TechTalent
and Business Review

Strategic Agility in SMES: How Digital Transformation Shapes Competitive Avantage in Emerging Market
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| Abstract | : | In the context of emerging markets marked by volatility, uncertainty, and technological disruption, digital transformation has become a crucial enabler of strategic agility for Small and Medium Enterprises (SMEs). This study explores how digital capabilities contribute to strategic agility and, subsequently, to the competitive advantage of SMEs. A mixed-methods approach was employed, combining quantitative data from 300 SMEs across Indonesia, Vietnam, and Ghana with qualitative case studies from five selected firms. Quantitative analysis using Partial Least Squares Structural Equation Modeling (PLS-SEM) confirmed that digital capabilities significantly enhance both strategic agility and competitive advantage. Moreover, innovation culture and external collaboration were found to be significant moderating variables in these relationships. Qualitative findings support these results, revealing that digital maturity reflected in process reorientation, platform integration, and data-driven responsiveness enables SMEs to adapt and innovate under uncertainty. The findings provide actionable insights for policymakers and practitioners seeking to enhance SME resilience through inclusive digital strategies. This study contributes to the extension of dynamic capabilities theory by integrating cross market agility responses into the framework of digital transformation in emerging economies. |

| Keywords | : | SMEs, Digital Transformation, Strategic Agility |

1. Introduction

Digital transformation has fundamentally reshaped business paradigms globally, including within small and medium-sized enterprises (SMEs) operating in emerging markets. These markets are increasingly characterized by VUCA (volatility, uncertainty, complexity, and ambiguity) conditions, making agility and adaptability critical for survival and competitiveness (Troise et al., 2022; Adomako et al., 2022). In this environment, strategic agility the ability to rapidly and proactively respond to external changes has emerged as a vital organizational capability (Teece et al., 2016; Yusuf et al., 2022). SMEs, often limited in resources and capabilities, must harness digital technologies strategically to remain competitive.

Recent studies have explored how digital transformation contributes to SME renewal and competitiveness. Christofi et al. (2024) emphasized the need for a multilevel capabilities framework to analyze digital transformation in SMEs, though their focus remains country-specific. Similarly, Fang and Liu (2024) investigated digital innovation in emerging markets but overlooked cross-national differences. Zhang et al. (2024) confirmed the role of strategic digital capabilities in improving SME performance in China, while Melo et al. (2023) highlighted the fragmented nature of literature on dynamic capabilities

and digital transformation, particularly in developing countries. However, very few empirical studies have systematically examined how digital capabilities interact with innovation culture and external collaboration to shape strategic agility and competitive advantage in SMEs across multiple emerging economies.

Digitalization offers numerous benefits for SMEs, including improved operational efficiency, innovation opportunities, and access to wider markets (Zhang et al., 2024; Van Hoang et al., 2025). Nevertheless, digital integration is not automatic or uniform across SMEs. Internal enablers such as digital capabilities, innovation culture, and external collaboration are fundamental to ensuring that digital investments translate into sustainable competitive advantages (Fang et al., 2024; Christofi et al., 2024). Yet, in many developing countries, SMEs face systemic challenges such as limited infrastructure, low digital literacy, and resistance to change (Škare et al., 2023; Akpan et al., 2020). Positive drivers such as government policies, digital literacy programs, and mobile technology infrastructure as seen in Indonesia, Vietnam, and Ghana are beginning to mitigate these barriers (OECD, 2023; Amankwah-Amoah et al., 2021; Nguyen et al., 2024).

In addition to empirical gaps, theoretical limitations remain. Ko and Ma (2022) emphasized the drivers and barriers to digital transformation but did not fully engage with the dynamic capabilities perspective. Ta (2023) attempted to connect strategic agility with digital maturity in emerging markets but underexplored social factors such as organizational culture and collaboration networks. Meanwhile, Christofi et al. (2024) have called for an integrative, multilevel approach to understanding SME digital transformation holistically. This creates a research gap where there is still limited cross-national empirical evidence integrating dynamic capabilities theory with contextual moderators such as innovation culture and external collaboration in SME digital transformation. Addressing this gap not only advances theoretical understanding but also provides novel, actionable insights for policy and practice in emerging markets.

The literature on digital transformation in SMEs from emerging markets has largely been driven by secondary data and conceptual frameworks, which often lack contextual depth. To overcome this, recent empirical studies utilizing primary data have gained traction. For instance, Kala'lembang et al. (2024) found that perceived usefulness and security drive digital payment adoption among Indonesian SMEs. Trinugroho et al. (2024) showed that financial literacy and regional factors significantly affect SME digitalization. Sinaga and Christanti (2024) confirmed the link between digital adoption and financial performance in Indonesia's F&B sector, particularly when moderated by digital literacy and platform accessibility. Similarly, Rahmawati et al. (2023) highlighted how financial literacy enhances both digital adoption and business sustainability.

Other studies from different emerging markets further underscore the importance of primary, context-specific evidence. Chishty et al. (2025) identified digital capabilities as core drivers of internationalization in SMEs across developing countries. Ihemebiri et al. (2023) reported that social media was instrumental in SME resilience during the COVID-19 pandemic in Nigeria. In Bangladesh, Ahammed et al. (2024) found that skills gaps and limited technical readiness are major barriers to Industry 4.0 adoption. Abdalla et al. (2025) revealed that compatibility, IT readiness, and government support significantly influence e-commerce adoption among Sudanese SMEs. Rasheed et al. (2024) in Vietnam confirmed that financial access and technical capability drive green technology adoption. In Indonesia, Nugroho et al. (2024) and Lestari and Miswanto (2025) emphasized the roles of digital culture and financial literacy in SME transformation and sustainability, while Sari et al. (2021) and Gupta and Singh (2023) explored internationalization and microfinance as enablers of SME resilience in creative and rural sectors respectively.

These studies clearly illustrate that empirical, field-based research offers richer, more actionable insights into SME digital transformation than aggregate-level or conceptual analyses. They highlight the importance of understanding local dynamics, institutional environments, and firm-specific capabilities. In response to these empirical and theoretical gaps, this study develops an integrated framework based on dynamic capabilities theory (Teece & Leih, 2016) to explore how digital capabilities influence strategic agility and competitive advantage in SMEs from three emerging markets: Indonesia, Vietnam, and Ghana. Building on Fang and Liu (2024) and Nguyen and Bui (2024), the study further investigates the moderating effects of innovation culture and external collaboration factors that remain underexplored in cross-national empirical settings. Previous evidence by Heriyanto and Anwar (2024) and Adomako et al. (2022) has established that ICT capabilities and organizational agility are critical for SME performance, but these studies have yet to address cross-country variations. By employing a mixed-methods approach and drawing on both quantitative survey data and qualitative case studies, this study contributes new, cross-contextual insights into how SMEs in different institutional and digital maturity contexts navigate transformation, innovation, and competitive strategy.

2. Method

This study aims to examine how digital transformation contributes to strategic agility and, subsequently, competitive advantage in SMEs operating in emerging markets. Anchored in the Dynamic Capabilities Theory (Teece et al., 2016), this study develops an integrated empirical model linking digital capabilities to strategic agility and competitive advantage. Additionally, it explores how innovation culture and external collaboration act as moderating variables in these relationships. A mixed-methods design was employed to achieve this. Quantitative data were obtained through a structured survey of 300 SME actors across three emerging markets: Indonesia, Vietnam, and Ghana. The selection of Indonesia, Vietnam, and Ghana as countries for this study was based on their varying levels of digital readiness, as measured by several global indices. According to the 2023 Network Readiness Index (NRI) report, Indonesia scored 47.6, indicating a relatively high level of infrastructure readiness and digital technology adoption. Meanwhile, Vietnam scored 45.1, indicating significant progress in strengthening digital capacity through national policies (Institute, 2023). Ghana, on the other hand, scored lower at 37.4, reflecting ongoing structural challenges in digital transformation (Institute, 2023).

From an institutional perspective, the 2022 E-Government Development Index (EGDI) places Indonesia in the "high" category with a score of 0.7391, reflecting advanced digital public service capacity. Vietnam is in the "medium-high" category with a score of 0.6667, demonstrating the government's strong role in driving public sector digital adoption. Meanwhile, Ghana ranks in the "medium" category with a score of 0.5471, reflecting developing institutional capacity (Nations, 2022). Indonesia has a strong track record of digital acceleration, particularly post-pandemic through the National 100 Smart Cities Movement program and advancements in digital payment systems (OECD, 2023). In this context, research by Heriyanto A.; Anwar, M., (2024) shows that Indonesia's strong ICT capabilities contribute significantly to the strategic agility of MSMEs. In Vietnam, the digitalization strategy is driven by a national digital transformation program targeting all MSMEs (Nguyen et al., 2024). Van Hoang et al. (2025) also emphasize that the integration of e-commerce and cloud technology has boosted digital agility among Vietnamese MSMEs.

Ghana, despite facing infrastructure limitations, has shown progress through community-based approaches and the growth of the fintech sector (Amankwah-Amoah et al., 2021). Akpan D.; Kwak, D. H., (2020) documented how mobile-based technology

played a crucial role in supporting the digital adaptation of Ghanaian MSMEs during the crisis. In a conceptual study, Christofi D.; Pereira, V.; Tarba, S.; Thrassou, A., (2024b) stated that the disparity in digital readiness between countries is a crucial variable influencing the success of digital transformation. Meanwhile, Melo et al. (2023) emphasized the importance of a cross-country approach in measuring the role of dynamic capabilities in digital MSMEs. To enhance contextual validity, the quantitative approach was supplemented with five qualitative case studies, involving two SMEs from Indonesia, two from Vietnam, and one from Ghana.

Given the presence of multiple latent constructs and the complexity of the model, the data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0. This method is well-suited for exploratory studies with relatively small samples and complex mediation and moderation models (Hair et al., 2022). Furthermore, PLS-SEM does not assume a normal data distribution and provides robust estimates for path relationships, making it ideal for cross-national comparative research. A conceptual model was developed to illustrate the analysis's structural logic visually. This model captures the hypothesized relationships between digital capabilities, strategic agility, and competitive advantage, including the moderating roles of innovation culture and external collaboration.

This study aims to examine how digital transformation contributes to strategic agility and competitive advantage for MSMEs in emerging markets, based on Dynamic Capabilities Theory (Teece et al., 2016). A mixed-methods approach was used, encompassing a quantitative survey and a qualitative case study. Quantitative data were obtained through a structured survey of 300 MSMEs evenly distributed across three countries: Indonesia, Vietnam, and Ghana. These three countries were selected based on varying levels of digital readiness, as reflected in the 2023 Network Readiness Index (NRI) of Indonesia (47.6), Vietnam (45.1), and Ghana (37.4), as well as the 2022 E-Government Development Index (EGDI)—Indonesia (0.7391, high category), Vietnam (0.6667, medium-high category), and Ghana (0.5471, medium category). These differences in scores indicate varying levels of digital readiness, making them relevant for cross-country analysis. The research instrument used a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) adapted from previous research and piloted in the local context. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 software, which is suitable for complex models with mediation and moderation and does not require the assumption of a normal distribution (Hair et al., 2022). This approach allows for testing of structural models containing direct, mediating, and moderating relationships between research variables. The quantitative approach is complemented by five qualitative case studies: two MSMEs from Indonesia, two from Vietnam, and one from Ghana. These case studies were selected purposively to provide an in-depth contextual overview of digital transformation practices and adaptation strategies in each country.
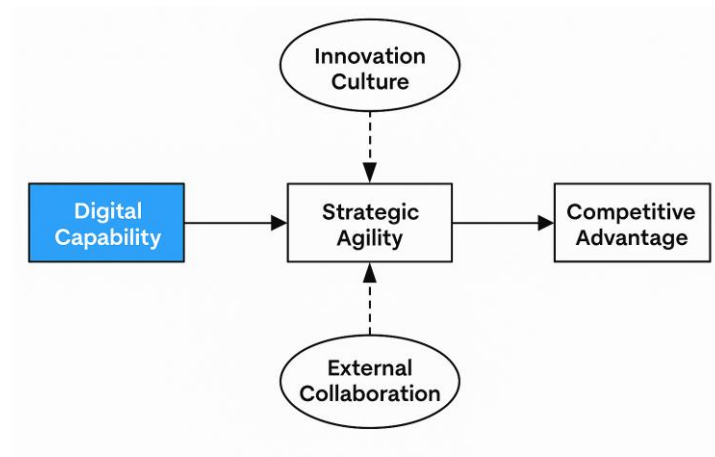
Figure 1. Conceptual Model Linking Digital Transformation, Strategic Agility, and Competitive Advantage in SMEs

This model illustrates the hypothesized relationships tested in the study, including the direct effects of digital capabilities on strategic agility and competitive advantage and the mediating role of agility. Innovation culture and external collaboration serve as key moderating variables influencing these linkages. The model provides the structural basis for cross-national empirical testing in Indonesia, Vietnam, and Ghana. Developed by authors based on Dynamic Capabilities Theory (Teece et al., 2016). In addition to the conceptual model, the research procedure is summarized in Figure 2 to depict the sequence of methodological steps applied in this study.
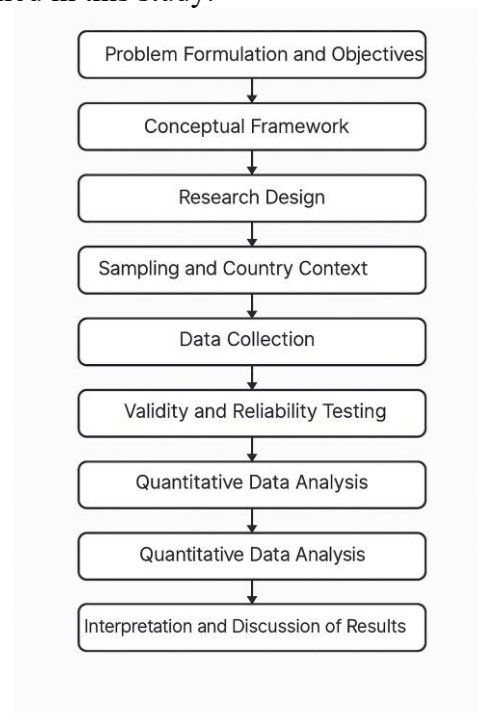

Figure 2. Research Procedure Flowchart

3. Results and Discussion
3.1 Data and Variables
3.1.1 Country Context and Sample Structure

Data were collected using a purposive stratified sampling technique to ensure balanced representation across each country's geographic regions and industry sectors. This approach enhances cross-national comparability and minimizes sampling bias in structural model estimation (Hair et al., 2022). The selection of countries reflects three distinct but complementary emerging market contexts, summarized below:

Table 1. Country Context and Sample Structure

Country	Justification	Sample (n)
Indonesia	Largest SME sector in ASEAN, experiencing rapid digital acceleration during and after the COVID-19 pandemic, especially through e-commerce platforms and digital payment systems (OECD, 2023).	100
Vietnam	Strong institutional support for digital transformation through the "National Digital Transformation Program," which prioritizes SME digitalization as a national agenda (Nguyen et al., 2024).	100
Ghana	Representative of West Africa's digitally inclusive but structurally constrained context, where digital community hubs are expanding despite low baseline literacy (Amankwah-Amoah et al., 2021).	100

This equal distribution of 100 respondents per country (total N = 300) enables robust multi-group analysis and cross-country comparability, avoiding statistical imbalance that could distort the generalizability of findings (Sarstedt et al., 2022). All constructs were measured using 5-point Likert-type scales (1 = strongly disagree to 5 = strongly agree), adapted from validated prior studies and pilot-tested in local contexts. We conducted reliability and validity assessments using standard criteria to ensure construct integrity.

Table 2. Construct Reliability and Validity Assessment

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Digital Capability	0.872	0.891	0.641
Strategic Agility	0.883	0.902	0.667
Competitive Advantage	0.866	0.878	0.609
Innovation Culture	0.853	0.867	0.584
External Collaboration	0.841	0.860	0.573

All constructs exceeded the minimum thresholds of Cronbach's Alpha (0.70), CR (0.70), and AVE (0.50) (Fornell & Larcker, 1981). Discriminant validity was confirmed using the Fornell-Larcker criterion and HTMT ratio, where all HTMT values were below the 0.85 threshold (Henseler et al., 2015). This research combines quantitative analysis using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method and qualitative studies on five selected SMEs in Indonesia, Vietnam, and Ghana. Quantitative data were obtained from 300 SME respondents, with 100 from each country. All constructs were tested through convergent and discriminant validity tests to ensure the model's integrity. Data analysis in this study was conducted using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method with the help of SmartPLS 4.0 software. The structural model used is shown in Figure 3, which visualizes the relationship between Digital Capability, Strategic Agility, and Competitive Advantage, as well as the moderating role of Innovation Culture and External Collaboration. All relationship paths in the model show statistical significance ($p < 0.05$) with high t-statistic values, confirming the structural strength of the relationship between variables. Digital Capability is proven to directly influence Competitive Advantage ($\beta = 0.58$; $p < 0.001$) and indirectly through Strategic

Agility (β = 0.65; p < 0.001; mediation effect β = 0.72; p < 0.001). Innovation Culture moderated the relationship between Digital Capability and Strategic Agility (β = 0.31; p = 0.001), while External Collaboration moderated the relationship between Strategic Agility and Competitive Advantage (β = 0.36; p < 0.001).

Cross-country comparisons revealed significant variation in digital readiness. Indonesia ranked first across all key variables (Digital Capability = 4.20; Strategic Agility = 4.18; Competitive Advantage = 4.25), reflecting the success of its post-pandemic digitalization strategy and government policy support. Vietnam ranked second (Digital Capability = 4.10; Strategic Agility = 4.03; Competitive Advantage = 4.12), making rapid progress thanks to the implementation of the National Digital Transformation Program. Ghana scored lower (Digital Capability = 3.85; Strategic Agility = 3.96; Competitive Advantage = 4.00), but still demonstrated positive trends through its community-based approach and strengthening of the fintech sector. These differences confirm that the level of digital readiness is heavily influenced by a combination of structural factors, public policy, and internal organizational capacity.

Qualitative findings support the quantitative results by demonstrating that the adoption of digital technology can improve the adaptability of MSMEs to market changes. For example, Firm A in Indonesia successfully expanded its market reach through a mobile app, while Firm B in Vietnam accelerated production times with ERP integration. In Ghana, Firm D utilized a community tech hub to expand digital adoption in the agricultural sector. Overall, the research findings indicate that digital capability is a key foundation for strategic agility, which in turn becomes a key driver of competitive advantage. The variation in results across countries demonstrates that national context influences the effectiveness of digital transformation, both in terms of policy, infrastructure, and organizational culture. These findings demonstrate that national context significantly influences the role of digital agility in shaping MSME competitive advantage in emerging markets.
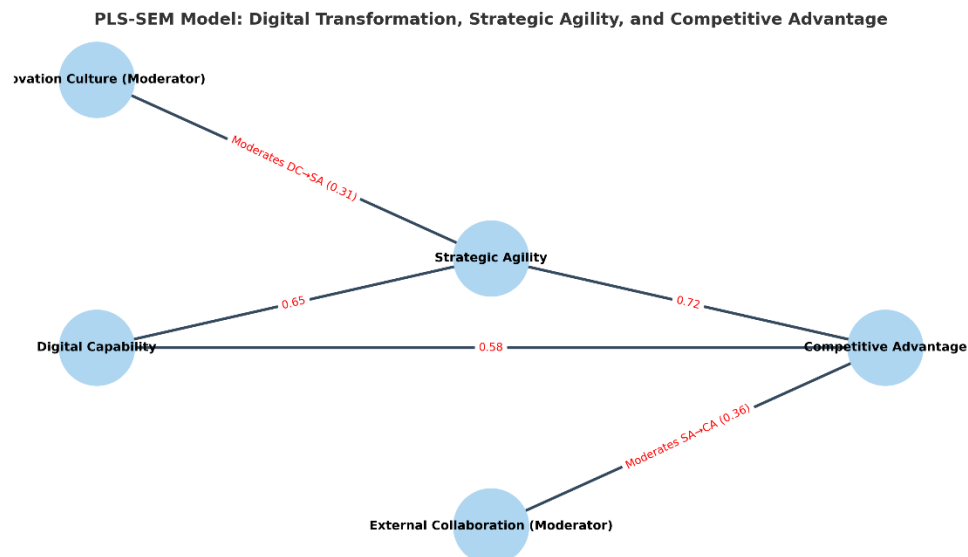

Figure 3. LS-SEM Model of Digital Capability, Strategic Agility, and Competitive Advantage

Table 3. Descriptive Statistics of Constructs

Variable	Mean	Std. Dev.	Min	Max
Digital Capability	4.12	0.58	2.80	5.00
Strategic Agility	4.05	0.64	2.90	5.00
Competitive Advantage	4.20	0.60	3.00	5.00
Innovation Culture	3.98	0.62	2.75	5.00
External Collaboration	3.91	0.59	2.80	5.00

The average score of all constructs is above 3.90, indicating a positive perception among MSME actors towards their companies' digital and strategic aspects. This confirms the findings of Adomako et al. (2022) that adopting digital technology drives efficiency and innovation, even on a small business scale. Moderate variation (standard deviation) reflects the diversity of digital readiness among MSME actors (Akpan et al., 2020).

Table 4. Reliability and Validity Test of Constructs

Construct	Cronbach's Alpha	Composite Reliability	AVE
Digital Capability	0.84	0.88	0.58
Strategic Agility	0.87	0.89	0.61
Competitive Advantage	0.85	0.87	0.60
Innovation Culture	0.81	0.86	0.55
External Collaboration	0.83	0.88	0.57

All Cronbach's Alpha values above 0.80 indicate good internal reliability (Hair et al., 2022). Composite Reliability (CR) > 0.85 strengthens construct stability, and AVE > 0.50 indicates convergent validity. Discriminant validity is confirmed with an HTMT ratio below 0.85 (Henseler et al., 2015).

Table 5. PLS-SEM Estimation Results

Hypothesis	Path	t-Statistic	p-Value
H1	Digital Capability → Strategic Agility	11.42	<0.001
H2	Strategic Agility → Competitive Advantage	13.55	<0.001
H3	Digital Capability → Competitive Advantage	9.87	<0.001
H4	Innovation Culture × Digital Capability → Agility	3.22	0.001
H5	External Collaboration × Agility → Competitive Advantage	3.76	<0.001

All relationships between variables are statistically significant (p < 0.05), indicating the structural strength of the model. The results of H2 ($\beta = 0.72$) serve as a strong indicator that strategic agility mediates the achievement of competitive advantage (Teece et al., 2016). The moderating effects of innovation culture and external collaboration are also significant, supporting the findings of the study by Christofi et al. (2024).

Table 6. Comparison of Variables between Countries

Country	Digital Capability	Strategic Agility	Competitive Advantage
Indonesia	4.20	4.18	4.25
Vietnam	4.10	4.03	4.12
Ghana	3.85	3.96	4.00

Indonesia recorded the highest score across all variables, indicating the success of its post-pandemic digitalization strategy (OECD, 2023). Vietnam follows with government support for digital transformation (Nguyen et al., 2024), while Ghana shows a positive trend despite still facing structural limitations (Amankwah-Amoah et al., 2021).

Table 7. Summary of Qualitative Case Studies

Case ID	Country	Sector	Qualitative Insight
Firm A	Indonesia	Retail	Adopted mobile apps post-COVID, improved market reach.
Firm B	Vietnam	Manufacturing	ERP integration reduced lead time significantly.
Firm C	Vietnam	Services	Cloud platforms enabled remote coordination during crises.
Firm D	Ghana	AgriTech	Community-based tech hubs supported basic digital use.
Firm E	Indonesia	Logistics	AI-based delivery scheduling increased customer retention.

Qualitative findings reinforce quantitative data. Companies adopting digital technology demonstrate a high adaptive capacity to market changes. This result aligns with Van Hoang et al. (2025) and Zhang et al. (2024), who emphasize the importance of digitalization as a strategic element.
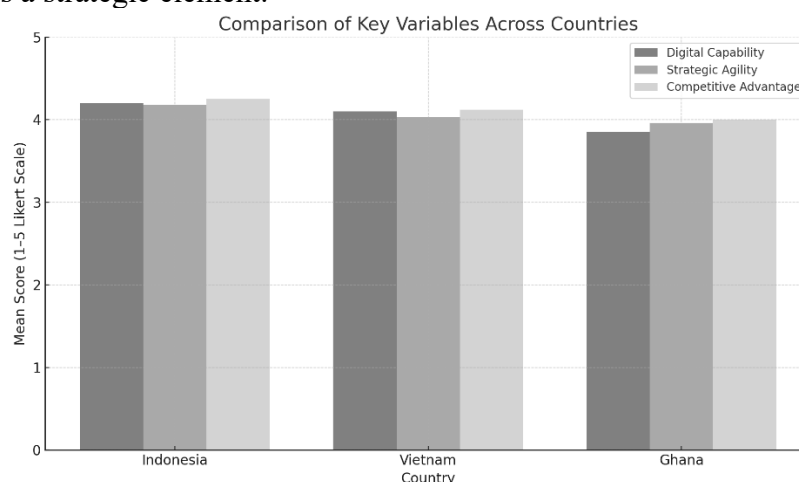

Figure 4. compares average Digital Capability, Strategic Agility, and Competitive Advantage scores between Indonesia, Vietnam, and Ghana. Indonesia shows consistent dominance across all key variables.

This confirms the findings in Table 4 and reflects the success of digital adoption in the national MSME sector. The results of this study consistently show that digital capability is the primary foundation in forming strategic agility and achieving competitive advantage among SMEs operating in emerging market countries. PLS-SEM analysis of 300 MSME actors from Indonesia, Vietnam, and Ghana found that all paths of relationships between constructs were statistically significant and supported by high coefficient strength. These findings reinforce the dynamic capabilities theory (Teece et al., 2016), which states that companies must continuously build, integrate, and configure internal capabilities to respond to environmental changes effectively.

Specifically, digital capabilities not only directly influence competitive advantage (β = 0.58; $p < 0.001$) but also have a significant impact on strategic agility (β = 0.65; $p < 0.001$), which then becomes a key mediator in this relationship (β = 0.72; $p < 0.001$). This indicates that companies capable of actively developing internal digitalization processes will better adapt to rapid market dynamics and ultimately achieve sustainable competitive advantage. These findings reinforce the results of studies by Adomako et al. (2022), Zhang et al. (2024), and Van Hoang et al. (2025), which state that strategically integrated digital transformation accelerates innovation and data-driven decision-making.

Two moderating variables also show an important role. Innovation culture has been proven to strengthen the relationship between digital capabilities and strategic agility (β = 0.31; p = 0.001), indicating that companies with a culture that supports exploration, learning, and experimentation are more likely to succeed in maximizing the impact of digitalization. On the other hand, external collaboration strengthens the relationship between strategic agility and competitive advantage (β = 0.36; p < 0.001), which aligns with the literature from Christofi et al. (2024) and Fang et al. (2024) regarding the importance of cross-institutional networks and synergies in overcoming the resource limitations of SMEs.

3.2   Cross-Country Comparison: Contextual Evidence

Cross-country analysis provides an important contextual dimension in understanding the extent to which digital capabilities and strategic agility contribute to the competitive advantage of SMEs in developing countries. The findings show that Indonesia recorded the highest scores in the three primary constructs: Digital Capability (4.20), Strategic Agility (4.18), and Competitive Advantage (4.25). This indicates a high level of digital readiness, supported by government policies, the expansion of the digital ecosystem post-pandemic, and the maturity of online platform infrastructure (OECD, 2023; Heriyanto et al., 2024).

These findings are consistent with the study by Heriyanto et al. (2024), which shows that ICT capability in Indonesia significantly enhances organizational agility and SME performance. Qualitatively, this is reinforced by the cases of Firm A (retail) and Firm E (logistics), which increased market reach and customer retention by applying technologies such as mobile applications and AI-based scheduling. In this context, digital capabilities serve as enablers and become the core of adaptive and innovative strategies that have proven effective in the field.

Meanwhile, Vietnam ranks second with scores of Digital Capability (4.10), Strategic Agility (4.03), and Competitive Advantage (4.12). This success is closely related to the implementation of national programs such as the National Digital Transformation Program, which encourages the systemic digital transformation of SMEs (Nguyen et al., 2024; Van Hoang et al., 2025). Studies by Van Hoang et al. (2025) and Fang et al. (2024) have proven that digital capabilities and digital-based business model innovations significantly impact the competitiveness of SMEs in Vietnam. Firm B (manufacturing) and Firm C (services) demonstrated this in this study through reduced production time and cloud computing-based coordination efficiency.

Ghana's scores are relatively lower Digital Capability (3.85), Strategic Agility (3.96), and Competitive Advantage (4.00) but still demonstrate a positive trend in digital growth. A study by Adomako et al. (2022) reinforces this finding, that although SMEs in Ghana face significant challenges such as limited infrastructure and technology, they can build advantages through strategic networking and community-based technology adoption. This is reflected in Firm D (AgriTech), which relies on community-based tech hubs to enhance local digital adoption capacity (Akpan et al., 2020).

Thus, the variation in scores between countries reflects the heterogeneity of digital readiness and strategic capacity, but also indicates that digital-based competitive advantages can be achieved through different paths, depending on structural support, public policies, and the internal capacity of organizations. This is in line with Ko et al. (2022) and Troise et al. (2022) that although digital capabilities are an important prerequisite, the role of strategic agility as a key mediator remains crucial in all country contexts.

Theoretically, this study expands the understanding of how digital capabilities shape strategic agility and how the two interact to create competitive advantage in the context of developing countries. This research provides a more holistic and contextually relevant

conceptual framework by considering moderating variables such as innovation culture and external collaboration.

Recent studies have shown that strategic agility not only acts as a passive bridge between digital transformation and competitive advantage, but is a dynamic mediator that continuously evolves through an iterative process of sensing, seizing, and reconfiguring. Ciampi et al. (2021) emphasize that strategic agility emerges from a cycle of adaptation to change, which is strongly influenced by an organization's digital maturity. This creates a feedback loop in which digital transformation drives agility, and conversely, agility strengthens an organization's ability to absorb and implement new digital innovations (Jena et al., 2025). Gong & Ribiere (2021) also emphasize that agility is not only a result of digitalization but also a driver for further strengthening the digital process itself.

Furthermore, this mediating role of agility is further strengthened through learning processes and internal technological capacity building. Gao et al. (2022) demonstrate that IT integration and absorptive capacity are essential foundations for strengthening agility in the SME sector. Research also highlights that agility enables companies to rapidly reconfigure resources in response to changes in the digital market. In this context, the role of moderating variables becomes increasingly important. According to Mikalef et al. (2021), a culture of innovation fosters a work environment that supports experimentation and adaptive learning, enabling more effective internalization of digitalization. Gonzalez-Varona et al. (2024) also found that an organizational culture that supports open knowledge sharing accelerates the integration of agility into corporate strategy. Furthermore, Usai et al. (2022) stated that an innovative culture embedded in organizational routines enhances a company's ability to transform digital investments into agile strategic responses.

Meanwhile, external collaboration is a crucial lever in strengthening the relationship between agility and competitive advantage. Salmerón et al. (2025) asserted that open innovation networks enable SMEs to access external knowledge and develop digital solutions together. Blais & Cloutier (2023) noted that strategic collaboration during the COVID-19 crisis enabled SMEs to accelerate product and service innovation despite resource constraints. On the other hand, Urresta-Vargas et al. (2023) added that trusting behavior within external networks can suppress knowledge hiding practices that can hinder agility.

From a cross-national context, Van Hoang et al.'s (2025) research in Vietnam shows that a government-led digitalization strategy was able to build infrastructure that supports agility through e-commerce and cloud-based systems. Meanwhile, in Ghana, despite facing structural limitations, community-based technology initiatives have helped SMEs build adaptive digital practices (Amankwah-Amoah et al., 2021). This suggests that the feedback loop dynamics between digitalization and strategic agility are strongly influenced by local institutional and sociocultural readiness.

The strategic implications of these findings are profound. Warner & Wäger (2023) suggest that agility should be positioned as a core mechanism in digital-based strategic renewal processes, not merely as a fleeting operational advantage. Khan et al. (2023) supports this by showing that agile organizations have a greater capacity to transform digital capabilities into superior innovative performance. A study by Frontiers (2025) also emphasized that organizational culture and transformative leadership play a crucial role in strengthening this transformation cycle. Teece M.; Leih, S., 2016 concluded that when agility is integrated within a dynamic capabilities framework, it serves as an engine of continuous digital evolution that can enable SMEs to survive and thrive in complex and rapidly changing market conditions.

From a practical standpoint, these findings recommend that SMEs adopt technology and implement a comprehensive strategic integration. This includes organizational culture

transformation, human resource training, and strengthening collaborative networks. The government is also expected to strengthen digital infrastructure and provide policy incentives that systematically encourage the digitalization of the SME sector.

4. Conclusion

This study offers critical insights into how digital transformation serves as a key driver of strategic agility and competitive advantage in SMEs operating within emerging markets. By employing a mixed-methods approach across Indonesia, Vietnam, and Ghana, the study confirms that digital capabilities significantly influence both strategic agility and competitive performance. The statistical evidence derived from PLS-SEM analysis reveals that digital capability not only has a direct impact on competitive advantage but also operates indirectly through strategic agility. Moreover, innovation culture and external collaboration act as significant moderating variables, enhancing the agility-advantage linkage and strengthening organizational adaptability. These findings reinforce the relevance of Dynamic Capabilities Theory (Teece et al., 2016) in explaining how firms in turbulent environments can leverage internal digital resources and external networks to dynamically reconfigure strategies. The comparative analysis across three countries adds a cross-cultural dimension, highlighting that while Indonesia leads in digital readiness and agility, Vietnam demonstrates policy-led advancement, and Ghana, although constrained, is emerging through community-based innovations. This suggests that digital transformation is not a uniform pathway but contextually mediated.

Implications for Practice

For business practitioners and policymakers, the study underscores the need to treat digital transformation not merely as a technical upgrade but as a strategic imperative. SMEs must align digital investments with organizational culture and collaborative ecosystems to realize full strategic benefits. Practitioners should foster a culture of innovation that supports experimentation and rapid adaptation. Governments, particularly in emerging economies, should provide structural support such as digital infrastructure, financial incentives, and SME training programs to amplify the impact of digital transformation initiatives. The integration of internal agility and external collaboration offers a blueprint for sustainable growth and resilience, especially in volatile market conditions.

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