“Entrepreneurial orientation, dynamic capabilities, and startup performance: The amplifying role of AI”

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ENTREPRENEURIAL ORIENTATION, DYNAMIC CAPABILITIES, AND STARTUP PERFORMANCE: THE AMPLIFYING ROLE OF AI

Abstract

Startups in emerging economies face pressures to translate strategic orientations and organizational capabilities into competitive performance amid resource constraints and institutional uncertainty. Despite interest in entrepreneurial orientation and dynamic capabilities as performance drivers, how they jointly influence startup performance through capability-conversion mechanisms – and how artificial intelligence (AI) amplifies these effects – remains underexplored. This study examines the mediating role of innovation capability in the entrepreneurial orientation–performance and dynamic capabilities–performance relationships, and the moderating role of AI adoption intensity, within Vietnamese startups. Data were collected from 315 founders, chief executive officers, and senior managers from September to December 2025 and analyzed using PLS-SEM. Results reveal that entrepreneurial orientation exerts a weak direct effect on performance ($\beta = 0.135$, $p < 0.01$) and a significant indirect effect through innovation capability ($\beta = 0.098$, $p < 0.001$), suggesting entrepreneurial orientation operates as a strategic catalyst rather than an immediate performance driver. Dynamic capabilities demonstrate both direct ($\beta = 0.176$, $p < 0.001$) and indirect effects via innovation capability ($\beta = 0.044$, $p = 0.004$), positioning it as a core value-creation engine. AI adoption intensity significantly moderates the entrepreneurial orientation–performance ($\beta = 0.232$), innovation capability–performance ($\beta = 0.202$), and dynamic capabilities–performance ($\beta = 0.282$) relationships, with the strongest amplification observed for dynamic capabilities. The model explains 66.5% of performance variance ($R^2 = 0.665$). These findings advance understanding of capability-conversion logic in emerging-economy startups and offer practical guidance for managers seeking to build competitive advantage through capability development and technology adoption.

Keywords innovation capability, Vietnam, PLS-SEM, emerging economies, strategic orientation

JEL Classification M13, L26, O31, O33

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INTRODUCTION

Startups are widely recognized as critical engines of innovation and economic growth, particularly in emerging economies undergoing rapid digital transformation and institutional volatility (Arabeche et al., 2022; Pham & Nguyen, 2024). Despite abundant entrepreneurial energy, many startups fail to translate strategic orientation into sustainable competitive outcomes, owing to resource limitations, managerial inexperience, and intense competitive pressures. This gap between entrepreneurial intent and realized performance raises a fundamental question – which strategic orientations and organizational capabilities enable startups to convert uncertainty into superior performance? Addressing this question carries theoretical and practical urgency, especially as digitalization reshapes competitive dynamics in economies where institutional conditions remain in transition.

Emerging research suggests that entrepreneurial orientation and dynamic capabilities are among the most influential antecedents of startup performance, yet their mechanisms remain insufficiently understood. From a capability-conversion perspective, entrepreneurial orientation may not directly drive performance but primarily activates innovation capability through learning and knowledge absorption processes (Makhloufi et al., 2021; Ngo, 2023). Similarly, dynamic capabilities theory argues that firms achieve superior outcomes not through static resources but through the sensing, seizing, and reconfiguring processes that enable continuous adaptation (Teece et al., 1997). Concurrently, artificial intelligence (AI) is increasingly conceptualized as an amplifier of existing capabilities rather than an independent performance driver (Mikalef & Gupta, 2021), though research examining AI's moderating role in entrepreneurship remains nascent, particularly in emerging markets (Uriarte et al., 2025).

Despite this growing attention, three gaps persist. First, empirical evidence on entrepreneurial orientation performance mechanisms in resource-constrained emerging-economy startups remains inconsistent, with most studies focusing on established firms in stable institutional environments (Daradkeh & Mansoor, 2023; Kusa et al., 2021). Second, the application of dynamic capabilities theory to early-stage ventures facing simultaneous liabilities of newness and environmental volatility is underexplored (Warner & Wäger, 2019). Third, research examining AI adoption as a strategic boundary condition that amplifies capability-performance linkages in startups is scarce, particularly where digital infrastructure is uneven (Mumi et al., 2025; Uriarte et al., 2025). Together, these gaps leave unresolved question of how entrepreneurial orientation and dynamic capabilities generate startup performance in digitally transitioning emerging economies.

1. LITERATURE REVIEW AND HYPOTHESES

Startups in emerging economies operate within highly dynamic environments characterized by institutional volatility, resource constraints, technological disruption, and rapidly evolving market demands. Compared with their counterparts in developed economies, these firms often face heightened uncertainty due to imperfect institutional support systems, limited access to strategic resources, and intense competitive pressures. In such contexts, the ability to continuously adapt, reconfigure resources, and develop new organizational capabilities becomes a critical determinant of long-term survival and sustainable performance. Recent evidence from Vietnamese organizations reinforces this perspective, demonstrating that resilience-related capabilities play a pivotal role in enhancing organizational adaptability and effectiveness under conditions of uncertainty and environmental turbulence (Minh & Ngoc Long, 2023). Collectively, these insights suggest that startups in emerging economies must rely not only on entrepreneurial initiatives but also on dynamic and innovation-oriented capabilities to build competitive advantage and achieve superior performance outcomes. The resource-based view (RBV) posits that valuable, rare, inimitable, and non-substitutable resources form the basis of competitive advantage (Barney, 1991). However, RBV alone is insufficient in dynamic contexts where continuous adaptation is required. Dynamic capability theory extends this perspective by emphasizing firms' abilities to sense opportunities, seize them through resource reconfiguration, and transform their operational base to maintain relevance (Eisenhardt & Martin, 2000; Teece, 2007).

Entrepreneurial orientation has been widely recognized as a strategic posture that enables firms to navigate uncertainty. Rooted in Miller's (1983) conceptualization of innovativeness, proactiveness, and risk-taking, entrepreneurial orientation was operationalized by Covin and Slevin (1989) as a firm-level construct associated with superior performance under hostile conditions. Lumpkin and Dess (1996) expanded its dimensionality and highlighted its contingent nature, suggesting that the entrepreneurial orientation–performance relationship depends on environmental and organizational factors. Empirical studies generally confirm positive associations between entrepreneurial orientation and small firm performance (Wiklund & Shepherd, 2003, 2005). A meta-analysis of 53 independent samples further validated this rela-

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tionship while identifying contextual moderators such as firm size, industry, and environmental dynamism (Rauch et al., 2009). Recent scholarship emphasizes the contextual sensitivity of entrepreneurial orientation. Wales (2016) and Wales et al. (2021) underscored the need for validation in emerging economies. Lee et al. (2019) confirmed positive financial effects but highlighted the role of environmental moderators. Daradkeh and Mansoor (2023) framed entrepreneurial orientation as a strategic resource aligned with RBV, particularly when combined with strategic flexibility. Chelliah et al. (2022) and Kusa et al. (2021) showed that entrepreneurial orientation enhances competitive capacity through knowledge management and strategic positioning, whereas Naskar et al. (2025) demonstrated stronger effects of entrepreneurial orientation in hostile environments.

Evidence from emerging economies is particularly relevant. Boso et al. (2013) found that entrepreneurial orientation combined with market orientation and network relationships improves small firm performance. Peng et al. (2020) confirmed that institutional quality moderates the effects of entrepreneurial orientation across developed and emerging contexts. However, most studies focus on established SMEs rather than early-stage startups facing simultaneous liabilities of newness and resource constraints. Beyond its direct influence on performance, entrepreneurial orientation may operate through capability-building mechanisms.

Innovation capability reflects an organization's institutionalized ability to generate, absorb, and deploy knowledge into new offerings (Guan & Ma, 2003; Lawson & Samson, 2001). Entrepreneurial orientation encourages experimentation, opportunity recognition, and knowledge accumulation (Covin & Slevin, 1989; Lumpkin & Dess, 1996), thereby laying the foundation for innovation capability development. Makhloufi et al. (2021) demonstrated that entrepreneurial orientation enhances absorptive capacity and innovation outcomes. Sulistyo and Ayuni (2020) found similar results in Southeast Asia. In Vietnam, Le Trinh (2019) and Anh et al. (2020) highlighted the role of entrepreneurial ecosystems in shaping innovation processes, while Ngo (2023) showed that innovation capability mediates the entrepreneurial orientation–performance relationship among Vietnamese SMEs. Yet, innovation capability is often measured as output rather than as an organizational capability (Saunila, 2020), and its mediating role in early-stage Vietnamese startups remains underexplored.

Dynamic capabilities represent higher-order processes that enable adaptation and renewal (Teece, 2007). Empirical evidence confirms positive associations between dynamic capabilities and firm performance, particularly in dynamic environments (Drnevich & Kriauciunas, 2011). Pavlou and El Sawy (2011) demonstrated that dynamic capabilities improve new product development outcomes, while Schilke (2014) showed that dynamic capabilities–performance relationships depend on strategic alignment and environmental turbulence. In digital transformation contexts, they facilitate successful technology adoption (Al-Moaid & Almarhdi, 2024). Preliminary evidence from Vietnam confirms the relevance of dynamic capabilities for firm performance and innovation in digitally transitioning contexts (Cuong et al., 2024), yet systematic testing among early-stage startups remains limited. By reconfiguring resources and integrating knowledge, dynamic capabilities enhance innovation processes (Eisenhardt & Martin, 2000; Pavlou & El Sawy, 2011). Prieto et al. (2009) and Zhou et al. (2019) found that dynamic capabilities drive product and process innovation. Research on absorptive capacity further confirms that learning and knowledge integration mediate capability transformation (Pham & Nguyen, 2024). However, prior studies often conflate dynamic capabilities with innovation capability or fail to explicitly test indirect relationships (Breznik & Hisrich, 2014; Fainshmidt et al., 2016).

In the digital era, artificial intelligence increasingly functions as a technological amplifier that enhances the effectiveness of organizational capabilities. From a dynamic capability perspective, AI strengthens sensing through large-scale data analytics, improves seizing through predictive modeling, and accelerates reconfiguration via automation and algorithmic optimization (Warner & Wäger, 2019). Mikalef and Gupta (2021) conceptualized AI capability as an integrated bundle of data infrastructure, analytical skills, and organizational processes that enhance business performance. Empirical evidence shows that AI-

supported analytics reinforces the performance impact of entrepreneurial initiatives (Dubey et al., 2020), while digitalization strategies strengthen the link between entrepreneurial orientation and innovation outcomes (Kraus et al., 2023; Samsami et al., 2025).

Beyond entrepreneurial posture, AI may also amplify the value-creation potential of innovation capability. Innovation capability reflects a firm's ability to generate and deploy new knowledge, yet its economic impact depends on the efficiency with which ideas are transformed into scalable market outcomes. AI enhances this transformation process by accelerating experimentation cycles, improving pattern recognition in customer data, and enabling rapid feedback integration. Large-scale evidence indicates that firms investing in AI achieve superior innovation-driven growth and revenue expansion (Babina et al., 2024). Importantly, D'Amico et al. (2025) demonstrated that AI positively moderates the relationship between knowledge collaboration diversity and innovation performance within open innovation ecosystems. Their findings imply that AI strengthens the economic returns of innovation-related capabilities by enhancing knowledge integration and exploitation efficiency. Similarly, Sahoo et al. (2024) showed that AI capability improves the performance outcomes of open innovation practices in B2B markets. These results suggest that AI does not merely generate innovation but intensifies the performance impact of existing innovation capability.

AI may also strengthen the performance implications of dynamic capabilities. By expanding sensing capacity and enabling predictive decision-making, AI enhances firms' ability to align resource reconfiguration with market signals (Warner & Wäger, 2019). Fosso Wamba (2022) showed that AI assimilation increases organizational agility, a core mechanism underlying dynamic capabilities. Mikalef and Gupta (2021) further confirmed that AI capability enhances organizational creativity and performance. However, direct empirical testing of AI as a moderating boundary condition in startup contexts remains limited, particularly in emerging economies (Mumi et al., 2025; Uriarte et al., 2025).

Taken together, these findings suggest that AI adoption intensity may amplify the performance effects of entrepreneurial orientation, innovation capability, and dynamic capabilities by enhancing data-driven decision processes and accelerating capability conversion into economic outcomes.

Accordingly, the objective of this study is to examine how entrepreneurial orientation and dynamic capabilities influence startup performance through innovation capability, as well as how AI adoption intensity moderates these relationships in Vietnamese startups. This study makes three important contributions to the entrepreneurship and innovation literature. First, it integrates entrepreneurial orientation, dynamic capabilities, innovation capability, and AI adoption intensity into a unified capability-conversion framework, thereby addressing the fragmentation evident in prior research. Second, it provides direct empirical evidence of the mediating role of innovation capability in transforming strategic orientations and organizational capabilities into enhanced startup performance. Third, it extends the emerging literature on AI by demonstrating that AI adoption intensity functions as a strategic capability amplifier, strengthening the relationships between entrepreneurial orientation, dynamic capabilities, innovation capability, and startup performance in the context of startups operating in an emerging economy. This perspective is consistent with recent evidence from emerging-market contexts, suggesting that organizational capabilities generate performance outcomes primarily through capability-transformation processes rather than through the direct deployment of resources alone (Cuong et al., 2025).

Based on this reasoning, the following hypotheses are proposed (Figure 1):

H1: Entrepreneurial orientation positively affects startup performance.

H2: Entrepreneurial orientation positively affects innovation capability.

H3: Dynamic capabilities positively affect startup performance.

H4: Dynamic capabilities positively affect innovation capability.

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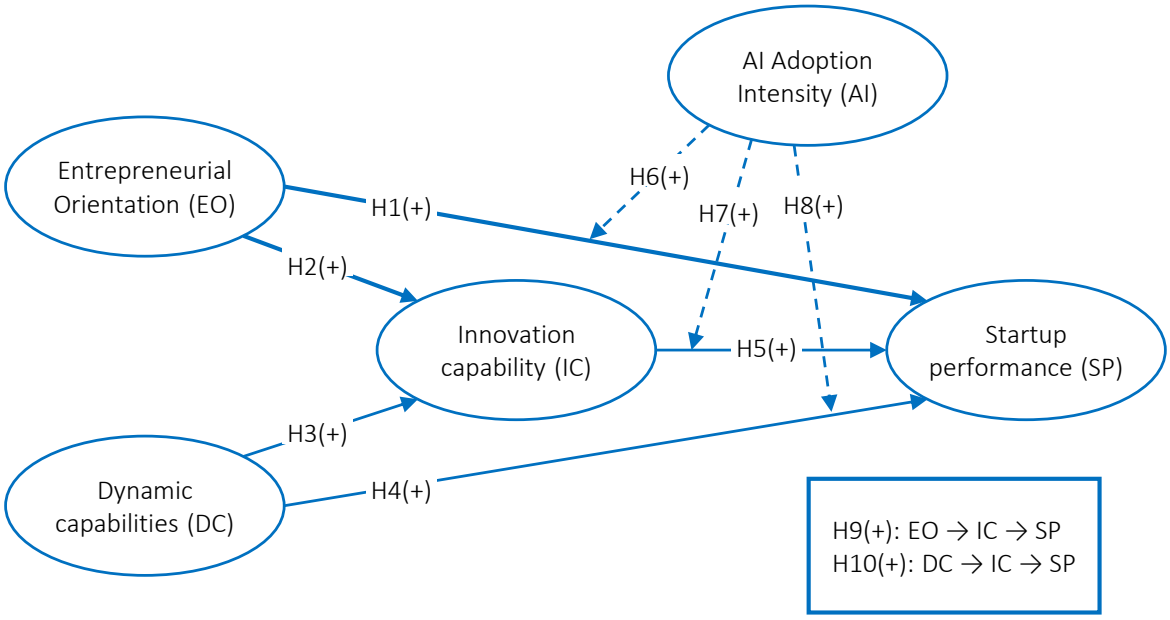

Figure 1. Research model

H5: Innovation capability positively affects startup performance.

H6: AI adoption intensity positively moderates the relationship between entrepreneurial orientation and startup performance.

H7: AI adoption intensity positively moderates the relationship between innovation capability and startup performance.

H8: AI adoption intensity positively moderates the relationship between dynamic capabilities and startup performance.

H9: Innovation capability mediates the relationship between entrepreneurial orientation and startup performance.

H10: Innovation capability mediates the relationship between dynamic capabilities and startup performance.

2. METHOD

This study employed a cross-sectional survey design to test the proposed theoretical model. Vietnam was selected as the research context because it represents a dynamic emerging economy characterized by institutional volatility, resource constraints, and accelerated digital transformation–conditions under which entrepreneurial orientation and capability-based mechanisms become particularly salient for firm survival and performance (Anh et al., 2020; Arabeche et al., 2022). The Vietnamese startup ecosystem has expanded rapidly over the past decade, especially in technology-enabled and innovation-driven sectors, providing an appropriate setting for examining capability-conversion logic in early-stage firms.

Startups were defined as independent firms operating for less than ten years and characterized by innovation-oriented business models or scalable growth ambitions. Data were collected from startups operating in Ho Chi Minh City, Hanoi, Da Nang, and other provinces across Vietnam to ensure geographic diversity and reduce regional concentration bias. The target population consisted of founders, chief executive officers, and middle- to senior-level managers who are directly involved in strategic decision-making and bear primary responsibility for organizational outcomes (Liu et al., 2021). In cases where founders simultaneously held CEO positions, respondents were instructed to select the role that best reflected their primary managerial responsibility. Only individuals with at least six months of tenure were included to ensure adequate organizational exposure and informed assessment of firm capabilities.

Surveys were administered in both paper-based and online formats between September and December 2025 through startup networks, incubators, entrepreneurship associations, and professional contacts. Prior to full deployment, the questionnaire was reviewed by an expert panel consisting of entrepreneurship scholars and startup mentors to ensure conceptual clarity and contextual appropriateness. A pilot test was subsequently conducted to verify item clarity, reliability, and scale validity. All measurement items were translated into Vietnamese using a double translation and back-translation procedure following Brislin (1980) to ensure semantic equivalence and minimize linguistic bias.

A total of 725 questionnaires were distributed, yielding 416 initial responses (response rate: 57.24%). After removing 101 responses that did not meet startup criteria, 315 valid questionnaires were retained for analysis. To assess non-response bias, early and late respondents were compared using independent-samples *t*-tests; no statistically significant differences were detected ($p > 0.05$), indicating negligible bias. Demographic and firm characteristics of the final sample are presented in Table 1.

All constructs were measured reflectively using five-point Likert scales (1 = strongly disagree, 5 = strongly agree) at the organizational level, reflecting perceptions of managers within startups. Entrepreneurial orientation was assessed with five items adapted from Covin and Slevin (1989) and Daradkeh and Mansoor (2023). Dynamic capabilities were measured using five items adapted from Teece et al. (1997) and Pavlou and El Sawy (2011), reflecting sensing, knowledge integration, and resource reconfiguration. Innovation capability was measured with five items adapted from Lawson and Samson (2001) and Sarwar et al. (2024). Startup performance was assessed using four items adapted from Daradkeh and Mansoor (2023), reflecting growth relative to competitors. AI adoption intensity (AI) was measured using four items adapted from Chen (2019) and Monteiro et al. (2023), capturing

Table 1. Sample characteristics

Classification	Variable	Frequency	%
Gender	Male	207	65.7
	Female	108	34.3
Age	Under 25	147	46.7
	25–34	71	22.5
	35–44	38	12.1
	45 and above	59	18.7
Education	Technical/Vocational	24	7.6
	Undergraduate	196	62.2
	Postgraduate	86	27.3
	Other	9	2.9
Position	Founder	144	45.7
	CEO	80	25.4
	Manager	91	28.9
Business sector	Technology	137	43.5
	Manufacturing	103	32.7
	Services	28	8.9
	Other	47	14.9
Firm age	Under 3 years	124	39.4
	3–5 years	111	35.2
	Over 5 years	80	25.4
Firm size	Under 10 employees	136	43.2
	10–50 employees	136	43.2
	Over 50 employees	43	13.7
Region	Ho Chi Minh City	143	45.4
	Hanoi	108	34.3
	Da Nang	43	13.7
	Other	21	6.7

Note: n = 315.

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the extent of AI deployment, its organizational impact, and the transformative scope of AI implementation across business processes. Consistent with Monteiro et al. (2023), AI adoption intensity is conceptualized as a multidimensional construct that reflects not only the breadth of AI utilization but also the degree to which AI shapes operational activities and facilitates business process transformation. The complete set of measurement items is provided in Appendix A.

PLS-SEM was employed due to its suitability for complex structural models, predictive-oriented research objectives, and non-normal data distributions (Hair et al., 2021). Analysis was conducted using SmartPLS 4.0. The measurement model was assessed through internal consistency reliability (Cronbach's alpha, composite reliability), convergent validity (average variance extracted, indicator loadings), and discriminant validity (heterotrait-monotrait ratio). The structural model was evaluated using bootstrapping with 5,000 resamples to generate path coefficients, *t*-values, confidence intervals, and significance levels. Explanatory power and predictive relevance were interpreted using R^2 and Q^2_predict values.

Participation was entirely voluntary and anonymous. All respondents were informed of the research purpose and their right to withdraw before completing the survey. No personally identifiable information was collected, and data were stored securely with access restricted to the research team. The dataset is original, has not been reused in any prior publication, and is employed solely for academic research purposes.

Common method bias (CMB) was assessed using the full collinearity test proposed by Kock (2015). The results indicated that all variance inflation factor (VIF) values ranged from 1.081 to 2.755, remaining well below the recommended threshold of 3.3. These findings suggest that common method bias is not a serious concern and is unlikely to compromise the validity of the study's results.

3. RESULTS

Reliability and convergent validity results are reported in Table 2. Cronbach's alpha values for all constructs exceed the recommended threshold of 0.70, while composite reliability (CR) ranges

Table 2. Reliability and validity assessment

Constructs	Items	Outer Loading	CA	Rho-A	CR	AVE	R^2	VIF
Startup Performance (SP)	SP1	0.797***	0.781	0.797	0.858	0.601	0.665	–
	SP2	0.816***						
	SP3	0.719***						
	SP4	0.766***						
Dynamic Capabilities (DC)	DC1	0.753***	0.804	0.808	0.864	0.560	–	–
	DC2	0.755***						
	DC3	0.763***						
	DC4	0.711***						
	DC5	0.758***						
Entrepreneurial Orientation (EO)	EO1	0.714***	0.780	0.788	0.850	0.532	–	–
	EO2	0.712***						
	EO3	0.732***						
	EO4	0.718***						
	EO5	0.769***						
Innovation Capability (IC)	IC1	0.770***	0.838	0.840	0.886	0.608	0.382	–
	IC2	0.795***						
	IC3	0.799***						
	IC4	0.771***						
	IC5	0.764***						
AI Adoption Intensity (AI)	AI1	0.724***	0.790	0.854	0.858	0.603	–	–
	AI2	0.855***						
	AI3	0.742***						
	AI4	0.780***						

Note: CA = Cronbach's alpha; CR = Composite Reliability; AVE = Average Variance Extracted. *** $p < 0.001$.

Table 3. Discriminant validity assessment (HTMT)

Constructs	1. AI	2. DC	3. EO	4. IC	5. SP	6. AI × EO	7. AI × IC	8. AI × DC
1. AI								
2. DC	0.014							
3. EO	0.198	0.474						
4. IC	0.263	0.497	0.711					
5. SP	0.139	0.388	0.348	0.361				
6. AI × EO	0.166	0.077	0.125	0.186	0.636			
7. AI × IC	0.266	0.087	0.181	0.189	0.638	0.746		
8. AI × DC	0.154	0.056	0.053	0.037	0.673	0.486	0.583	

Note: AI = AI adoption intensity; DC = dynamic capabilities; EO = entrepreneurial orientation; IC = innovation capability; SP = startup performance.

from 0.850 to 0.886, indicating satisfactory internal consistency. All outer loadings are above 0.70. Average variance extracted (AVE) values range from 0.532 to 0.608, exceeding the minimum threshold of 0.50 and confirming convergent validity. These results demonstrate that the reflective measurement model meets established reliability and validity criteria.

Discriminant validity was assessed using the heterotrait-monotrait (HTMT) ratio. As shown in Table 3, all HTMT values are below the recommended threshold of 0.85, confirming that the constructs are empirically distinct. The highest HTMT value is observed between entrepreneurial orientation and innovation capability (0.711), which remains within acceptable limits.

The structural model was evaluated using bootstrapping with 5,000 resamples. Table 4 reports standardized path coefficients, *t*-values, confidence intervals, and effect sizes for all hypothesized relationships. All eight hypotheses are supported. Entrepreneurial orientation has a positive but modest effect on startup performance (β = 0.135, $p = 0.007$), while demonstrating a strong effect on innovation capability (β = 0.498, $p < 0.001$). Dynamic capabilities positively affect startup performance (β = 0.176, $p < 0.001$) and innovation capability (β = 0.224, $p < 0.001$). Innovation capability is positively associated with startup performance (β = 0.196, $p < 0.001$).

Regarding moderating effects, AI adoption intensity strengthens the effects of entrepreneurial orientation (β = 0.232, $p = 0.001$), innovation capability (β = 0.202, $p = 0.001$), and dynamic capabilities (β = 0.282, $p < 0.001$) on startup performance. Among the interaction effects, AI × DC exhibits the largest effect size ($f^2 = 0.201$), indicating a medium effect. Variance inflation factor (VIF) values range from 1.167 to 2.755, suggesting no multicollinearity concerns.

Figure 2 presents the estimated structural model with standardized path coefficients and R^2 values for endogenous constructs.

The mediation analysis presented in Table 5 provides empirical support for the capability-conversion mechanism proposed in this study. Specifically, in-

Table 4. Structural path analysis: VIF and hypothesis testing

Hypothesis and Path	VIF	β	t	f²	95% CI	Supported	Sig.
H1: EO → SP	1.619	0.135	2.692	0.033	[0.036, 0.233]	Yes	**
H2: EO → IC	1.167	0.498	8.231	0.344	[0.371, 0.605]	Yes	***
H3: DC → SP	1.300	0.176	3.507	0.071	[0.078, 0.276]	Yes	***
H4: DC → IC	1.167	0.224	4.119	0.070	[0.120, 0.333]	Yes	***
H5: IC → SP	1.713	0.196	4.039	0.067	[0.102, 0.290]	Yes	***
H6: AI × EO → SP	2.326	0.232	3.273	0.097	[0.057, 0.340]	Yes	**
H7: AI × IC → SP	2.755	0.202	3.254	0.071	[0.040, 0.303]	Yes	**
H8: AI × DC → SP	1.617	0.282	4.361	0.201	[0.154, 0.374]	Yes	***

Note: VIF = Variance Inflation Factor; CI = Confidence Interval; f2 = effect size: > 0.02 (small), > 0.15 (medium), > 0.35 (large) (Cohen, 1988). * p < 0.05; ** p < 0.01; *** p < 0.001 (one-tailed, based on t(4999)). AI = AI adoption intensity; DC = dynamic capabilities; EO = entrepreneurial orientation; IC = innovation capability; SP = startup performance.

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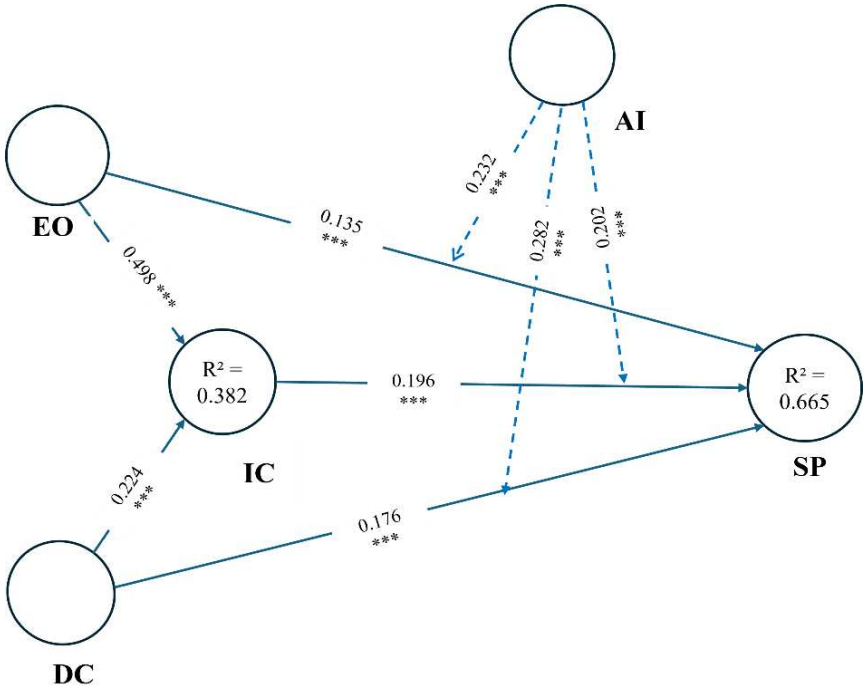


Note: AI = AI adoption intensity; DC = dynamic capabilities; EO = entrepreneurial orientation; IC = innovation capability; SP = startup performance.

Figure 2. Final structural model with standardized path coefficients and R^2 values

novation capability significantly mediated the relationship between entrepreneurial orientation and startup performance (β = 0.098, t = 3.570, p < 0.001), thereby supporting *H9*. Similarly, innovation capability significantly mediated the relationship between dynamic capabilities and startup performance (β = 0.044, t = 2.892, p = 0.004), providing support for *H10*. These findings suggest that entrepreneurial orientation and dynamic capabilities contribute to startup performance not only through their direct effects but also indirectly by enhancing firms' innovation capability. Consequently, innovation capability serves as a critical pathway through which strategic orientations and organizational capabilities are transformed into superior startup performance.

Model explanatory and predictive power are presented in Table 6. The model explains 38.2% of variance in innovation capability (R^2 = 0.382) and 66.5% of variance in startup performance (R^2 = 0.665), indicating moderate to substantial explanatory power. Q^2_predict values are positive for both endogenous constructs (innovation capability = 0.365; startup performance = 0.573), confirming predictive relevance.

To further examine the significant moderating effects identified in the structural model, simple slope analyses were conducted following Dawson (2014) to visualize and facilitate the interpretation of the significant interaction effects. Figures 3–5

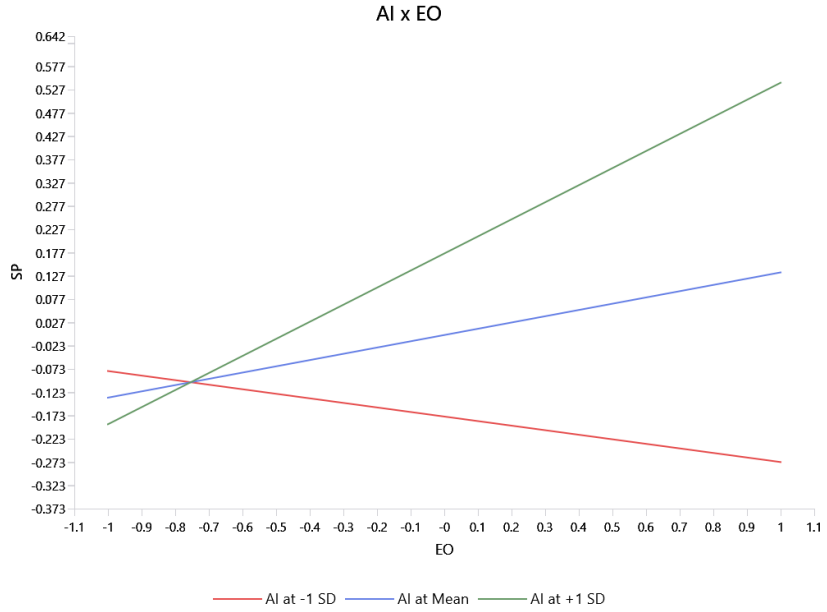
Table 5. Indirect effects and mediation analysis

Hypothesis	Indirect Path	β	t-value	p-value	95% CI	Result
H9	EO → IC → SP	0.098	3.570	< 0.001	[0.051, 0.160]	Supported
H10	DC → IC → SP	0.044	2.892	0.004	[0.020, 0.082]	Supported

Note: DC = dynamic capabilities; EO = entrepreneurial orientation; IC = innovation capability; SP = startup performance.

Table 6. Explanatory and predictive power

Endogenous Construct	R^2	Adjusted R^2	Q^2_predict
Innovation Capability (IC)	0.382	0.378	0.365
Startup Performance (SP)	0.665	0.658	0.573

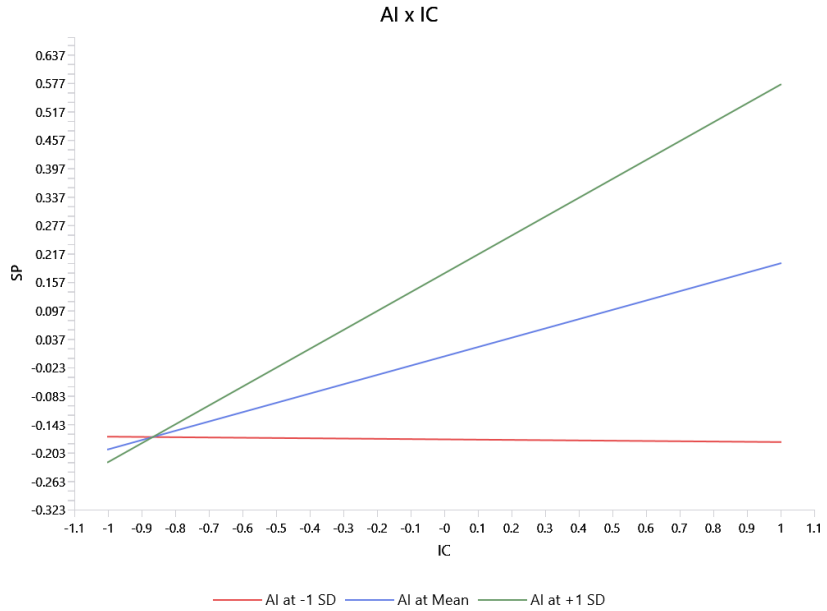


Note: AI = AI adoption intensity; EO = entrepreneurial orientation; SP = startup performance.

Figure 3. Moderating effect of AI adoption intensity on the entrepreneurial orientation–startup performance relationship

illustrate the conditional relationships among entrepreneurial orientation, innovation capability, dynamic capabilities, and startup performance across varying levels of AI adoption intensity.

Figure 3 illustrates that the positive relationship between entrepreneurial orientation and startup performance becomes progressively stronger as AI adoption intensity increases. This finding supports H6 and suggests that AI adoption intensity serves as a strategic capability amplifier, enhancing the performance benefits of entrepreneurial orientation.



Note: AI = AI adoption intensity; IC = innovation capability; SP = startup performance.

Figure 4. Moderating effect of AI adoption intensity on the innovation capability–startup performance relationship

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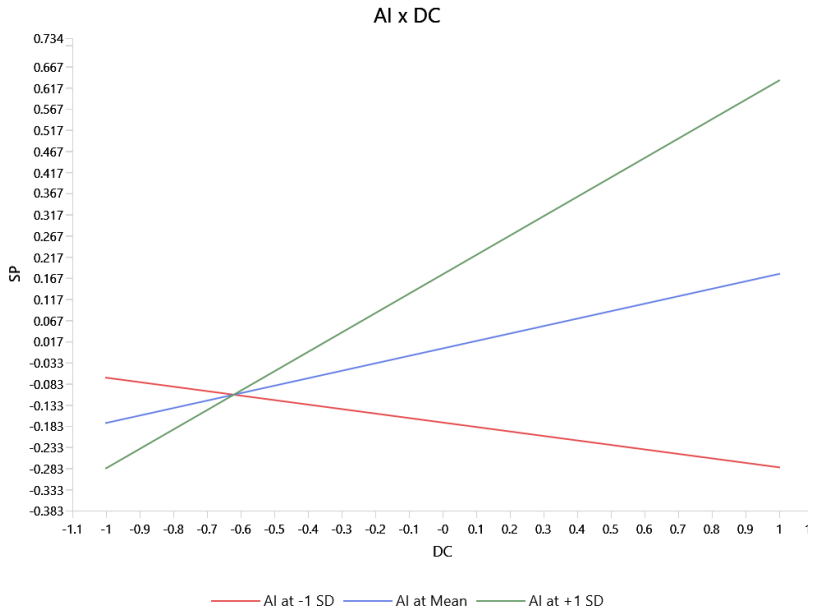

Note: AI = AI adoption intensity; DC = dynamic capabilities; SP = startup performance.

Figure 5. Moderating effect of AI adoption intensity on the dynamic capabilities–startup performance relationship

Figure 4 illustrates that the positive effect of innovation capability on startup performance becomes stronger at higher levels of AI adoption intensity. This finding supports *H7* and highlights the complementary role of AI adoption intensity in enhancing the performance returns generated by firms' innovation capability.

Figure 5 illustrates that the positive effect of dynamic capabilities on startup performance becomes progressively stronger at higher levels of AI adoption intensity. This finding supports *H8* and reinforces the view that AI adoption intensity functions as a strategic capability amplifier, enhancing the performance benefits generated by firms' dynamic capabilities.

Across all three figures, the slope representing high AI adoption intensity (+1 SD) is noticeably steeper than the slopes representing mean and low levels of AI adoption intensity. The simple slope analyses presented in Figures 3–5 provide evidence that AI adoption intensity amplifies the positive effects of entrepreneurial orientation, innovation capability, and dynamic capabilities on startup performance. These results reinforce the view that AI functions as a strategic capability amplifier, enhancing the extent to which firms can translate entrepreneurial, innovative, and dynamic capabilities into superior performance outcomes.

4. DISCUSSION

The findings provide robust evidence for the capability-conversion logic underlying startup performance in emerging economies. The significant indirect effects observed for *H9* and *H10* indicate that innovation capability functions as a key transmission mechanism through which entrepreneurial orientation and dynamic capabilities are translated into superior startup performance. These findings extend prior capability-based research by demonstrating that strategic orientations and higher-order capabilities create value not only through direct effects but also through capability-building processes, with AI adoption intensity amplifying these effects across multiple pathways. This finding is broadly consistent with recent evidence from emerging economies, indicating that organizational performance is strengthened through mediating capability mechanisms such as knowledge management, technology adoption, and organizational agility (Le et al., 2024). Consistent with the resource-based view (Barney, 1991) and dynamic capability theory (Teece, 2007), the results confirm that strategic orientations and higher-order capabilities do not operate in isolation but translate into performance through structured capability-building processes – a pattern that carries particular salience in insti-

tutionally volatile, resource-constrained environments where direct resource advantages are difficult to sustain. Entrepreneurial orientation exhibits a positive but modest direct effect on startup performance while exerting a substantially stronger influence on innovation capability. This pattern supports prior meta-analytic evidence that entrepreneurial orientation–performance relationships are context-dependent and often mediated by organizational mechanisms (Rauch et al., 2009; Wales et al., 2021). Rather than functioning as an immediate performance driver, entrepreneurial orientation appears to operate as a strategic catalyst that stimulates knowledge exploration, experimentation, and opportunity recognition, which subsequently enhance innovation capability. This finding aligns with Makhloufi et al. (2021) and Ngo (2023), who identify innovation-related mechanisms as critical transmission channels linking entrepreneurial orientation to firm outcomes. In resource-constrained startup environments, entrepreneurial posture alone may not guarantee performance gains unless it is institutionalized through structured innovation processes – a condition that the present findings confirm empirically for Vietnamese early-stage ventures. Following Hair et al. (2022), the simultaneous significance of both direct and indirect effects indicates complementary partial mediation. These findings suggest that innovation capability serves as an important, although not exclusive, mechanism through which entrepreneurial orientation and dynamic capabilities contribute to startup performance.

Dynamic capabilities demonstrate both direct and indirect effects on startup performance. The positive dynamic capabilities–performance relationship supports earlier evidence that sensing, seizing, and reconfiguring processes enhance competitive advantage in volatile environments (Drnevich & Kriauciunas, 2011; Pavlou & El Sawy, 2011). Unlike Schilke (2014), who identified an inverted U-shaped relationship between environmental dynamism and dynamic capabilities value among established firms, the present results reveal consistently positive effects of dynamic capabilities – a divergence that likely reflects the distinct dynamics of early-stage ventures, for which capability reconfiguration is a foundational rather than supplementary competitive mechanism. The significant linkage between innovation capability and dynamic capabilities further confirms that dynamic capabilities contribute to performance partly by strengthening firms' innovation processes, reinforcing the argument that dynamic capabilities function as a higher-order mechanism that reorganizes operational resources into innovation outputs (Breznik & Hisrich, 2014; Eisenhardt & Martin, 2000).

Innovation capability emerges as a significant and independent predictor of startup performance, confirming prior evidence that innovation-related capabilities are central to value creation in both developed and emerging contexts (Calantone et al., 2002; Rosenbusch et al., 2011). Importantly, the overall explanatory power observed in this study (R^2 = 0.665 for startup performance) exceeds levels commonly reported in mature institutional contexts, suggesting that in emerging economies characterized by institutional uncertainty and resource scarcity, innovation capability may represent a particularly salient performance lever. Startups operating under such conditions appear to rely more heavily on internal knowledge recombination and adaptive innovation to overcome structural constraints – a mechanism that innovation capability is uniquely positioned to capture as an organizational-level construct rather than a mere output measure (Saunila, 2020).

A central contribution of this study lies in examining the moderating role of AI adoption intensity across three performance pathways. The results indicate that AI adoption strengthens the effects of entrepreneurial orientation, innovation capability, and dynamic capabilities on startup performance, with the strongest amplification observed in the dynamic capabilities–performance relationship (f^2 = 0.201, medium effect). This finding extends recent digital capability research suggesting that AI functions not merely as a technological resource but as an accelerator of sensing-seizing-reconfiguring processes (Mikalef & Gupta, 2021; Warner & Wäger, 2019). In line with D'Amico et al. (2025), who show that AI enhances the value extraction of innovation activities in open innovation

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systems, the results further confirm that AI amplifies the economic returns of innovation capability within startup contexts. The comparatively smaller effect observed in the innovation capability–performance moderation suggests that AI primarily enhances the exploitation efficiency of already-operationalized innovation processes, whereas its strongest leverage lies in accelerating higher-order dynamic capability routines – processes that are inherently more data-intensive and where AI-enabled sensing and predictive reconfiguration yield the greatest marginal returns.

Collectively, these results offer three theoretical contributions that respond directly to identified gaps in the literature. First, this study moves beyond fragmented examinations of entrepreneurial orientation and dynamic capabilities by empirically modeling their joint and parallel effects through a shared innovation capability mediator within a single integrated framework – a structure that prior research has called for but rarely tested (Fainshmidt et al., 2016; Makhloufi et al., 2021). Second, it provides the first systematic empirical test of AI adoption intensity as a simultaneous moderating boundary condition across all three capability-performance pathways (entrepreneurial orientation–startup performance, innovation capability–startup performance, and dynamic capabilities–startup performance) in an emerging-economy startup context, addressing a gap that bibliometric and hybrid reviews have consistently flagged as unresolved (Mumi et al., 2025; Uriarte et al., 2025). Third, by demonstrating that capability-conversion logic operates robustly under conditions of institutional volatility and rapid digital transformation, the study strengthens the cross-contextual validity of dynamic capability theory beyond the established-firm settings where it has been most extensively tested.

From a managerial perspective, the findings suggest that startup leaders in emerging economies should avoid overemphasizing entrepreneurial posture as a standalone performance strategy. Instead, deliberate investments in structured innovation capability – through knowledge management systems, R&D routines, and cross-functional learning mechanisms – are more likely to convert entrepreneurial energy into sustainable performance gains. AI adoption should be approached not as a substitute for capability development but as a complementary accelerator that amplifies the returns of pre-existing dynamic capabilities, particularly in data-intensive operational domains where predictive analytics and process automation can reduce reconfiguration costs and decision latency.

Despite these contributions, several limitations warrant consideration and suggest directions for future research. The cross-sectional design restricts causal inference; longitudinal research tracking capability development and AI adoption trajectories over the startup lifecycle would better capture how entrepreneurial orientation, dynamic capabilities, and innovation capability co-evolve under changing institutional conditions. The reliance on self-reported managerial perceptions may introduce common method bias, suggesting that future studies incorporate objective performance indicators or multi-informant designs. The sample is limited to Vietnamese startups, and while Vietnam provides a theoretically appropriate context, the institutional boundary conditions that moderate capability-conversion logic – including digital infrastructure maturity, regulatory stability, and ecosystem density – may differ substantially across emerging markets, warranting replication in other transitioning economies such as Indonesia, India, or sub-Saharan Africa. Finally, AI adoption was measured as an aggregate intensity construct; disaggregating AI types, such as analytical, generative, or autonomous AI, would allow future research to examine whether distinct AI applications carry different amplification mechanisms across entrepreneurial orientation, dynamic capabilities, and innovation capability links to performance.

Overall, startup performance in emerging economies is best understood not as a direct consequence of entrepreneurial posture alone, but as the outcome of a layered capability architecture in which strategic orientation, dynamic reconfiguration processes, innovation capability, and AI-enabled digital amplification jointly interact to generate competitive advantage.

CONCLUSION

This study examined how entrepreneurial orientation and dynamic capabilities contribute to startup performance in an emerging economy, with particular emphasis on the mediating role of innovation capability and the moderating role of AI adoption intensity. Drawing on resource-based view and dynamic capability theory, the proposed framework was tested using survey data from 315 Vietnamese startups collected between September and December 2025.

The results confirm that entrepreneurial orientation operates primarily as a strategic catalyst rather than a direct performance driver, exerting a strong influence on innovation capability ($\beta = 0.498$, $p < 0.001$) while contributing modestly to performance directly ($\beta = 0.135$, $p < 0.01$). Dynamic capabilities demonstrate a dual role, positively affecting both startup performance and innovation capability, while innovation capability in turn significantly enhances performance outcomes. Furthermore, innovation capability was found to significantly mediate the relationships between entrepreneurial orientation and startup performance, as well as between dynamic capabilities and startup performance, thereby confirming its role as a critical capability-conversion mechanism through which strategic orientations and organizational capabilities are translated into superior startup performance. AI adoption intensity amplifies the effects of entrepreneurial orientation, innovation capability, and dynamic capabilities on startup performance, with the strongest moderating effect observed in the dynamic capabilities–performance relationship ($\beta = 0.282$, $f^2 = 0.201$). The integrated model explains 66.5% of the variance in startup performance, providing robust empirical support for a capability-conversion logic of competitive advantage in emerging-economy startups.

Therefore, startup performance is best understood not as a direct consequence of entrepreneurial posture alone, but as the outcome of a layered capability architecture in which strategic orientation, dynamic reconfiguration, innovation capability, and AI-enabled amplification jointly interact. For startup founders and managers, these findings underscore the importance of deliberately building innovation capability as an intermediary mechanism and strategically aligning AI investments with existing dynamic capability processes to maximize performance returns.

AUTHOR CONTRIBUTIONS

Conceptualization: Nguyen Ngoc-Long.
Data curation: Nguyen Kien Quoc.
Formal analysis: Nguyen Kien Quoc.
Funding acquisition: Nguyen Ngoc-Long.
Investigation: Nguyen Kien Quoc.
Methodology: Nguyen Ngoc-Long.
Project administration: Nguyen Ngoc-Long.
Resources: Nguyen Kien Quoc.
Software: Nguyen Kien Quoc.
Supervision: Nguyen Ngoc-Long.
Validation: Nguyen Ngoc-Long.
Visualization: Nguyen Kien Quoc.
Writing – original draft: Nguyen Ngoc-Long.
Writing – review & editing: Nguyen Kien Quoc, Nguyen Ngoc-Long.

AI USE STATEMENT

ChatGPT (OpenAI) was used exclusively for language editing and paraphrasing under the direct supervision of the authors. The tool was not utilized for data collection, data generation, coding, statisti-

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cal analysis, hypothesis testing, interpretation of results, or the formulation of research conclusions. All conceptual contributions, methodological decisions, analyses, and interpretations reported in this study were developed and validated by the authors, who retain full responsibility for the content of the manuscript.

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APPENDIX A

Table A1. Measurement scales

Variable	Items	Description	Source
Dynamic Capabilities (DC)	DC1	We frequently scan the environment to identify new business opportunities	The construct was conceptually grounded in Teece (2007), while the measurement items were adapted from Pavlou and El Sawy (2011)
	DC2	We often review our product development efforts to ensure they are in line with what the customers want	
	DC3	We carefully interrelate our actions with each other to meet changing conditions	
	DC4	We are effective in utilizing knowledge to create new products	
	DC5	We can successfully reconfigure our resources to come up with new productive assets	
Entrepreneurial Orientation (EO)	EO1	Our company actively introduces new products or services before competitors	The construct was conceptually grounded in Covin and Slevin (1989), while the measurement items were adapted from Daradkeh and Mansoor (2023)
	EO2	Our company encourages employees to develop creative ideas and innovative projects	
	EO3	Our company has a strong tendency to choose high-risk, high-reward projects	
	EO4	Our company values innovation, technological leadership, and R&D	
	EO5	Our company often makes bold strategic decisions despite uncertain environments	
Innovation Capability (IC)	IC1	Our firm has an organizational culture that promotes innovation	The construct was conceptually grounded in Lawson and Samson (2001), while the measurement items were adapted from Sarwar et al. (2024)
	IC2	Our firm is able to use knowledge from various sources to develop products efficiently and rapidly	
	IC3	Our firm is able to identify changes in the market and rapidly apply them to its own products and processes	
	IC4	The employees in our firm are able to contribute to activities such as product development, improving the innovation process, and developing new ideas	
	IC5	Our firm is able to evaluate new ideas from customers, suppliers, etc., and take them into account in product development	
Startup Performance (SP)	SP1	The company's sales growth rate is higher than that of competitors in the same industry	Daradkeh and Mansoor (2023)
	SP2	The company's net profit growth rate is higher than that of competitors in the same industry	
	SP3	The company's employee growth rate is higher than that of competitors in the same industry	
	SP4	The company's market share growth rate is higher than that of competitors in the same industry	
AI Adoption Intensity (AI)	AI1	The company has implemented AI in all business processes	Chen (2019), Monteiro et al. (2023)
	AI2	The AI implementation had a high impact on business operations	
	AI3	The AI implementation, considering its potential for the company's business, was an extensive process	
	AI4	The AI implementation allowed business processes to be substantially changed	

Note: All items measured on 5-point Likert scales (1 = Strongly Disagree to 5 = Strongly Agree).

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