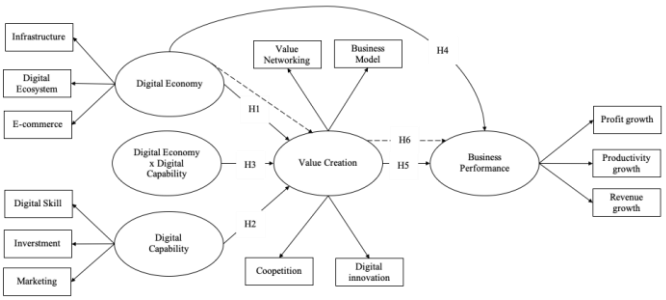

Fig. 2. Full path diagram

Based on the literature review and the research framework developed, this study proposes six hypotheses, with the final hypothesis addressing mediation effects:

1. **H1:** The digital economy has a positive effect on value creation.
2. **H2:** Digital capability has a positive effect on value creation.
3. **H3:** Digital capability positively moderates the relationship between the digital economy and value creation; the effect of the digital economy on value creation is stronger at higher levels of digital capability (i.e., the Digital Economy × Digital Capability interaction is positive).
4. **H4:** The digital economy has a direct positive effect on business performance.

5. **H5:** Value creation has a positive effect on business performance (operationalized via profit growth, productivity growth, and revenue growth).
6. **H6:** The digital economy positively affects business performance **through** value creation.

To determine whether digital capability functions as a moderator that strengthens the relationship between the digital economy and value creation, and whether value creation fully or partially mediates the effect of the digital economy on business performance, it is essential to conduct rigorous tests of these hypotheses. Digital capability is regarded as a moderator if H3 is significant. Value creation is considered a full mediator if H1, H5, and H6 are significant whereas H5 is not significant. Conversely, it is considered a partial mediator if all hypotheses (H1, H5, H4, H6) are significant. Hypotheses H1–H5 are tested using the following test statistics:

$$z_{value} = \frac{\hat{\theta}}{Se(\hat{\theta})} \quad (3)$$

Meanwhile, to test H6, the following Sobel test statistic is used:

$$z_{value} = \frac{\widehat{\gamma_{11}}\widehat{\beta_{21}}}{Se\left(\widehat{\gamma_{11}}\widehat{\beta_{21}}\right)} \quad (4)$$

where

$$Se\left(\widehat{\gamma_{11}}\widehat{\beta_{21}}\right) = \sqrt{\widehat{\beta_{21}}^{2} var(\widehat{\gamma_{11}}) + \widehat{\gamma_{11}}^{2} var\left(\widehat{\beta_{21}}\right)}. \quad (5)$$

Both test statistics are asymptotically distributed as standard normal (z) variates.

3.5 Model Fit Evaluation

To assess the adequacy of the model estimated via structural equation modeling, multiple goodness-of-fit criteria were considered. These include the Root Mean Square Error of Approximation (RMSEA), for which values below 0.08 are generally regarded as acceptable. In addition, the Comparative Fit Index (CFI) and the Tucker–Lewis Index (TLI) were examined, with values above 0.90 indicating satisfactory model fit.

3.6 Importance–Performance Analysis

To distinguish high-performing attributes from those requiring managerial attention, this study applied the Importance–Performance Analysis (IPA) method. IPA complements the structural model by evaluating the relative importance and performance of key constructs, thereby translating statistical relationships among digital capabilities, value creation, and firm performance into actionable strategic priorities for MSMEs engaged in digital transformation (Martilla & James, 1977).

4. RESULT

4.1 Descriptive Analysis

An online survey of 127 micro, small, and medium enterprises (MSMEs) in West Java, Indonesia, identified fourteen industry sectors. As shown in Table 2, the five most prevalent sectors were education (23.6%), services (22.0%), finance (11.0%), manufacturing (7.1%), and food and beverages (6.3%).

Table 2. Sectoral Distribution of MSMEs

Sector	Frequency	Percentage (%)
Education	30	23.6
Services	28	22
Finance	14	11
Manufacturing	9	7.1
Food & Beverages	8	6.3
Health	8	6.3
Apparel	6	4.7
Plantation/Agribusiness	6	4.7
Marketing	5	3.9
Logistics	3	2.4
Suppliers	3	2.4
Self-employed	3	2.4
Property/Real Estate	2	1.6
Telecommunications	2	1.6
Total	127	100

In this study, we combine four main variables—digital economy, digital capability, value creation, and business performance. The digital economy variable is measured using six indicators, whereas digital capability is measured with eight indicators. Value creation and business performance are evaluated using four and three indicators, respectively. At the exploratory stage, we present descriptive statistics for each indicator representing these variables (see Table 3).

Table 3. Descriptive Statistics

Variable	Dimension		Indicator	Min	Mean	Median	Modus	Max	SD
Digital Economy	Infrastructure	X1	The expansion of the internet network has become evenly distributed across Indonesia.	1	3.29	3	4	5	0.98
		X2	Current internet speed is adequate and facilitates business actors' access to e-commerce.	1	3.60	4	4	5	0.93
	Digital Ecosystem	X3	The digital ecosystem is now well established, enabling MSME business actors to adopt technology more quickly, build an integrated business environment, and manage systems and operating costs.	1	3.65	4	4	5	0.85
		X4	Financial inclusion remains relatively low, as evidenced by the limited number of people with accounts at financial institutions and the limited incidence of online purchases.	1	3.34	4	4	5	0.94
	E-commerce	X5	Although e-commerce has grown rapidly, only a small share of businesses are leveraging digital technology to sell across multiple e-commerce platforms.	1	3.46	4	4	5	1.03
		X6	Local e-commerce sellers currently face difficulties in selling their products; the most common obstacles include low demand, lack of capital, shortage of skilled labor, limited internet access, limited delivery services, and fraud during transactions.	2	3.73	4	4	5	0.85
Digital Capability	Digital Skill	M1	Limited digital skills are a barrier to accelerating the digital economy in Indonesia, particularly in West Java.	1	3.90	4	4	5	0.88
		M2	The digital skill domains MSME business actors in Indonesia need to apply the digital economy include: digital technology, data science, and digital marketing.	2	4.26	4	4	5	0.72
	Investment	M3	MSME business actors are able to invest in production facilities.	2	3.56	4	4	5	0.80
		M4	MSME business actors are able to invest through alliances and partnerships.	1	3.85	4	4	5	0.76

Variable	Dimension		Indicator	Min	Mean	Median	Modus	Max	SD
		M5	MSME business actors are able to invest in risk-mitigation mapping.	2	3.36	3	3	5	0.89
	Marketing	M6	MSME business actors are able to develop a customer database.	1	3.46	4	4	5	1.00
		M7	MSME business actors are able to set customer segmentation to deliver the right value for each segment.	1	3.56	4	4	5	0.94
		M8	MSME business actors are able to build a strong brand.	1	3.47	4	4	5	1.07
Value Creation	Value Networking	Y1	In implementing the digital economy, value networks have provided clear benefits to MSME business actors.	2	3.96	4	4	5	0.67
	Business Model	Y2	MSME business actors have adopted a digital business model to provide the best services and improve performance.	1	3.63	4	4	5	0.87
	Coopetition	Y3	Through the digital economy, MSME business actors benefit from collaboration with competitors operating in the same business layer.	2	3.83	4	4	5	0.78
	Digital innovation	Y4	The digital economy stimulates MSME business actors to innovate and create new products/services.	2	4.23	4	4	5	0.69
Businis Performance	Profit growth	Z1	Through the digital economy, MSME business actors have achieved their targeted profit growth.	1	3.67	4	4	5	0.76
	Productivity growth	Z2	Through the digital economy, MSME business actors have improved productivity (meeting targets efficiently and effectively).	1	3.70	4	4	5	0.80
	Revenue growth	Z3	Through the digital economy, MSME business actors have achieved their targeted revenue growth.	2	3.72	4	4	5	0.77

SD: standard deviation

Overall, the descriptive statistics indicate that respondents' perceptions are generally positive across all constructs: nearly all medians and modes equal 4 (agree), with means ranging from 3.29 to 4.26 and moderate dispersion (SD ≈ 0.67–1.07). Within value creation, digital innovation (Y4) and value networking (Y1) stand out with higher means, suggesting that MSMEs perceive tangible benefits from using technology to generate new products/services and to broaden collaboration. On the capability side, core digital competencies—particularly data/analytics and digital marketing (M2)—appear relatively well established.

Conversely, several areas remain priority targets for improvement. In the digital-economy dimension, perceptions of network infrastructure (X1) are the lowest, while two negatively worded items—financial inclusion (X4) and multi-platform e-commerce adoption (X5)—signal structural barriers and uneven uptake. X6 (e-commerce constraints) also reflects persistent frictions; its high mean indicates broad agreement that such bottlenecks are still experienced. For capability, investment in digital risk mitigation (M5) and customer-database management (M6) are comparatively weaker and more dispersed, pointing to a need to strengthen data governance, cybersecurity, and process readiness.

Business-performance indicators—profit growth, productivity growth, and revenue growth (Z1–Z3)—cluster around 3.67–3.72 with a median of 4, reflecting reasonably good yet not robust outcomes. For consistent interpretation in subsequent analyses (CFA/SEM/IPA), negatively worded items (X4, X5, X6, and M1 if treated as a barrier) should be reverse-coded so that higher scores always indicate better conditions. In addition, the duplicated code "Z1" for productivity should be corrected to Z2 to maintain construct consistency.

4.2 Evaluation of item validity and reliability

In structural equation modeling, an essential step is evaluating the validity and reliability of the indicators used to measure each construct. To this end, we examine inter-item correlations, as summarized in Table 4. Particular attention is paid to within-construct correlations (highlighted in grey), which are expected to be higher than correlations observed across constructs.

Table 4. Inter-item correlation matrix

Indicator	X1	X2	X3	X4	X5	X6	M1	M2	M3	M4	M5	M6	M7	M8	Y1	Y2	Y3	Y4	Z1	Z2	Z3
X1	1.00																				
X2	0.36	1.00																			
X3	0.33	0.53	1.00																		
X4	0.01	0.06	-0.03	1.00																	
X5	0.14	0.11	0.25	0.47	1.00																
X6	0.07	0.05	0.02	0.44	0.51	1.00															
M1	-0.03	0.09	0.14	0.25	0.46	0.45	1.00														
M2	-0.03	0.15	0.17	0.13	0.19	0.33	0.27	1.00													
M3	0.20	0.25	0.35	0.00	0.23	0.04	0.03	0.10	1.00												
M4	0.23	0.20	0.40	0.16	0.25	0.09	0.02	0.23	0.36	1.00											
M5	0.21	0.22	0.28	0.07	0.21	0.05	0.03	0.06	0.47	0.51	1.00										
M6	0.10	0.19	0.31	0.08	0.17	-0.01	0.06	0.05	0.42	0.51	0.62	1.00									
M7	0.08	0.24	0.34	0.13	0.27	0.09	0.08	0.16	0.48	0.57	0.53	0.75	1.00								
M8	0.19	0.21	0.28	0.09	0.16	0.03	-0.04	0.04	0.49	0.44	0.62	0.62	0.66	1.00							
Y1	0.22	0.36	0.41	0.16	0.13	0.19	0.10	0.34	0.29	0.33	0.21	0.28	0.36	0.34	1.00						
Y2	0.25	0.33	0.41	0.07	0.12	0.10	0.11	0.18	0.37	0.42	0.44	0.44	0.45	0.50	0.53	1.00					
Y3	0.15	0.19	0.35	0.01	0.08	0.16	0.02	0.23	0.24	0.27	0.21	0.27	0.29	0.28	0.47	0.50	1.00				
Y4	0.08	0.34	0.31	0.06	0.10	0.04	0.13	0.33	0.35	0.35	0.07	0.19	0.34	0.24	0.48	0.34	0.39	1.00			
Z1	0.11	0.18	0.27	0.10	0.13	0.15	0.10	0.22	0.24	0.15	0.24	0.27	0.26	0.25	0.46	0.42	0.42	0.24	1.00		
Z2	0.16	0.18	0.25	0.03	0.08	0.07	0.04	0.33	0.31	0.37	0.41	0.33	0.40	0.45	0.35	0.49	0.36	0.30	0.57	1.00	
Z3	0.12	0.23	0.33	0.04	0.04	0.09	0.02	0.30	0.27	0.32	0.34	0.28	0.30	0.43	0.43	0.52	0.42	0.30	0.60	0.69	1.00

Table 4 reports the inter-item correlations. The results show that within the Digital Economy variable (X1–X6) several indicators exhibit very low—and in some cases negative—correlations. For example, X3 (a well-established digital ecosystem enabling MSMEs to adopt technology quickly, build an integrated business environment, and manage operating costs efficiently) correlates negatively with X4 (financial inclusion remains relatively low, as reflected in the limited number of accounts at financial institutions and limited online purchasing). This pattern indicates that these two indicators capture different dimensions of the digital-economy construct. By contrast, for Digital Capability (M1–M8), Value Creation (Y1–Y4), and Business Performance (Z1–Z3), all indicators display positive and consistently strong correlations. These findings support good construct validity and adequate reliability for those variables.

Item analysis based on confirmatory factor analysis (CFA). The measurement model was evaluated in two stages. In the first-order stage, indicator-to-dimension/construct relations were specified as follows: for Digital Economy (X), X1–X2 load on Infrastructure (INF), X3 represents Digital Ecosystem (DECO) (single-indicator), and X5–X6 load on E-commerce (ECOM); for Digital Capability (M), M1–M2 load on Digital Skill (DS), M3–M5 on Investment (INV), and M6–M8 on Marketing (MRK); Value Creation (Y) is measured directly by Y1–Y4 (Value Networking, Business Model, Coopetition, Digital Innovation); Business Performance (Z) is measured by Z1–Z3 (Profit growth, Productivity growth, Revenue growth). In the second-order stage, dimension-to-construct relations were estimated for X (INF, DECO, ECOM → X) and M (DS, INV, MRK → M).

CFA acceptance criteria were factor loadings ≥ 0.50, CR ≥ 0.70, and AVE ≥ 0.50. All higher-order constructs

demonstrated adequate composite reliability (CR ≥ 0.70). At the item level, most loadings exceeded 0.50, confirming strong contributions to their dimensions/constructs. A few indicators fell within 0.30–0.50 (e.g., barrier-type items such as X1 or M1); these were retained because the associated constructs' CRs remained high and their theoretical relevance is clear. For DECO as a single-indicator dimension (X3), reliability was addressed explicitly and the indicator was retained as a first-order dimension of the second-order Digital Economy factor. Regarding convergent validity, Digital Economy, Digital Capability, and Business Performance achieved AVE ≥ 0.50, while Value Creation was slightly below the threshold but deemed acceptable given adequate loadings and CR. All negatively worded items (e.g., constraint items such as X5, X6, or M1) were reverse-coded to ensure consistent interpretation (higher scores = better conditions/capabilities).

Taken together, the measurement model is valid and reliable: indicators represent their dimensions/constructs well; dimensions consistently form the second-order factors (X and M); and the three key metrics (loadings, CR, AVE) justify proceeding to the structural model analysis.

Table 5. Item validity and reliability analysis

Variable	Dimension		Indicator	Loading	R^2	VE	CR	AVE
Digital Economy	Infrastructure	X1	The expansion of the internet network has become evenly distributed across Indonesia.	0.477	0.228	0.772	0.848	0.544
		X2	Current internet speed is adequate and facilitates business actors' access to e-commerce.	0.751	0.564	0.436		
	Digital Ecosystem	X3	The digital ecosystem is now well established, enabling MSME business actors to adopt technology more quickly, build an integrated business environment, and manage systems and operating costs.	0.838	0.702	0.298		
	E-commerce	X5	Although e-commerce has grown rapidly, only a small share of businesses are leveraging digital technology to sell across multiple e-commerce platforms.	0.976	0.953	0.047		
		X6	Local e-commerce sellers currently face difficulties in selling their products; the most common obstacles include low demand, lack of capital, shortage of skilled labor, limited internet access, limited delivery services, and fraud during transactions.	0.524	0.275	0.725		
Digital Capability	Digital Skill	M1	Limited digital skills are a barrier to accelerating the digital economy in Indonesia, particularly in West Java.	0.350	0.123	0.878	0.896	0.531
		M2	The digital skill domains MSME business actors in Indonesia need to apply the digital economy include: digital technology, data science, and digital marketing.	0.771	0.594	0.406		
	Investment	M3	MSME business actors are able to invest in production facilities.	0.643	0.413	0.587		
		M4	MSME business actors are able to invest through alliances and partnerships.	0.680	0.462	0.538		
		M5	MSME business actors are able to invest in risk-mitigation mapping.	0.772	0.596	0.404		
	Marketing	M6	MSME business actors are able to develop a customer database.	0.846	0.716	0.284		
		M7	MSME business actors are able to set customer segmentation to deliver the right value for each segment.	0.871	0.759	0.241		
		M8	MSME business actors are able to build a strong brand.	0.764	0.584	0.416		
Value Creation	Value Networking	Y1	In implementing the digital economy, value networks have provided clear benefits to MSME business actors.	0.705	0.497	0.503	0.761	0.448

Variable	Dimension		Indicator	Loading	R^2	VE	CR	AVE
	Business Model	Y2	MSME business actors have adopted a digital business model to provide the best services and improve performance.	0.776	0.602	0.398		
	Coopetition	Y3	Through the digital economy, MSME business actors benefit from collaboration with competitors operating in the same business layer.	0.637	0.406	0.594		
	Digital innovation	Y4	The digital economy stimulates MSME business actors to innovate and create new products/services.	0.535	0.286	0.714		
Business Performance	Profit growth	Z1	The expansion of the internet network has become evenly distributed across Indonesia.	0.716	0.513	0.487	0.834	0.628
	Productivity growth	Z2	Current internet speed is adequate and facilitates business actors' access to e-commerce.	0.803	0.645	0.355		
	Revenue growth	Z3	The digital ecosystem is now well established, enabling MSME business actors to adopt technology more quickly, build an integrated business environment, and manage systems and operating costs.	0.852	0.726	0.274		

4.3 Measurement analysis

Based on the measurement analysis, most indicators exhibit factor loadings ≥ 0.50. A few indicators fall below this threshold—most notably M1 (0.350) and X1 (0.477)—but are retained because the internal consistency of their constructs is strong, as reflected in composite reliability (CR) values above the conventional cutoffs. At the construct level, all CRs are adequate: Digital Economy = 0.848, Digital Capability = 0.896, Value Creation = 0.761, and Business Performance = 0.834.

For convergent validity, three constructs meet the criterion AVE ≥ 0.50—Digital Economy (0.544), Digital Capability (0.531), and Business Performance (0.628). Value Creation is slightly below the threshold (AVE = 0.448) but is deemed acceptable under the adopted criteria (item loadings ≥ 0.30 and CR > 0.60). Although the latent variable value creation exhibited an AVE value (0.448) slightly below the recommended threshold of 0.50 (Fornell & Larcker, 1981), the construct was retained in the model because its composite reliability (CR = 0.761) indicated acceptable internal consistency, and all factor loadings exceeded the minimum acceptable value of 0.50. Moreover, value creation holds strong theoretical importance within the research framework, serving as a key mediating construct that links digital capabilities to firm performance. Therefore, despite the marginally suboptimal AVE, the construct was considered valid for inclusion based on its reliability and theoretical relevance.

At the item level, the strongest indicators include X5 (0.976), X3 (0.838), M6–M8 (≥ 0.764), M2 (0.771), Y2 (0.776), Y1 (0.705), Z3 (0.852), and Z2 (0.803). Indicators with relatively lower contributions, yet still within acceptable bounds, are M1 (0.350), X1 (0.477), X6 (0.524), and Y4 (0.535). Overall, the measurement model is reliable and valid for three constructs and acceptable for Value Creation under the stated criteria, and is therefore suitable for subsequent structural analysis.

4.4 Structural model evaluation

After identifying the appropriate items for each construct, the next step involved assessing the structural model. The initial stage comprised model–fit evaluation alongside hypothesis testing. The results indicate an excellent fit: the chi-square statistic is 29.547 with p = 0.489; a p-value above 0.05 suggests adequate fit to the data. The RMSEA is 0.000, far below the 0.08 benchmark, and both the CFI and TLI equal 1.000, well above the 0.900 threshold. Collectively, these indices confirm a very strong correspondence between the model and the observed data.

Subsequently, the hypotheses were tested. Table 6 reports the effects of the digital economy on value creation, the direct effect of the digital economy on business performance, the relationship between value creation and business performance, and the indirect effect of the digital economy on business performance through value creation. A visual summary of these results is presented in Figure 2.

Table 6. Structural model evaluation

Hyphotesis	Parameter	Coefficient	Z-value	p-value	Decision
Digital Economy → Value Creation	(γ_{11})	0.378	2.939	0.003	H1 Accepted
Digital Capability → Value Creation	(γ_{12})	0.404	3.194	0.001	H2 Accepted
Digital Economy × Digital Capability → Value Creation	(γ_{13})	-0.050	-0.613	0.540	H3 Rejected
Digital Economy → Business Performance	(γ_{21})	-0.108	-0.813	0.416	H4 Rejected
Business Performance → Value Creation	(β_{21})	0.828	4.096	0.000	H5 Accepted
Business Performance → Value Creation → Digital Economy	($\gamma_{11}\times\beta_{21}$)	0.313	2.435	0.015	H6 Accepted

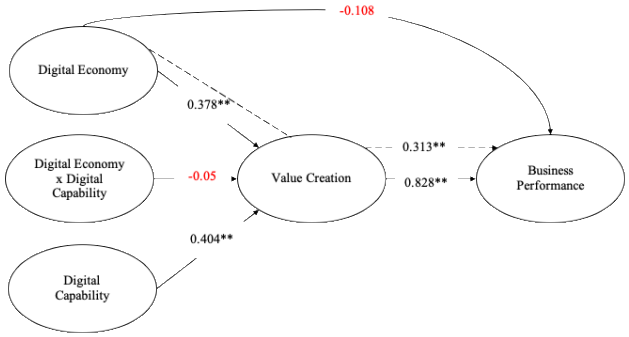

Fig. 3. Structural model evaluation

The hypothesis tests reported in Table 6 and Figure 3 show that the digital economy has a positive and significant effect on value creation (γ_{11} = 0.378; z = 2.939; p = 0.003), and digital capability likewise exerts a positive and significant effect on value creation (γ_{12} = 0.404; z = 3.194; p = 0.001). In contrast, the interaction between the digital economy and digital capability is not significant (γ_{13} = −0.050; z = −0.613; p = 0.540), indicating no evidence of moderation.

On the outcome side, the direct effect of the digital economy on business performance is insignificant and small, with a negative sign (γ_{21} = −0.108; z = −0.813; p = 0.416). By contrast, value creation has a strong, positive, and significant effect on business performance (β_{21} = 0.828; z = 4.096; p < 0.001). The mediation test indicates that the indirect effect of the digital economy on business performance via value creation is significant ($\gamma_{11} \times \beta_{21}$ = 0.313; z = 2.435; p = 0.015).

Taken together, these results indicate that the digital economy and digital capability enhance value creation, and value creation, in turn, improves business performance. Because the direct path from the digital economy to performance is not significant while the indirect path through value creation is significant, the pattern is consistent with full mediation: the digital economy affects performance primarily through value-creation mechanisms rather than directly. The absence of moderation implies that, in this sample, the magnitude of the digital economy's effect on value creation does not depend on the level of digital capability.

Table 7. Moderation analysis of Digital Capability

Effect	Level Moderation of Digital Capability	Coefficient	Z-Vaue	p-value
Direct effect of the Digital Economy → Value Creation	Low (Mean – 1 SD)	0.381	3.054	0.002
	Average (Mean)	0.378	2.939	0.003
	High (Mean + 1 SD)	0.376	2.295	0.022
Indirect effect of the Digital Economy → Value Creation → Business Performance	Low (Mean – 1 SD)	0.316	2.54	0.011
	Average (Mean)	0.313	2.435	0.015
	High (Mean + 1 SD)	0.311	2.005	0.045
Total effect of the Digital Economy → Business Performance	Low (Mean – 1 SD)	0.208	2.255	0.024
	Average (Mean)	0.205	1.846	0.065
	High (Mean + 1 SD)	0.203	1.269	0.204

Moderation analysis of Digital Capability

The results at the three levels of digital capability—low, average, and high—exhibit a consistent pattern. First, the direct effect of the digital economy on value creation remains positive and significant across all capability levels ($\beta \approx 0.38$; $p < 0.05$). Although the coefficient decreases slightly from low to high capability, the difference is small and does not indicate meaningful moderation. Second, the indirect effect of the digital economy on business performance through value creation is also significant at all levels of capability ($\beta \approx 0.31$; $p < 0.05$), underscoring value creation as the primary pathway through which the digital economy influences performance. Consistent with earlier findings, this indirect effect weakens marginally as digital capability increases, but it remains statistically significant. Third, the total effect of the digital economy on business performance is significant only when

digital capability is low (β = 0.208; p = 0.024); it becomes marginal at the average level (p = 0.065) and non-significant at the high level (p = 0.204). This pattern aligns with the small direct path from the digital economy to performance: as digital capability matures, the additional contribution of the digital economy tends to be absorbed through value-creation mechanisms, while the total impact on performance diminishes. Overall, the digital economy enhances performance primarily via value creation at all levels of digital capability, with the total "payoff" most pronounced among organizations whose digital capability remains relatively low. Practically, efforts should focus on strengthening the mechanisms of value creation—value networking, business model design, coopetition, and digital innovation—so that investments in the digital economy are optimally converted into performance gains.

4.5 Importance–Performance Analysis (IPA).

The IPA is constructed using the mean score of each indicator as the performance metric and its standardized factor loading as the implied importance

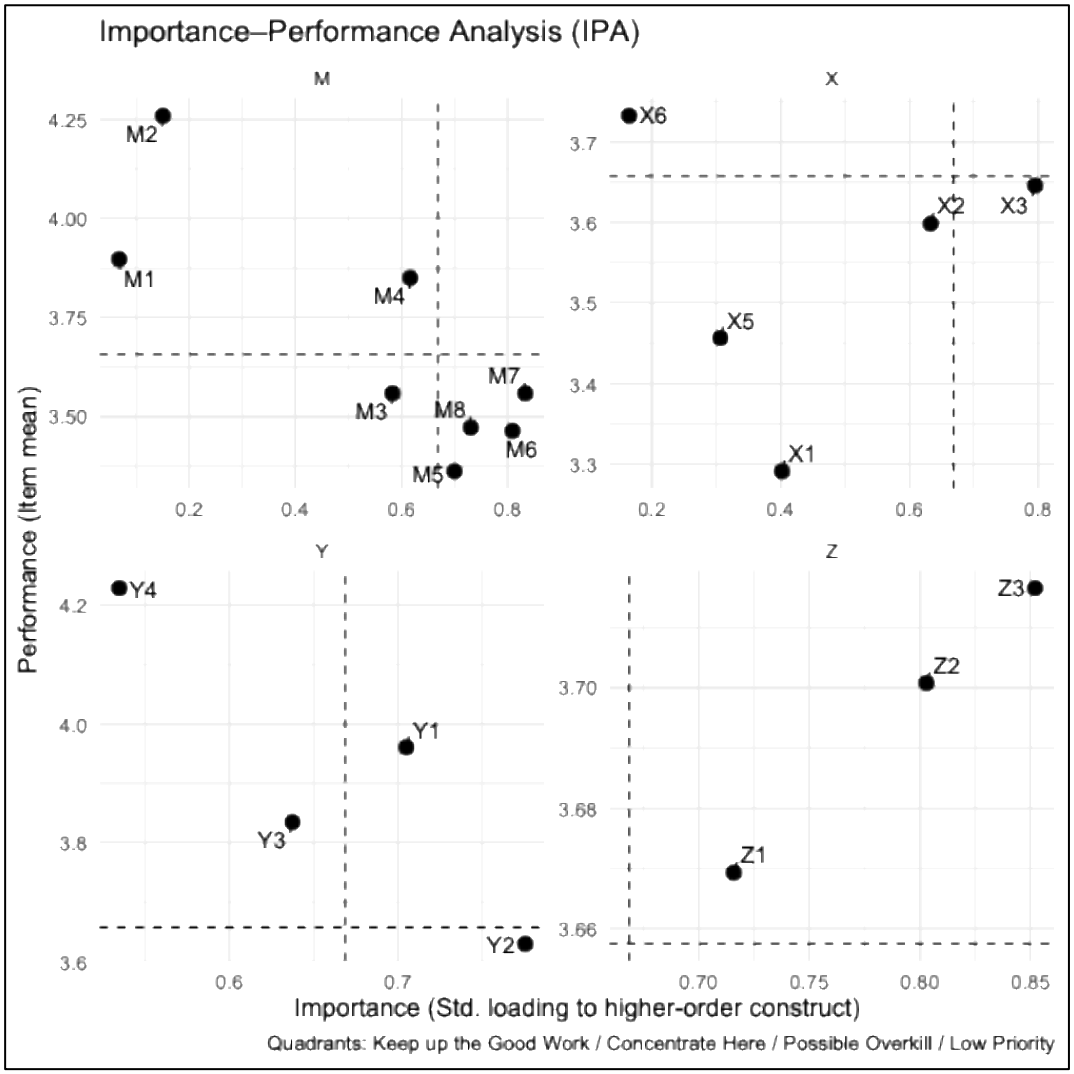

Fig. 4. Importance–Performance Analysis (IPA)

The IPA results (Figure 4) show a consistent pattern across all four constructs.

For the Digital Economy, cross-platform e-commerce use and the integrated, secure management of e-commerce processes (X5, X6) emerge as priority improvement areas: they are important but perform relatively weaker. In contrast, the enabling digital ecosystem and internet speed (X3, X2) fall in the "keep up the good work" quadrant and should be maintained. Network availability (X1) appears less urgent than the other indicators.

Within Digital Capability, the most pressing needs are customer database management, digital brand strengthening, and risk-mitigation investment (M6, M8, M5). All three are important yet lag in performance. Data/analytics-based and digital-marketing skills and segmentation practices (M2, M7) are working well and worth continuing, while facility investment and partnerships (M3, M4) are adequate but not top priorities at present.

For Value Creation, digital innovation and value networking (Y4, Y1) act as high-value levers that are already performing well. Digital business model design (Y2) sits near

the threshold and likely requires strengthening to align with target segments. Coopetition practices (Y3) are beneficial, though not as critical as the two pillars above.

Regarding Business Performance, productivity and revenue growth (Z2, Z3) are strong, while profit growth (Z1) lags slightly, indicating room for improvement via cost efficiency and higher repeat purchases.

Strategically, the short-term priority is to close gaps on high-importance / low-performance indicators—especially X5, X6, M6, M8, and M5—while maintaining existing strengths (X3, X2, M2, M7) and continuing to channel efforts through value-creation mechanisms (Y1, Y4), as these most effectively convert digital adoption into business performance.

The results validate previous research by Lenka et al. (2017) and Matarazzo at al. (2021), affirming that digital capabilities augment value creation through enhanced intelligence, connectedness, and innovation agility. In contrast to Guo et al. (2020), this study found that the moderating influence of digital capability was insignificant, suggesting that for MSMEs, digital capability serves mainly as a fundamental enabler rather than a limiting factor in the relationship between the digital economy and value generation.

The results must be understood within the specific context of West Java, where MSMEs may encounter restrictions in digital infrastructure, inconsistent broadband connectivity, and varying levels of policy assistance. These regional considerations may affect the speed and efficacy of digital transformation relative to other provinces.The results must be understood within the specific context of West Java, where MSMEs may encounter constraints in digital infrastructure, inconsistent internet availability, and varying levels of policy assistance. These regional considerations may affect the speed and efficacy of digital transformation relative to other provinces.

5. DISCUSSION AND CONCLUSION

This study illustrates that the digital economy amplifies value creation, hence significantly propelling business performance. Digital capability immediately fosters value creation; yet, its moderating effect on the relationship between the digital economy and value creation is insignificant. The data suggest that value creation is the primary conduit via which the digital economy affects firm performance. Consequently, companies ought to concentrate their performance-enhancement strategies on fortifying value-creation processes—broadening digital networks, optimizing business models, encouraging collaboration, and nurturing continuous innovation—while developing digital competence as the fundamental enabler.

The ramifications extend beyond organizational practices to the formulation of digital policy. As emerging technologies like artificial intelligence, blockchain, and data analytics become essential for value generation, future digital-economy policies must prioritize capability development that incorporates these tools into business operations. Policymakers may facilitate this transformation by fostering open digital ecosystems, encouraging technology adoption among SMEs, and guaranteeing equal access to data infrastructure and cybersecurity standards.

The forthcoming stage of digital transformation is expected to shift value generation from efficiency-oriented to intelligence-oriented systems, wherein AI customizes client experiences, blockchain guarantees trust and transparency, and data platforms facilitate real-time collaboration across networks. Future research may investigate how these technological transformations alter the mediating function of value creation—whether via enhanced decision-making systems, decentralized business models, or novel forms of digital trust—thereby enriching our comprehension of how the digital economy perpetually redefines business performance.

5.1 Policy perspective

From a policy standpoint, the digital transformation of Indonesian MSMEs can be expedited through organized interventions, including digital literacy and upskilling initiatives, financial incentives for e-commerce engagement, and subsidies or grants for the adoption of CRM and analytics systems. Policymakers must prioritize enhancing digital infrastructure and establishing regulatory certainty to bolster long-term competitiveness in the digital economy.

5.2 Managerial Implications

5.2.1 Customer Relationship Management Strategy

Performance enhancements are predominantly facilitated by value creation, as the direct impact of the digital economy on performance was unsubstantiated, and digital capacity exhibited no substantial moderating influence. Management should concentrate on enhancing value-creation mechanisms by utilizing digital capabilities as a foundational enabler. Primary objectives encompass the organization and cleansing of the customer database, the implementation of a streamlined CRM system to facilitate customer segmentation, data-informed offers, and retention initiatives, as well as the assurance of data integrity and security. Companies must connect their digital business models with customer requirements, expand partner networks, and maintain innovation driven by client feedback.

5.2.2 Digital Branding

Enhancing the digital brand is crucial for conveying trust, differentiation, and innovation in the market. Managers must foster effective communication among internal departments to ensure a uniform corporate identity across digital platforms. Investments in cybersecurity and service continuity planning are equally vital for mitigating operational risks and enhancing brand reliability.

5.2.3 Marketplace Integration

To achieve efficient e-commerce execution, companies must eliminate integration deficiencies across sales channels—catalogs, inventories, payments, and fulfillment—to guarantee smooth consumer experiences. Standardizing store operating procedures and ensuring secure transaction environments are essential measures for achieving operational excellence.

To maintain advancement, firms must designate explicit process owners for CRM, e-commerce, and brand management, while monitoring key performance indicators including conversion rates, customer retention, productivity, and the impact of digital sales on overall performance.

5.3 Limitations and Future Directions

This study acknowledges several limitations. With 127 observations and 21 indicators, the sample size falls below the recommended ratio for stable SEM estimation, which may

reduce the robustness and generalizability of the findings. Future research should therefore employ larger and more diverse samples to improve model stability and external validity. Although data were collected from 14 sectors, cross-sectoral differences were not examined because the primary focus was on the overall structural model. Subsequent studies could conduct sector-specific or multi-group analyses to explore variations in how digital capability, value creation, and firm performance interact across industries.

Empirically, the study confirms that the digital economy enhances firm performance mainly through value creation, while the moderating role of digital capability is statistically insignificant. This suggests that value creation acts as the central mechanism linking the digital economy to performance, with digital capability serving as an enabling foundation. From a policy perspective, digital transformation among MSMEs can be accelerated through initiatives that promote digital upskilling, e-commerce participation, and CRM adoption. Future research should also investigate how emerging technologies—such as artificial intelligence, blockchain, and data analytics—reshape value-creation mechanisms and redefine performance in the evolving digital economy.

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