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INTEGRATING THE KNOWLEDGE-BASED VIEW AND INTERNATIONAL STRATEGY: THE MEDIATING ROLE OF INNOVATION ON MSME PERFORMANCE IN INDONESIA

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Abstract

This study examines how knowledge-based resources influence MSME performance in Batam's food and beverage sector by integrating the Knowledge-Based View and internationalization theory. We propose that digitalization, knowledge processes, IT infrastructure, and risk management affect firm performance directly and indirectly through international strategy, while innovation functions as a potential moderator. A cross-sectional survey of 200 owners and managers was analyzed using partial least squares structural equation modeling. Results indicate that all four KBV components exert significant positive direct effects on international strategy and on firm performance. International strategy partially mediates the relationships between KBV resources and performance. Innovation, operationalized primarily as process and incremental innovation, did not moderate the examined relationships. The structural model explains 61.5 percent of variance in firm performance and 30 percent in international strategy and meets fit criteria with an SRMR of 0.067. These findings extend KBV to MSMEs in a developing-market context by demonstrating that internal knowledge and technological capabilities, when orchestrated through international strategy, enhance firm performance. Practically, managers should prioritize knowledge management, targeted digital investments, and basic risk controls, while policymakers should combine innovation support with capacity-building programs to convert innovation into international performance gains. Future studies should adopt longitudinal and cross-country designs.

INTRODUCTION

The increasing intensity of global competition has driven micro, small, and medium enterprises (MSMEs) to rethink how internal knowledge resources interact with external strategic demands to sustain business growth (Yuwono et al., 2024). Strong sustainability and consistent growth are expected to enhance financial outcomes, which ultimately improve overall firm performance. However, rapid technological developments have transformed the global business landscape, forcing MSMEs to confront challenges such as limited resources, market uncertainties, and operational risks (Abdurohim, 2023; Momtaz & Parra, 2024). This creates a strategic tension between the Knowledge-Based View (KBV)—which emphasizes

internal knowledge as a key resource for competitiveness—and the demands of international strategy, which require acquiring and leveraging external knowledge. Understanding how these internal and external forces interact is critical to explaining MSME performance in emerging markets like Indonesia, where structural limitations amplify this theoretical contradiction.

The Knowledge-Based View (KBV) posits that a firm's intangible assets—such as knowledge, skills, competencies, and intellectual capital—are the foundation of sustainable competitive advantage (Intara & Suwansin, 2024). Nevertheless, the assumptions of this theory largely derive from developed economies, while MSMEs in emerging countries operate in environments characterized by institutional voids, resource scarcity, and weak innovation ecosystems. To achieve competitiveness and growth, MSMEs must not only manage internal knowledge effectively but also integrate external learning through well-designed international strategy. The ability to balance these two dimensions reflects a dynamic capability that remains underexplored within the KBV framework, especially in developing contexts.

Although Indonesia's Coordinating Minister for Economic Affairs emphasizes the strategic potential of MSMEs in driving economic growth (Limanseto, 2023), their digital transformation has been constrained by limited technological literacy, lack of financial capital, and slow adaptation to change (Rahayu et al., 2023; Anatan & Nur, 2023). These constraints weaken their ability to transform knowledge-based resources into innovation outcomes that enhance international competitiveness. Even with government assistance programs, a persistent gap remains between knowledge resources and performance outcomes (Cruz et al., 2023). This calls for an integrative framework that examines how innovation mediates the relationship between knowledge-based resources and international strategy, thereby improving MSME performance.

Managing knowledge infrastructure, digital capabilities, and risk systems is increasingly critical to MSME strategic success (Damiyana et al., 2024). Nonetheless, many small firms with constrained resources struggle to develop innovation capacity and to adopt effective international strategy (Costa et al., 2023; Yuwono et al., 2025). As global competition intensifies, MSMEs require strategies that not only facilitate market access but also explicitly link internal knowledge management with innovation-led international performance (Larios-Francia & Ferasso, 2023). MSME performance indicators such as revenue growth, financial outcomes, and business sustainability often depend on how effectively firms integrate internal knowledge with innovation and external strategy (Rosyidiana & Narsa, 2024). Consequently, many MSMEs fail to reach the desired level of performance due to a lack of well-planned international strategy strategy and low levels of innovation (Yuwono, 2021; Tay et al., 2022).

Prior studies have established the importance of innovation and digitalization in improving MSME competitiveness in various contexts, such as China (Chen et al., 2024; Ouyang, 2024; Zheng et al., 2023) and Spain (Beglaryan et al., 2024; Merín-Rodrigáñez et al., 2024). However, these studies predominantly treat innovation as a direct determinant of performance rather than a mediating mechanism that links knowledge resources and international strategy. In developing economies, including Indonesia, empirical evidence remains limited regarding how internal knowledge infrastructures, digital capabilities, and risk management systems jointly drive innovation-based international performance. Furthermore, study by Nelaeva & Nilssen, (2022) highlight that firms in less developed countries still lack a comprehensive understanding of how knowledge, skills, and technology operate differently in global markets. This gap underscores the need for contextualized studies integrating KBV, innovation, and international strategy in emerging economies such as Indonesia.

The novelty of this study lies in integrating the Knowledge-Based View and international strategy through the mediating role of innovation to explain MSME performance in Indonesia. Theoretically, this study proposes to extend KBV by integrating a dynamic capabilities perspective—positioning innovation as a micro-foundational dynamic capability that mediates

the conversion of internal knowledge into international strategic outcomes under institutional constraints. Contextually, it provides an empirical examination of MSMEs operating under institutional voids, thereby broadening the applicability of KBV to developing markets. Practically, this study offers insights into how MSME managers can leverage knowledge-based resources and innovation to formulate international strategy that enhance competitiveness and sustainability. Therefore, the objective of this study is to analyze the influence of the Knowledge-Based View on MSME performance through the mediating role of innovation and international strategy, contributing to both theoretical refinement and policy formulation for MSME development in emerging economies.

HYPOTHESIS DEVELOPMENT

Knowledge-Based View and Dynamic Capabilities as Theoretical Foundations

The Knowledge-Based View (KBV) posits that knowledge is the most strategically significant resource of a firm, forming the basis for sustained competitive advantage (Zámborský et al., 2023). Beyond its static value, knowledge must be actively transformed into dynamic capabilities—the firm's ability to sense opportunities, seize them, and reconfigure resources in response to environmental changes (Teece, 2007; Cooper et al., 2023; Sun et al., 2024). This transformation relies on absorptive capacity, defined as the ability to identify, assimilate, and apply external knowledge to generate value (Rasyid et al., 2021; Stoian et al 2024).

Knowledge processes and digitalization enhance absorptive capacity by enabling efficient information acquisition, organizational learning, and integration of insights into operations. For MSMEs in emerging economies like Indonesia, where institutional voids, resource constraints, and technological limitations prevail, dynamic capabilities built on strong absorptive capacity are critical for innovation, internationalization, and sustainable performance (Xie, 2021). Consequently, digitalization, knowledge processes, IT infrastructure, and risk management are conceptualized as knowledge-based resources that strengthen absorptive capacity and dynamic capabilities. These mechanisms facilitate innovation, which mediates the conversion of knowledge resources into value, while international strategy operationalizes these innovation outcomes into superior firm performance.

Effect of Digitalization on International Strategy and Firm Performance

Digitalization is recognized as a strategic enabler that transforms tacit and explicit knowledge into valuable organizational capabilities. By integrating technology into business operations, communication, and decision-making processes, firms can enhance efficiency, responsiveness, and competitiveness (Fernández-Portillo et al., 2022; ; Guo & Xu, 2023). Through the lens of dynamic capability theory, digitalization enables organizations to sense and seize new opportunities, particularly in volatile international markets, by facilitating real-time information flow and adaptive learning mechanisms (Noor et al., 2025; Rosyidiana & Narsa, 2024). For MSMEs, these capabilities are crucial for optimizing operational efficiency, reducing time-to-market, and strengthening overall competitiveness, which theoretically explains how digitalization positively influences firm performance.

Beyond operational efficiency, digitalization plays a pivotal role in shaping a firm's international strategy. The application of digital tools such as social media marketing and digital branding enables firms to strengthen global visibility, access broader markets, and enhance customer engagement at relatively low costs (Suprapto & Viviani, 2024; Lim & Kesumahati, 2023; W. Yuwono et al., 2025). These processes align with international strategy objectives, where digital platforms serve as vehicles for knowledge dissemination, cross-border collaboration, and innovation diffusion. Consequently, digitalization not only optimizes operational efficiency and performance but also facilitates the development of effective

international strategy, providing MSMEs with a sustainable competitive advantage in global markets (Ricardo & Laulita, 2022; Cuandra, et al., 2025).

H_1: Digitalization has a positive effect on firm performance.

H_2: Digitalization has a positive effect on international strategy.

Effect of Knowledge Process on International Strategy and Firm Performance

Within the Knowledge-Based View (KBV), knowledge processes—comprising the generation, sharing, and utilization of knowledge—constitute a fundamental dynamic capability that enables firms to sense and respond to environmental changes effectively. Through systematic knowledge acquisition and dissemination, firms enhance their absorptive capacity and learning orientation, which are essential for transforming knowledge into strategic action and innovation (Rasyid et al., 2021; Nyuga & Tanova, 2024). This mechanism explains how knowledge processes drive firm performance: firms that efficiently manage knowledge are better equipped to develop innovative products and services, optimize operational efficiency, and adapt to technological and market changes, thereby achieving superior performance outcomes.

Furthermore, knowledge processes play a pivotal role in shaping a firm's international strategy. Effective knowledge management fosters innovation-based competitiveness by facilitating the development of new products and services aligned with evolving customer needs. Stoian et al. (2024) emphasize that when knowledge processes are integrated with a firm's innovation capabilities, they generate international competitiveness by enabling firms to create differentiated offerings for global markets, ultimately increasing revenue and market reach (Kanski & Pizon, 2023). In this sense, knowledge processes act as a critical bridge linking knowledge-based resources to both strategic and financial outcomes, reinforcing the theoretical foundation for their influence on international strategy.

H_3: Knowledge process has a positive effect on firm performance.

H_4: Knowledge process has a positive effect on international strategy.

Effect of IT Infrastructure on International Strategy and Firm Performance

IT infrastructure functions as a critical organizational asset that facilitates the integration, storage, and dissemination of knowledge across business processes. It encompasses interconnected technological components—hardware, software, and networks—that collectively enable automation, data-driven decision-making, and operational efficiency (Cholis et al., 2023). From a dynamic capability's perspective, IT infrastructure enhances a firm's ability to reconfigure resources, adapt to environmental shifts, and sustain competitive advantage by improving sensing and seizing capacities. By facilitating knowledge integration and real-time analytics, IT infrastructure strengthens absorptive capacity and supports innovation, which in turn improves operational efficiency, accelerates decision-making, and enhances overall firm performance (Hermanto et al., 2024: Bi, 2020).

Beyond internal operations, IT infrastructure plays a strategic role in shaping a firm's international strategy. It enables cross-border knowledge sharing, supports inter-organizational collaboration, and strengthens global connectivity, which are essential for identifying international market opportunities, coordinating activities across borders, and adapting strategies to heterogeneous environments (Adomako & Nguyen, 2024; Hadikusuma & Siagian, 2022).]Firms that effectively leverage IT capabilities can align technological resources with strategic objectives, reduce operational costs, and foster innovation, thereby gaining sustainable competitive advantages in global markets (Njanka et al., 2021). In this way, IT infrastructure acts as a pivotal enabler linking knowledge-based resources, innovation, and international strategy to achieve superior firm performance.

H_5: IT infrastructure has a positive effect on firm performance.

H_6: IT infrastructure has a positive effect on international strategy.

Effect of Risk Management on International Strategy and Firm Performance

Risk management represents a complementary capability that supports the effective utilization of knowledge resources in uncertain environments. It enables MSMEs to anticipate market volatility, reduce performance risks, and strengthen strategic decision-making when expanding internationally (Dias et al., 2021; Natasha & Rokhim, 2024). By embedding proactive and systematic risk strategies, firms can ensure that knowledge and innovation are translated into operational efficiency, sustainable competitiveness, and superior firm performance (Ayu et al., 2024; Asir et al., 2023). Sentika et al. (2023) states that risk management is essential for firm performance as it enables informed decision-making, promotes innovation in uncertain environments, and reinforces long-term stability and financial continuity.

Beyond internal outcomes, risk management strengthens a firm's international strategy by enabling adaptive and resilient strategic actions. Through controlled risk exposure, firms can integrate cross-border knowledge, respond to dynamic international market conditions, and align global operations with environmental uncertainties. This theoretical perspective positions risk management as a dynamic capability that bridges knowledge utilization with sustainable competitive advantage in global markets (Mukti & Bratamanggala, 2025).

H_7: Risk management has a positive effect on firm performance.

H_8: Risk management has a positive effect on international strategy.

Effect of International Strategy on Firm Performance

International strategy defines how firms orchestrate internal resources to compete effectively across borders. From a capability and resource orchestration perspective, firms that systematically align and recombine knowledge, technologies, and network assets can exploit scale, scope, and learning advantages in international markets. By integrating these resources, international strategy facilitates cross-border knowledge flows, promotes innovation, and enhances organizational learning, which collectively improve firm performance (Nguyen et al., 2019; Sun et al., 2019).

Mechanistically, international strategy enhances performance through three interconnected channels. First, it improves market access by enabling firms to identify and prioritize foreign market opportunities. Second, it fosters knowledge creation and diffusion, whereby cross-border activities generate new insights that feed into product and process innovation. Third, it leverages network and alliance advantages, allowing firms to access complementary resources and mitigate the liability of foreignness (Regnér & Zander, 2014; James et al., 2024) These mechanisms position international strategy as a dynamic capability that translates resource orchestration into sustained competitive advantage. Based on this theoretical reasoning, the hypothesis is formulated as follows:

H_9: International strategy has a positive effect on firm performance.

International Strategy as a Mediator between Knowledge-Based Resources and Firm Performance

International strategy functions as a dynamic capability that enables firms to transform internal knowledge-based resources into superior performance outcomes. By orchestrating digitalization, knowledge processes, IT infrastructure, and risk management, firms can align internal capabilities with global market opportunities, fostering innovation, learning, and competitive advantage (Aydemir & Alper, 2024). In this framework, international strategy serves as a mediator, translating the potential of these resources into actionable strategies that improve firm performance.

Digitalization enhances international strategy by enabling cross-border knowledge

integration, real-time information sharing, and adaptive decision-making, which collectively support innovation and market responsiveness (Camino-Mogro et al., 2023; Liu et al., 2023). Knowledge processes enhance firms' dynamic performance and adaptability, enabling them to respond efficiently to market changes and sustain competitiveness in dynamic environments (Wahyuni & Novita, 2021; Zakaria, 2023). Moreover, knowledge processes contribute to international strategy by improving responsiveness to global market dynamics, particularly through the systematic management, dissemination, and utilization of knowledge across multiple foreign operations. This process strengthens strategic decision-making, coordination, and global learning capabilities (Li & Gao, 2023; Massa et al., 2023; Stoian et al., 2024).

IT infrastructure strengthens international strategy by enabling digital connectivity, operational integration, and collaborative capabilities across borders, which promote innovation-based competitiveness (Wang & Zhang, 2025). Similarly, risk management supports international strategy by enhancing strategic agility, mitigating uncertainties in foreign markets, and ensuring that knowledge-based resources are effectively deployed for sustained performance. Collectively, these mechanisms demonstrate how international strategy mediates the relationship between knowledge-based resources and firm performance (Vrontis et al., 2022; Shen & Bădulescu, 2025).

H_{10}: Digitalization has a positive effect on firm performance through international strategy.
H_{11}: Knowledge process has a positive effect on firm performance through international strategy.
H_{12}: IT infrastructure has a positive effect on firm performance through international strategy.
H_{13}: Risk management has a positive effect on firm performance through international strategy.

The Moderating Role of Innovation in the Relationship between Knowledge-Based Resources and Firm Performance

Innovation plays an important role in connecting a company's resources with its performance. For example, in terms of digitalization, innovation can help companies utilize digital technology in a more appropriate and efficient way. In this manner, utilizing technology can significantly enhance company performance. Likewise, the knowledge management process will become more useful if accompanied by innovation, because it can encourage companies to continue to adapt and create competitive advantages in an increasingly tight market (Massa et al., 2023; Stoian et al., 2024). In IT infrastructure, innovation directs the utilization of digital opportunities and ensures that technology investments can generate business growth and competitiveness (Wardhana, 2023).

Finally, in the area of risk management, innovation enables firms to actively respond to uncertainty, increasing resilience and long-term success (Asir et al., 2023; Dias et al., 2021). Consistent with Mahmoud et al. (2016), as discussed in Cuandra et al. (2025) innovation-driven behavior encourages firms to monitor rapidly changing customer preferences, drive product and process innovation, and develop adaptive strategies that strengthen their competitive advantage. This approach reflects the ability of firms to anticipate and respond to market dynamics and environmental uncertainty through continuous renewal of processes and resources. These findings together indicate that innovation enhances the effectiveness of strategic and operational capabilities, leading to superior MSME performance, including stronger brand image and greater customer engagement with sustainability (Jocelyn & Christiarini, 2024). Thus, theoretical mechanisms indicate that innovation not only complements knowledge-based resources but modulates the strength of their impact on firm performance by enhancing resource integration, strategic application, and adaptability.

H_{14}: Innovation moderates the relationship between digitalization and firm performance.
H_{15}: Innovation moderates the relationship between knowledge processes and firm performance.

H_{16}: Innovation moderates the relationship between IT infrastructure and firm performance.
H_{17}: Innovation moderates the relationship between risk management and firm performance.

The Moderating Role of Innovation in the Relationship between International Strategy and Firm Performance

Innovation functions as a dynamic capability that enhances the effectiveness of international strategy in improving firm performance. According to dynamic capability theory, innovation enables firms to integrate, reconfigure, and deploy resources strategically across international markets, ensuring alignment between strategic orientations and evolving global demand (Giniuniene & Jurksiene, 2015; Larabi, 2025). By facilitating the translation of international strategy into novel products, services, and processes, innovation enhances the firm's ability to exploit market opportunities, adapt to competitive pressures, and leverage global knowledge networks effectively (Sun et al., 2019). Through this mechanism, firms with higher innovation capability can realize stronger performance outcomes from their internationalization efforts. Based on this theoretical reasoning, the moderated hypothesis is formulated as:
H_{18}: Innovation moderates the relationship between international strategy and firm performance.

METHODS

Research Design

This study employs a quantitative research design developed from previous studies by Massa et al. (2023) and Meyer et al. (2023). The design is correlational in nature, aiming to examine the relationships among knowledge-based resources, international strategy, innovation, and firm performance in MSMEs. The study also incorporates mediation (international strategy) and moderation (innovation) mechanisms to explore the causal pathways through which resources influence performance outcomes. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The method was selected because this research emphasizes theory development and prediction, consistent with the theory-building orientation of PLS-SEM rather than the confirmatory purpose of CB-SEM. PLS-SEM is also suitable for complex models involving latent constructs, non-normal data, and moderate sample sizes (Hair et al., 2021).

Population and Sampling

The population comprises MSMEs in Batam City operating in the food and beverage sector, with annual revenues not exceeding IDR 50 billion. A purposive sampling technique was applied to ensure respondents met the following criteria: (1) business owners operating in Batam City, (2) aged 20–60 years, (3) educational background from senior high school to master's degree, (4) business experience of 1–20 years, and (5) sufficient understanding of the research topic and questionnaire (Sugiyono, 2016). A total of 200 valid responses were collected from 296 distributed questionnaires. According to Hair et al. 2021 , this sample size satisfies the rule-of-thumb for PLS-SEM and substantially exceeds the traditional minimum suggested for correlational studies (Gay & Diehl, 1992). A minimum sample size in PLS-SEM should be adequate to capture the model's complexity and number of predictors. Therefore, the actual sample size of 200 respondents provides robust statistical power and reliability for testing the study's 18 hypotheses, including both mediation and moderation effects.

Data Collection

Data were collected using a structured online questionnaire distributed via Google Forms through MSME networks and business associations. Respondent participation was voluntary, and confidentiality was guaranteed. To reduce common method bias (CMB), procedural

remedies included anonymity assurance, randomization of questionnaire items, and a pilot test with 30 MSME owners to refine clarity. Incomplete and duplicate responses were removed. The Harman's single-factor test showed that the first factor explained only 27.59% of the total variance, confirming no severe CMB.

Measurement of Constructs

All constructs were measured using reflective indicators adapted from validated prior studies, scored on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) (Koo, M. & S.-W., 2025). Digitalization, adapted from Gimeno-Arias et al. (2024) captures how firms understand digital benefits, utilize resources, prepare staff, automate processes, and provide digital training. Knowledge Process based on Adomako, (2024), measures the acquisition of managerial, technical, and procedural knowledge from foreign sources. IT Infrastructure, following Ma et al. (2021), assesses firms' technological capacity to access, build, and manage internal knowledge. Risk Management from Catanzaro & Teyssier, (2021) evaluates how firms manage internal procedures to mitigate international risks. International Strategy, adapted from Chetty et al. (2024), covers market research, selection, and innovation-driven strategies. Innovation, from Nwankpa et al. (2022), examines the extent of process improvements and technology adoption.

Lastly, Revenue Growth following Wahab & Radmehr, (2024) measures profitability, sales growth, and market share relative to competitors. Financial Performance from Ahsan, (2024) reflects efficiency, sales performance, and brand value. Finally, the Survival based on Islam et al. (2023), assesses firms' continuity planning, remote work readiness, emergency communication, and cash-flow management during crises. All measurement indicators met the criteria for convergent validity, with factor loadings exceeding 0.70, AVE above 0.50, and reliability coefficients greater than 0.70. Discriminant validity, assessed through cross-loading analysis and the HTMT ratio, indicated that each indicator loaded highest on its intended construct and that all HTMT values were below 0.85, confirming that the constructs were empirically distinct and valid.

Data Analysis

Data were analyzed using SPSS and SmartPLS 4. SPSS provided descriptive statistics and bias checks, while SmartPLS evaluated the measurement and structural models. The measurement model met criteria for reliability and validity (Hair et al., 2021). The structural model was assessed using bootstrapping with 5,000 resamples, assessed the significance of 18 hypotheses, including four direct effects, four mediation effects, and five moderation effects. The structural model demonstrated strong explanatory power, with $R^2 = 0.615$ for firm performance (substantial) and $R^2 = 0.300$ for international strategy (moderate). The SRMR value of 0.067 indicated an acceptable model fit (<0.08). Although innovation's moderating effect was not significant, the results confirmed the mediating role of international strategy in strengthening the effects of digitalization, knowledge processes, IT infrastructure, and risk management on performance. Collectively, these findings validate that the proposed PLS-SEM model was robust, theoretically consistent with the Knowledge-Based View (KBV) and Internationalization Theory, and empirically reliable for explaining MSME competitiveness and performance in Indonesia.

RESULTS AND DISCUSSION

This study analyzed the data collected from respondents through a questionnaire distributed to 200 individuals in Batam City. The respondents consist of owners or managers of Micro, Small, and Medium Enterprises (MSMEs), specifically in the food and beverage sector. The detailed respondent data is presented in Table 1.

Table 1.
Respondent Characteristics

Criteria	Amount	Presentation
By Gender		
Male	75	37,5%
Female	125	62,5%
By Age		
12-27 years old	88	44,0%
28-43 years old	100	50,0%
44-59 years old	12	6,0%
By Education Level		
Senior high school	79	39,5%
Diploma (Associate degree)	59	29,5%
Bachelor's degree	59	29,5%
Master's degree	3	1,5%
Based on Sector of Business		
Trendy Foods	75	37,5
Catering	14	7,0%
Bakery	18	9,0%
Street Food	65	32,5%
Organic or Healthy Food	9	4,5%
Restaurant	11	5,5%
Café	8	4,0%
Based on Length of Business		
1 up to 3 years	124	62,0%
> 3 years up to 6 years	69	34,5%
> 6 years	7	3,5%
Based on Annual Income		
Less than IDR 2 billion	177	88,5%
IDR 2 billion up to IDR 15 billion	21	10,5%
More than IDR 15 billion up to IDR 50 billion	2	1,0%
Based on Business Location		
Batam Kota District	56	28,0%
Batu Aji District	11	5,5%
Batu Ampar District	53	26,5%
Lubuk Baja District	12	6,0%
Bengkong District	51	25,5%
Nongsa District	6	3,0%
Sagulung District	4	2,0%
Sekupang District	4	2,0%
Sungai Beduk District	2	1,0%
Belakang Padang District	1	0,5%
Based on Long Business Operation		
1 up to 3 years	124	61,7%
More than 3 years up to 6 years	69	34,3%
More than 6 years	7	3,5%

Source: Data Processed, 2025

Based on Table 1, the sample is predominantly composed of female respondents aged between 28 and 43 years, with a high school level of education. They operate businesses in the

trendy food sector, have been in operation for 1 to 3 years, generate an annual income of less than IDR 2 billion, and are mostly located in the Batam Kota sub-district.

Table 2.
Common Method Bias Test Results

Total	% of Variance	Cumulative %
11.865	27.592	27.592

Source: Data Processed, 2025

Common Method Bias (CMB) testing was conducted using SPSS software, resulting in a variance value of 27.592%, which is below the threshold of 50%. Based on the table 2, it can be concluded that the study does not indicate the presence of bias. It can be concluded that the data used for measurement does not experience errors or data failures.

Reliability and Validity Test

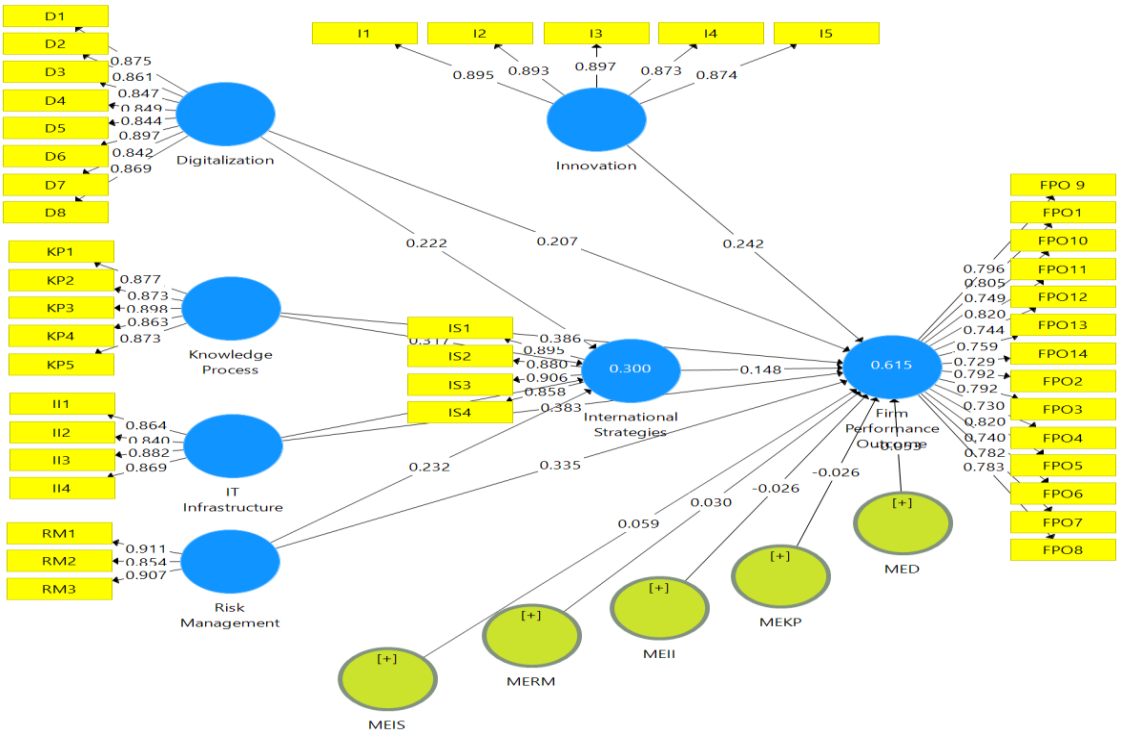
Table 3
Reliability Test Results

Variable	Indicator	Loading Factor	Average Variance Extracted (AVE)	Composite Reliability	Cronbach's Alpha
Digitalization	D1	0.875	0.740	0.958	0.950
	D2	0.861			
	D3	0.847			
	D4	0.849			
	D5	0.844			
	D6	0.897			
	D7	0.842			
	D8	0.869			
Knowledge Process	KP1	0.877	0.769	0.943	0.925
	KP2	0.873			
	KP3	0.898			
	KP4	0.863			
	KP5	0.873			
IT Infrastructure	II1	0.864	0.746	0.922	0.887
	II2	0.840			
	II3	0.882			
	II4	0.869			
International Strategy	IS1	0.895	0.783	0.935	0.908
	IS2	0.880			
	IS3	0.906			
	IS4	0.858			
Moderating Effect-D	ME-D		1.000	1.000	1.000
Moderating Effect -II	ME-II		1.000	1.000	1.000
Moderating Effect -IS	ME-IS		1.000	1.000	1.000
Moderating Effect -KP	ME-KP		1.000	1.000	1.000
Moderating Effect -RM	ME-RM		1.000	1.000	1.000
Innovation	I1	0.895	0.785	0.947	0.932
	I2	0.893			
	I3	0.897			
	I4	0.873			
	I5	0.874			
Risk Management	RM1	0.911	0.794	0.921	0.873
	RM2	0.854			
	RM3	0.907			
Firm Performance	FPO1	0.805	0.601	0.949	0.945
	FPO2	0.792			

Variable	Indicator	Loading Factor	Average Variance Extracted (AVE)	Composite Reliability	Cronbach's Alpha
	FPO3	0.792			
	FPO4	0.730			
	FPO5	0.820			
	FPO6	0.740			
	FPO7	0.782			
	FPO8	0.783			
	FPO9	0.796			
	FPO10	0.749			
	FPO11	0.820			
	FPO12	0.744			
	FPO13	0.759			
	FPO14	0.729			

Source: Data Processed, 2025

The loading factor was tested to assess whether the research model is appropriate for the given questions or statements, and it is considered valid if the outer loading value exceeds 0.7. A construct is considered valid if the AVE value is above 0.5. Reliability is acceptable when both composite reliability and Cronbach's alpha are over 0.6. Based on the results in Table 3, all the values (including loading factor, AVE, composite reliability, and Cronbach's alpha) meet the recommended thresholds (Hamid & Anwar, 2019).



Source: Data Processed, 2025

Figure 2.
SEM-PLS Model

Figure 2 displays the SEM-PLS measurement model showing the relationships among latent constructs and their indicators. All indicators have outer loading values above 0.70, confirming strong indicator reliability. Each demonstrate high loading values ranging from approximately 0.729 to 0.911, indicating that all items effectively represent their respective constructs.

Table 4
Cross-Loading Validity

Indicator	D	FPO	II	I	IS	KP	ME D	ME II	ME IS	ME KP	ME RM	RM
D1	0.874	0.073	0.028	-0.105	0.196	0.068	0.002	0.114	0.118	0.021	-0.008	-0.093
D2	0.852	0.099	-0.007	0.042	0.140	0.062	0.010	-0.037	0.073	-0.030	-0.036	-0.081
D3	0.839	0.062	-0.065	0.000	0.102	-0.004	-0.099	0.035	0.098	-0.003	0.023	-0.024
D4	0.861	0.039	-0.002	0.007	0.270	0.099	-0.012	0.070	0.123	-0.052	-0.052	-0.072
D5	0.848	0.135	-0.010	0.041	0.226	0.003	-0.071	0.072	0.113	-0.019	0.017	-0.033
D6	0.893	0.065	-0.009	0.058	0.198	0.058	-0.096	0.100	0.095	-0.077	-0.128	-0.046
D7	0.843	0.014	0.032	0.020	0.134	-0.049	0.080	0.060	0.084	-0.008	-0.008	-0.145
D8	0.866	0.012	-0.045	0.001	0.161	0.069	-0.032	0.132	0.071	-0.088	-0.083	-0.073
D * I	-0.035	-0.008	0.085	-0.112	0.114	-0.039	1.000	0.085	0.161	0.175	-0.053	-0.044
FPO1	0.033	0.794	-0.060	-0.113	-0.018	0.080	0.037	0.023	-0.010	-0.046	0.096	-0.019
FPO2	0.057	0.753	-0.090	-0.005	-0.021	0.044	-0.082	0.040	-0.054	0.011	0.065	0.054
FPO3	-0.087	0.701	-0.098	-0.076	-0.066	-0.000	-0.017	-0.041	-0.075	-0.078	0.090	-0.047
FPO4	0.114	0.835	-0.132	-0.026	0.084	0.077	-0.036	-0.037	-0.113	-0.062	-0.037	0.079
FPO5	-0.037	0.738	-0.055	-0.072	-0.026	0.060	-0.025	-0.041	-0.123	-0.108	0.012	0.044
FPO6	0.017	0.725	-0.065	-0.102	-0.017	0.041	-0.048	0.072	-0.084	-0.041	0.025	0.002
FPO7	-0.075	0.705	0.051	0.036	0.081	0.049	0.045	-0.037	-0.057	0.020	-0.029	0.016
FPO8	-0.021	0.759	-0.059	-0.018	-0.025	0.051	0.027	0.055	-0.095	-0.042	0.120	0.008
FP O9	0.070	0.823	-0.092	-0.135	0.035	0.037	0.035	-0.025	-0.026	0.015	0.111	0.058
FPO10	0.124	0.745	-0.037	-0.021	0.026	0.075	-0.001	-0.066	-0.071	0.036	0.020	0.045
FPO11	0.066	0.761	-0.105	-0.112	0.068	0.041	0.052	-0.087	-0.121	-0.030	0.052	0.071
FPO12	-0.052	0.739	-0.068	-0.117	-0.126	-0.063	-0.051	-0.020	-0.120	-0.030	0.049	-0.063
FPO13	0.032	0.750	-0.008	-0.113	-0.007	0.018	0.033	-0.019	-0.078	0.031	0.084	-0.023
FPO14	0.132	0.747	-0.040	-0.064	0.048	0.063	-0.028	0.033	-0.109	0.008	-0.057	0.027
I1	0.006	-0.121	-0.002	0.910	-0.068	-0.068	-0.141	-0.070	0.053	0.039	-0.220	-0.091
I2	-0.007	-0.070	-0.026	0.875	-0.110	-0.112	-0.069	-0.092	0.115	0.083	-0.130	-0.102
I3	0.025	-0.081	-0.046	0.895	-0.112	-0.114	-0.124	-0.072	0.115	0.123	-0.168	-0.044
I4	0.029	-0.063	0.004	0.838	-0.059	-0.102	-0.073	-0.030	0.149	0.127	-0.117	-0.027
I5	-0.002	-0.121	-0.033	0.901	-0.101	-0.036	-0.073	-0.069	0.112	0.126	-0.089	-0.136
II1	0.004	-0.074	0.862	-0.082	0.243	-0.010	0.023	0.076	0.085	0.031	-0.020	-0.031
II2	-0.007	-0.096	0.844	0.036	0.245	-0.090	0.082	0.042	0.024	-0.077	-0.001	-0.035
II3	-0.033	-0.112	0.878	0.014	0.230	0.004	0.098	0.002	-0.045	0.002	-0.063	0.044
II4	0.006	-0.084	0.872	-0.047	0.278	-0.043	0.087	0.114	0.052	-0.002	0.013	-0.044
IS1	0.234	-0.021	0.310	-0.087	0.896	0.250	0.165	-0.037	0.144	0.077	-0.038	0.226
IS2	0.145	-0.030	0.255	-0.068	0.880	0.354	0.053	0.089	0.149	0.071	-0.097	0.206
IS3	0.224	0.053	0.269	-0.087	0.906	0.347	0.105	0.058	0.212	0.052	0.014	0.245
IS4	0.181	0.048	0.167	-0.124	0.857	0.238	0.072	-0.002	0.155	0.053	-0.048	0.171
II * I	0.083	-0.015	0.070	-0.076	0.033	-0.014	0.085	1.000	0.368	0.143	0.060	-0.020
IS * I	0.117	-0.106	0.034	0.115	0.188	0.075	0.161	0.368	1.000	0.471	0.273	-0.049
KP1	0.050	0.059	-0.062	-0.093	0.288	0.879	-0.007	-0.025	0.069	0.088	-0.028	0.077
KP2	0.058	0.027	0.027	-0.030	0.323	0.871	-0.034	0.008	0.062	0.017	-0.146	0.119
KP3	0.050	0.037	-0.051	-0.085	0.312	0.896	-0.073	-0.018	0.088	0.049	-0.025	0.106
KP4	0.068	0.110	-0.039	-0.132	0.300	0.868	-0.053	-0.032	0.012	0.018	-0.021	0.063
KP5	-0.006	0.030	-0.064	-0.048	0.260	0.870	0.003	0.009	0.107	0.039	-0.082	0.093
KP * I	-0.039	-0.031	-0.014	0.108	0.072	0.047	0.175	0.143	0.471	1.000	0.191	-0.071
RM1	-0.059	0.076	-0.080	-0.095	0.240	0.155	-0.030	-0.009	-0.055	-0.048	-0.125	0.916
RM2	-0.107	-0.007	-0.062	-0.117	0.164	0.023	-0.050	-0.038	-0.037	-0.070	-0.006	0.858
RM3	-0.060	0.021	0.078	-0.060	0.231	0.077	-0.042	-0.014	-0.036	-0.076	-0.095	0.899
RM * I	-0.042	0.060	-0.019	-0.167	-0.046	-0.069	-0.053	0.060	0.273	0.191	1.000	-0.094

Source: Data Processed, 2025

Cross-loading validity testing was conducted to assess whether the research model is appropriate for the given questions or statements. According to Hair et al. (2017) a question or statement is considered valid or demonstrates good validity if the outer loading value is greater than 0.7. Therefore, all items tested in this study are deemed valid.

Table 5.
HTMT Criterion Assessment

	D	FPO	II	I	IS	KP	ME-D	ME-II	ME-IS	ME-KP	ME-RM	RM
D												
FPO	0.245											
II	0.041	0.428										
I	0.055	0.169	0.061									
IS	0.221	0.523	0.314	0.114								
KP	0.069	0.474	0.063	0.105	0.364							
ME-D	0.062	0.069	0.080	0.115	0.126	0.038						
ME-II	0.042	0.048	0.037	0.117	0.079	0.064	0.171					
ME-IS	0.126	0.152	0.063	0.135	0.205	0.083	0.148	0.456				
ME-KP	0.087	0.088	0.083	0.075	0.054	0.021	0.089	0.148	0.363			
ME-RM	0.049	0.087	0.027	0.173	0.060	0.074	0.076	0.176	0.262	0.074		
RM	0.096	0.387	0.093	0.104	0.262	0.108	0.036	0.081	0.056	0.026	0.102	

Source: Data Processed, 2025

Discriminant validity was further evaluated using the Heterotrait–Monotrait Ratio (HTMT) criterion, as presented in Table 5. The results show that all HTMT values among the constructs are well below the threshold of 1.0, indicating the absence of multicollinearity and confirming that each construct is empirically distinct. The highest HTMT value observed was 0.523 between International Strategy (IS) and Firm Performance Outcome (FPO), which remains far below the conservative cut-off value of 0.85 recommended by Hair et al. (2021). Therefore, the model satisfies the discriminant validity requirement, demonstrating that the constructs in this study are conceptually and statistically distinct (Hamid & Anwar, 2019).

Evaluation of the structural model (inner model)

The inner model was tested by examining the R-square values and determining whether the research hypotheses are accepted or rejected. This is assessed through the T-statistics and P-values, which must meet the minimum thresholds of > 1.96 and < 0.05 (Hamid & Anwar, 2019). The complete results are presented in Tables 4 and 5.

Table 6.
R-Square Test

	R-Square (R^2)	R-Square Adjusted
FPO	0.615	0.638
IS	0.300	0.320

Source: Data Processed, 2025

The R Square (R^2) value in this study refers to the criteria established by Hair et al. (Hair et al., 2017), where the interpretation of R^2 is categorized into three levels: substantial (≥ 0.75), moderate (0.50–0.749), and weak (0.25–0.499). Based on this classification, the test results indicate that the R^2 value for the Firm Performance Outcome (FPO) variable is considered moderate, while the R^2 value for International Strategy is categorized as weak. Although Q^2 and f^2 were not explicitly reported, the explanatory power of the model was evaluated using the Adjusted R^2 values, which demonstrate a substantial proportion of explained variance in the endogenous constructs.

Table 7.
Results of acceptance and rejection of the hypothesis

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Result
Digitalization → Firm Performance	0.207	0.208	0.055	**3.792**	**0.000**	H1 Accepted
Digitalization →International Strategy	0.222	0.225	0.063	**3.542**	**0.000**	H2 Accepted
Knowledge Process → Firm Performance	0.386	0.385	0.044	**8.789**	**0.000**	H3 Accepted
Knowledge Process → International Strategy	0.317	0.319	0.059	**5.398**	**0.000**	H4 Accepted
IT Infrastructure → Firm Performance	0.383	0.382	0.043	**8.824**	**0.000**	H5 Accepted
IT Infrastructure → International Strategy	0.307	0.306	0.065	**4.735**	**0.000**	H6 Accepted
Risk Management → Firm Performance	0.335	0.332	0.051	**6.618**	**0.000**	H7 Accepted
Risk Management → International Strategy	0.232	0.232	0.064	**3.648**	**0.000**	H8 Accepted
International Strategy → Firm Performance	0.148	0.143	0.053	**2.758**	**0.006**	H9 Accepted
Digitalization → International Strategy → Firm Performance	0.033	0.031	0.015	**2.201**	**0.028**	H10 Accepted
Knowledge Process → International Strategy → Firm Performance	0.047	0.045	0.020	**2.341**	**0.019**	H11 Accepted
IT Infrastructure → International Strategy → Firm Performance	0.045	0.043	0.019	**2.399**	**0.017**	H12 Accepted
Risk Management → International Strategy → Firm Performance	0.034	0.032	0.015	**2.293**	**0.022**	H13 Accepted
Digitalization*Innovation → Firm Performance	-0.053	-0.053	0.054	0.983	0.326	H14 Rejected
Knowledge Process*Innovation →Firm Performance	-0.026	-0.026	0.051	0.506	0.613	H15 Rejected
International Strategy*Innovation →Firm Performance	0.059	0.063	0.065	0.906	0.365	H16 Rejected
IT Infrastructure* Innovation → Firm Performance	-0.026	-0.030	0.047	0.560	0.576	H17 Rejected
H.18 Risk Management* Innovation → Firm Performance	0.030	0.034	0.047	0.644	0.520	H18 Rejected

Source: Data Processed, 2025

Table 7 reveal that all direct and mediating effects are significant, while all moderating effects are not supported. Specifically, Digitalization, Knowledge Process, IT Infrastructure, and Risk Management have significant positive effects on both International Strategy and Firm Performance ($p < 0.05$). International Strategy also exerts a significant effect on Firm Performance, confirming its mediating role. The mediation results (H10–H13) indicate that International Strategy partially mediates the relationship between knowledge-based resources and firm performance. Conversely, the moderating effects of Innovation (H14–H18) are insignificant ($p > 0.05$), suggesting that innovation does not moderate these relationships. Overall, the results highlight that knowledge-based resources and international strategy are key drivers of MSME performance, whereas innovation functions independently rather than as a moderator.

Table 8.
SRMR Test Results

	Original Sample (O)	Sample Mean (M)	95%	99%
Saturated Model	0.067	0.044	0.050	0.089

	Original Sample (O)	Sample Mean (M)	95%	99%
Estimated Model	0.067	0.044	0.050	0.067

Source: Data Processed, 2025

Table 8 presents the Standardized Root Mean Square Residual (SRMR) values used to evaluate the model's goodness of fit. The SRMR value obtained for both the saturated and estimated models is 0.067, which falls below the recommended threshold of 0.10 (Ghozali, 2015). These results collectively confirm that the model exhibits acceptable explanatory power and overall fit, despite the absence of predictive relevance (Q^2) and effect size (f^2) reporting. This result indicates that the structural model demonstrates an acceptable fit and is statistically adequate for further analysis. Thus, the overall model can be considered reliable and appropriate for explaining the relationships among the studied constructs.

Based on the results above, it is show that digitalization has a strong and positive impact on both firm performance and international strategy. This is supported by significant t-values of 3.792 and 3.542 with p-values of 0.000. For MSMEs, adopting digital technologies provides tangible benefits, such as cost reduction, improved operational efficiency, and enhanced decision-making speed. These advantages support long-term growth and competitiveness. Digitalization also enables MSMEs to expand their market scope by opening opportunities for cross-border collaboration and facilitating the adoption of international strategy that strengthen global competitiveness and ensure business sustainability. Within the framework of internationalization theory, digitalization acts as an enabler that reduces information asymmetry and transaction costs, thereby improving foreign market entry and coordination. From a KBV perspective, digitalization enhances firms' abilities to create, store, and apply knowledge for strategic advantage. These findings are consistent with previous studies by Deng et al. (2022), Fitri (2022), Guo & Xu (2021), Rosyidiana & Narsa (2024) dan Strange et al. (2022).

Comparative evidence from Southeast Asia also confirms similar patterns. Amin & Sudarmiatin (2024) revealed that digital capacity, market knowledge, and international networking significantly and positively influence the internationalization performance of MSMEs across ASEAN countries. These findings underscore the critical need for cohesive strategies to enhance MSMEs' capabilities for effective international expansion. Research by Li et al. (2024) conducted in China further provides substantial evidence that digitalization—particularly through the lens of digital resilience—exerts a strong and positive impact on firm performance and international strategy. This impact is largely mediated by improvements in internal operational efficiency and innovation, both of which are essential for strengthening export readiness and achieving sustained international success.

A critical determinant of MSME success lies in the knowledge absorption process. The results indicate that the knowledge process has a clear and positive impact on both firm performance and international strategy, as shown by high t-values of 8.789 and 5.398, both with p-values of 0.000. This reinforces the Knowledge-Based View (KBV), which conceptualizes knowledge as a strategic asset driving sustained competitive advantage. Firms capable of acquiring, sharing, and applying knowledge effectively are more responsive to market shifts and more adaptive to global opportunities. Knowledge processes cultivate organizational learning and strategic readiness, enabling MSMEs to explore international markets and maintain business sustainability. The findings are aligned with the mechanism of KBV, wherein knowledge allows firms to develop distinctive capabilities that competitors find difficult to imitate, ultimately fostering superior international performance. These findings are in line with prior research by Zámborský et al. (2023) Stoian et al. (2024), and Indah Sari & Gantino (2023).

The analysis further indicates that IT infrastructure has a strong and positive effect on firm performance, reflected in a t-value of 8.824 with a significance level of 0.000, and also positively influences international strategy, as shown by a t-value of 4.735 and a significance level of 0.000. IT infrastructure facilitates automation and digital service delivery, such as

online marketing, customer support, and digital payment systems, which collectively enhance efficiency, satisfaction, and brand image. In KBV terms, IT systems act as repositories and conduits for organizational knowledge, enabling firms to process information rapidly and transform it into actionable strategic insights. Digitalization depends heavily on robust IT infrastructure, encompassing both hardware such as computers, smartphones, telecommunication devices and software such as social media tools, AI-based systems, marketplace integration, and automated financial recording applications. However, MSME practitioners must possess adequate knowledge and training to optimize these tools effectively. This finding corresponds with the works of Cholis et al. (2023), Gao et al. (2022), dan Hermanto et al. (2024).

Comparative regional studies also support these findings. For instance, research from China provides strong evidence that the development of information infrastructure—an essential component of IT infrastructure—has a significant positive impact on firms' export performance, which constitutes a crucial aspect of international strategy (Zhou et al., 2024). Other studies also reveal the positive influence of Internet capabilities on international strategic orientation and international business relationships, both of which are key components or closely related to international strategy. However, these studies do not directly measure or claim a strong and positive effect of IT infrastructure on overall firm performance. Their focus is more specific, examining how Internet-related capabilities shape relationship-building and strategic direction within the international business context (Mathews et al., 2021).

Risk management is a critical aspect that must be properly managed by companies. The data analysis shows that risk management has a significant positive effect on both firm performance and international strategy. This is evident from Table 5, which reports t-statistics and p-values for risk management of 6.618 and 0.000 for firm performance and 3.648 and 0.000 for international strategy. Effective risk management helps firms identify, assess, and mitigate operational disruptions, thereby strengthening competitiveness and resilience. Within internationalization theory, risk management reduces exposure to foreign market uncertainties—such as exchange rate fluctuations, logistics issues, and regulatory challenges—thus improving firms' ability to operate internationally. Moreover, from a KBV standpoint, systematic risk management represents an organizational knowledge process that accumulates experiential learning and procedural know-how, directly supporting sustainable performance. These findings are consistent with Asir Asir et al. (2023), Ayu et al. (2024), Dias et al. (2021) and Virglerova et al. (2020), which emphasize that comprehensive risk management enhances business stability, customer trust, and long-term growth.

International strategy plays an important role in firm performance, both directly and indirectly. The test results show that international strategy has a significant positive direct effect on firm performance, as indicated by a t-statistic of 2.758 and a p-value of 0.006. The indirect effect occurs through the role of international strategy as a mediating variable. The t-statistics and p-values for each mediation hypothesis are as follows: First, digitalization has a significant positive effect on firm performance through international strategy, with values of 2.201 and 0.028, respectively. Second, the knowledge process has a significant positive effect on firm performance through international strategy, with values of 2.341 and 0.019. Third, IT infrastructure has a significant positive effect on firm performance through international strategy, with values of 2.399 and 0.017. Fourth, risk management has a significant positive effect on firm performance through international strategy, with values of 2.293 and 0.022. Adopting or utilizing international strategy helps companies access broader markets, enabling them to attract more new customers, which ultimately increases product sales and MSME profitability. However, the relationship between internationalization and firm performance can be complex once implemented and therefore requires strong competitive advantages and robust evaluation capabilities. These findings are consistent with previous studies by (Arbelo et al.,

2024; Cabral et al., 2020).

Comparative evidence from prior studies further aligns with the findings of this research. Saputra et al. (2020) demonstrated that the internationalization process mediates the relationship between knowledge management and dynamic capabilities in influencing SMEs' export performance. Both knowledge management and dynamic capabilities exert a direct positive impact on export performance, while the mediating effect of internationalization, although smaller in magnitude, strengthens this relationship. These findings reinforce the current study's results, which show that international strategy serves as a mediating mechanism through which knowledge-based resources—such as knowledge processes and IT infrastructure—enhance MSME performance. This underscores the pivotal role of international strategy in translating internal knowledge and capabilities into improved competitive and export outcomes.

In contrast, the moderation analysis reveals that innovation does not significantly moderate the relationships between digitalization, knowledge management, IT infrastructure, risk management, and international strategy with firm performance. All five moderation hypotheses were rejected (t-values < 1.96, p-values > 0.05). Several contextual explanations account for this outcome. First, MSMEs in Batam City generally operate under resource constraints, such as limited financial capacity, managerial expertise, and technological readiness, which restrict their ability to leverage innovation effectively. Second, innovation in this study is largely incremental and process-oriented, rather than radical or market-driven, limiting its potential to enhance the strength of these relationships. Third, the low variance in innovation levels across respondents may have reduced statistical power to detect moderating effects.

This finding is consistent with Satyasri Akula (2024), who found that innovation did not moderate the digitalization–performance relationship, and with Kadarusman & Siti Rosyafah, (2022), who observed no significant moderating effect of innovation capacity on the relationship between entrepreneurial orientation and financial performance. Other studies, such as those by Anwar et al. (2023), Mamduh et al. (2024), and Permatasari & Praswati (2024) have instead conceptualized innovation as a mediating variable, suggesting that its impact on performance may occur indirectly rather than as an interaction effect. Comparative studies in other Southeast Asian contexts, including Malaysia, Thailand, and Vietnam, also demonstrate that the innovation–performance relationship is contingent on firm size, absorptive capacity, and institutional support. Similar findings were reported by Srijuntrapun & Boon-itt (2020), Kowang et al. (2021), Abd Rahman & Zainol (2022), T. V. Nguyen et al. (2023) and Le & Nguyen (2024), who collectively emphasized that innovation contributes more strongly to performance when firms possess higher absorptive capacity, operate at a larger scale, and receive adequate institutional backing.

The overall model demonstrates robust explanatory power, with an R^2 value of 0.615 for firm performance, indicating a substantial level of explained variance, and an R^2 of 0.300 for international strategy, reflecting moderate explanatory strength. The model also achieves good fit, with an SRMR value of 0.067, confirming statistical adequacy. These results validate that the proposed model provides both theoretical robustness and practical relevance. From a managerial standpoint, this implies that enhancing digitalization, IT infrastructure, knowledge management, and risk management practices can collectively strengthen MSME performance and international readiness. For every improvement in these strategic resources, MSMEs can expect measurable performance gains and greater resilience in global competition. To strengthen quantification and managerial interpretation, future research is encouraged to report standardized path coefficients (β) and effect sizes (f^2), allowing more precise estimations of how capability improvements translate into performance outcomes.

Overall, this study contributes to extending the Knowledge-Based View by empirically

demonstrating how knowledge, technological, and procedural resources form a foundation for international strategy and performance among Indonesian MSMEs. It also enriches internationalization theory by highlighting how internal resource readiness enables small firms to overcome market barriers and succeed globally. Policymakers should prioritize programs that integrate innovation support with training, digital adoption, and risk management initiatives, ensuring that MSMEs can translate resource investments into sustainable international performance.

CONCLUSION

This study confirms that digitalization, knowledge processes, IT infrastructure, risk management, and international strategy significantly and positively influence MSME performance in Batam. These findings reinforce the Knowledge-Based View (KBV) by demonstrating that knowledge-related resources and technological capabilities serve as key drivers of both strategic orientation and firm performance in developing-market MSMEs. The results further reveal that international strategy functions as a mediating mechanism that translates internal resources into improved performance outcomes, underscoring the strategic importance of aligning knowledge assets with global market initiatives. However, innovation, when examined as a moderating variable, did not yield a significant effect, indicating that its role may depend on contextual factors such as absorptive capacity, firm size, and the nature of innovation employed. Theoretically, this study extends the KBV framework to the MSME context by integrating international strategy as a mediating path and highlighting the conditional nature of innovation within dynamic capability theory.

From a practical and policy standpoint, the findings emphasize the need for MSME managers to invest in digital infrastructure, strengthen knowledge processes, enhance IT systems, and implement proactive risk management to build international competitiveness. Policymakers should focus on strengthening the knowledge ecosystem by supporting digital literacy, innovation training, and international market access programs that empower MSMEs to compete globally. Despite its contributions, this study is limited to MSMEs in Batam's food and beverage sector, and its cross-sectional design restricts causal inference. Future research should employ longitudinal or multi-sectoral designs, incorporate more nuanced measures of innovation (radical versus incremental), and examine comparative contexts across Southeast Asia to better understand institutional influences on MSME internationalization. Overall, this research provides empirical and theoretical support for integrating the KBV and internationalization perspectives, offering a foundation for strategies that enhance MSME performance and global competitiveness in emerging economies.

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