

Environmental Dynamism, Digitalization, and Digital Capability: Explaining Small Firms Performance in Ecuador

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Abstract

Despite growing interest in digital transformation among small and medium-sized enterprises, understanding how they use digital technologies to enhance competitiveness, particularly in emerging markets, is still limited. Grounded in the resource-based view, resource orchestration theory, and digital transformation literature, this study explores how environmental dynamism influences firm performance, focusing on the mediating role of digitalization and digital capability in Ecuadorian companies. To test our hypotheses, we used structural equation modeling with survey data from 109 managers. Our findings indicate that digitalization and digital capability mediate the relationship between environmental dynamism and performance, emphasizing the need to integrate technological and managerial dimensions to face digital transformation. This topic is relevant because small firms face greater challenges for technological adoption.

Keywords: environmental dynamism; digitalization; digital capability; small and medium-sized enterprises.

Dinamismo ambiental, digitalización y capacidad digital: explicación del desempeño de las pequeñas empresas en Ecuador

Resumen

A pesar del creciente interés en la transformación digital entre las pequeñas y medianas empresas, aún no se entiende bien cómo utilizan las tecnologías digitales para mejorar la competitividad, particularmente en los mercados emergentes. Desde el punto de vista de los recursos, la teoría de la orquestación de recursos y la literatura sobre transformación digital, este estudio explora cómo el dinamismo ambiental influye en el desempeño de las empresas, centrándose en el papel mediador de la digitalización y la capacidad digital en las empresas ecuatorianas. Para probar nuestras hipótesis, utilizamos el modelado de ecuaciones estructurales con datos de encuestas de 109 gerentes. Nuestros hallazgos indican que la digitalización y la capacidad digital median la relación entre el dinamismo ambiental y el desempeño y enfatizan la necesidad de integrar las dimensiones tecnológicas y de gestión para enfrentar la transformación digital. Este tema es relevante porque las pequeñas empresas enfrentan mayores desafíos para la adopción tecnológica.

Palabras clave: dinamismo del entorno; digitalización; capacidad digital; pequeñas y medianas empresas.

Dinamismo ambiental, digitalização e capacidade digital: explicação do desempenho das pequenas empresas no Equador

Resumo

Apesar do crescente interesse na transformação digital entre as pequenas e médias empresas, ainda não se compreende bem como elas utilizam as tecnologias digitais para melhorar a competitividade, particularmente nos mercados emergentes. Do ponto de vista dos recursos, da teoria da orquestração de recursos e da literatura sobre transformação digital, este estudo explora como o dinamismo ambiental influencia o desempenho das empresas, com foco no papel mediador da digitalização e da capacidade digital nas empresas equatorianas. Para testar nossas hipóteses, utilizamos a modelagem de equações estruturais com dados de pesquisas realizadas com 109 gerentes. Nossas descobertas indicam que a digitalização e a capacidade digital mediam a relação entre o dinamismo ambiental e o desempenho e enfatizam a necessidade de integrar as dimensões tecnológicas e de gestão para enfrentar a transformação digital. Este tema é relevante porque as pequenas empresas enfrentam maiores desafios para a adoção tecnológica.

Palavras-chave: dinamismo do ambiente; digitalização; capacidade digital; pequenas e médias empresas.

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1. Introduction

The recent proliferation of digital technologies across various organizational contexts has offered a new opportunity to assess how firms maintain competitiveness in dynamic environments (Rodríguez-Peña, 2023). While there is evidence that investing in digital technologies can have a positive effect on firm performance (Leão & da Silva, 2021), its success is contingent upon several factors, including strategic alignment, organizational capabilities, cultural adaptability, and the effective integration of digital technologies into core business processes (Loonam et al., 2018). Accordingly, many firms struggle to grasp what a successful investment in digital technologies really entails; therefore, they fail to adapt to this dynamic environment (Browder et al., 2024).

Despite the difficulties large companies encounter in adopting digital technologies (Carroll et al., 2023), their size can provide them with a competitive edge for implementing these innovations (Oduro et al., 2023). However, this is not the case for small and medium-sized enterprises (SMEs) because they often grapple with limitations in financial capital (Rao et al., 2021), human capital (Owalla et al., 2022), and capabilities required to scale their business models (Galli-Debicella, 2021). Despite growing interest in digital transformation among SMEs (Dörr et al., 2023), our understanding of how they leverage digital technologies for competitiveness remains fragmented and limited (Hanelt et al., 2021). Given the pivotal role of SMEs in driving industrial and national development (Garzoni et al., 2020), and their heightened challenges compared to larger corporations, it is imperative to understand the digital factors that bridge a higher environmental dynamism and firm performance for SMEs.

Additionally, Oduro et al. (2023) highlight the nuanced impact of digital technology investment on firm performance across countries. They observe that these effects are more pronounced in emerging economies, particularly those in the early stages of digital adoption. In such contexts, companies are often more receptive to digital innovation, operational efficiency, and flexibility because their need to adopt them is stronger than in developed economies. Ecuador, as a rapidly digitalizing emerging economy, presents an intriguing context for examining the mediating role of digital factors between environmental dynamism and SMEs performance, since it has demonstrated significant progress in digital adoption, outpacing many of its South American counterparts (World Bank, 2024).

This research aims at exploring and clarifying the relationship between environmental dynamism and firm performance, specifically focusing on the role of digitalization and digital capability within Ecuadorian SMEs. The study seeks to determine whether and how a company's ability to adapt to a dynamic environment through digitalization and digital capability serves as mediating factors that influence firm performance. Understanding this is essential because it addresses the limited knowledge of digital transformation success among SMEs in emerging markets. The need for flexibility and operational efficiency is particularly acute in this context.

We draw on the resource-based view (RBV) of the firm (Wernerfelt, 1984), the resource orchestration theory (Barney et al., 2011), and literature on digital transformation (Kraus et al., 2021) to evaluate how digitalization and digital capability mediate between environmental dynamism and firm performance for Ecuadorian SMEs. Digitalization is the process of incorporating digital technologies, such as computer systems and software applications, into various business processes (Verhoef et al., 2021). Furthermore, Zhou & Wu (2010: 552) define technological capability as "a firm's ability to use various technologies." In this study, digital capacity is also defined like that.

To test our research model, we used Structural Equation Modeling (SmartPLS). It examines complex relationships and tests direct and mediation effects and provides robust statistical validation (Mangindaan, 2022). From a theoretical perspective, while previous research has often isolated the role of technology (for example, Rakshit & Jeyaraj, 2023) or organizational factors (for example, Scuotto et al., 2021) on SMEs' digital transformation success, this paper highlights the importance of a balanced approach considering technological and managerial dimensions simultaneously. From a managerial perspective, this nuanced understanding contributes to the existing body of knowledge by providing a more comprehensive and actionable framework for SMEs to navigate the complexities of digital transformation. Specifically, SMEs should prioritize investment in innovative digital tools and systems to provide the infrastructure for innovation (i.e., digitalization) to enhance their chances of a successful digital transformation. However, they must keep in mind that developing digital literacy and strategic thinking skills among their managers (i.e., digital capability) unlocks the true potential of this transformation.

Furthermore, our mediation model aligns with a growing body of research on the impact of technology adoption on SMEs performance in Latin America. For instance, studies show that absorptive capacity (Cuevas-Vargas et al., 2022) and frugal innovation (Cuevas-Vargas et al., 2022) mediate the relationship between technology adoption and performance in Colombian SMEs. Similar results were found in Perú, where human resource management practices mediate the relationship (Espina-Romero et al., 2024); and in Brazil, where significant implementation barriers reduce the effect of digital transformation on performance (Cassaro et al., 2024). Our study extends this line of research by emphasizing that technological investment alone is insufficient to achieve a meaningful digital transformation. By contrasting Ecuadorian data with these regional findings, we advance the Latin American conversation on how SMEs in developing countries successfully leverage digital transformation for competitive advantage.

The paper is structured as follows. In section 2 we discuss the concepts of the proposed constructs drawing upon extant literature and propose hypotheses representing the relationship between environmental dynamism, digitalization, digital capability, and firm performance. Section 3 explains how we tested our hypotheses with a structural modeling analysis, using data collected from

managers in 109 SMEs in Ecuador. Finally, we present our results, discuss our findings and limitations, and provide suggestions for future research.

2. Theoretical framework

2.1 Digitalization and digital capability

Digital transformation is “a process wherein organizations respond to changes taking place in their environment by using digital technologies to alter their value creation processes” (Vial, 2019: 32). In this study, we focus on two constructs that capture distinct yet complementary dimensions of digital transformation: digitalization, the portfolio of digital resources that firms adopt; and digital capability, the managerial capacity to mobilize these resources, as we elaborate below. Together, these constructs represent the technological and managerial dimensions of digital transformation, illustrating how firms not only adopt digital tools but also develop the competencies required to extract value from them.

The RBV suggests that a company's performance stems from its proprietary resources, which enable it to exploit or neutralize environmental challenges (Barney, 1991). Resource orchestration extends the RBV theory, suggesting that the way resources are deployed is no less significant than resources themselves (Barney et al., 2011). Performance is not solely a matter of having the right resources; it requires specific managerial actions to maximize their impact (Sirmon et al., 2007).

Based on these theories, ultimately securing performance resulting from adaptation to environmental challenges hinges on the alignment among resources and decisions about them (Björkdahl, 2020). We propose that digitalization measures the portfolio of resources that companies built to face a high level of environmental dynamism brought about by digital technologies.

Digitalization is the process of altering a company's resource portfolio by integrating advanced digital systems and software applications, such as e-commerce, the Internet of Things (IoT), and artificial intelligence (Verhoef et al., 2021). This transformation gives rise to digital capability, which is the firm's ability to effectively use these digital resources. Resource orchestration theory emphasizes that managers must succeed at resource mobilization. It involves organizing resources to achieve specific strategic goals. Therefore, a core managerial obstacle lies in understanding how to leverage these new digital resources (Miao et al., 2017). Following Zhai et al. (2022)—who argue that managers should mobilize digital technologies to reduce costs, introduce new products or processes, or improve operational efficiency—we posit that the true measure of a developed digital capability is the successful achievement of these outcomes. Consequently, to effectively respond to environmental dynamism, only companies that can demonstrate achieving these efficiencies and innovations have fully developed their digital capability.

An example may illustrate how digitalization and digital capability must work together. A retail company that does not

have an online store is missing out on a significant portion of the market. However, simply having a website is not enough; the company must also be able to use it effectively. This includes ensuring the website is user-friendly, secure, and able to efficiently process orders. Additionally, the company must take advantage of digital marketing to reach its target audience and analyze customer data to make informed business decisions. We argue that the combination of digitalization, i.e., investment in digital resources, and digital capability and the ability to use this technology effectively positively impact firm performance.

2.2 Environmental dynamism and SMEs firm performance

Environmental dynamism refers to the degree of instability, unpredictability, and rate of change in an organization's external environment (Dess & Beard, 1984). This construct represents the external context rather than internal managerial actions. It provides the environmental boundary conditions that motivate firms to develop digital resources and capabilities.

As environmental dynamism increases, so does the pressure on companies to remain competitive. SMEs in emerging markets have demonstrated resilience in hostile external environments by leveraging their creativity and flexibility to mobilize resources and products (Smallbone & Welter, 2001). In fact, SMEs are often better positioned to capitalize on the volatility introduced by new market players in a dynamic environment (Mickiewicz & Olarewaju, 2020).

Emerging markets are characterized by institutional voids, a lack of established institutions to promote and support market functions (Mair et al., 2012). These institutional voids can increase SMEs' operational costs and hinder their performance (Moro et al., 2017). However, Mickiewicz and Olarewaju (2020) argue that SMEs from developing economies can mitigate these challenges by forging new trust-based relationships. When market conditions change, SME managers can rapidly replace traditional market mechanisms with trust-based interactions (Mickiewicz and Olarewaju, 2020). The greater the number of trust-based relationships an SME can establish, the higher its potential performance (Gaur et al., 2011). Therefore, we posit:

H1: Environmental dynamism has a significant positive impact on the performance of Ecuadorian SMEs

2.3 Environmental dynamism, digitalization, and firm performance

Substantial evidence suggests that digitalization positively influences firm performance across various contexts. Yang and Yee (2022) discovered that it transformed operational processes, leading to enhanced performance. Similarly, Hossain and Sultana (2024) conducted a cross-country panel analysis of high- and low-digitalized global companies, finding that digitalized firms consistently outperformed non-digitalized firms. In line with these

findings, Ribeiro-Navarrete et al. (2021) examined the digitalization of knowledge-intensive business services, demonstrating that digitalizing strategic corporate processes can improve company performance. Finally, a meta-analysis of 109 published studies by Oduro et al. (2023) revealed a moderate but positive impact of digital technologies on firm performance.

Similar findings have emerged in SMEs. Compared to larger firms, SMEs may have a more urgent need to adopt innovative technologies to address challenges associated with their size (Etienne et al., 2023), better meet customer expectations (Nguyen, 2009), or leverage their greater strategic flexibility (Miroshnychenko et al., 2021). Indeed, research suggests that the positive correlation between digitalization and firm performance is more pronounced in smaller firms (Oduro et al., 2023).

Scholars have observed comparable outcomes when examining specific technologies. For instance, studies have shown that adopting social media (Chatterjee & Kumar, 2020), data analytics (Ferraris et al., 2019), blockchain technologies (Rakshit & Jeyaraj, 2023), or the Internet of Things (Wasimet al., 2022) can enhance SMEs performance. However, this approach to understanding the relationship between digitalization and SMEs performance may be incomplete since organizations often combine multiple digital technologies rather than relying on a single approach during digital transformation. The more sophisticated this combination of technologies, the more sophisticated their resource bundle becomes, increasing their chances of survival and improving firm performance (Verhoef et al., 2021).

For example, to enhance its operations and customer experience, a small retail store may try to successfully integrate various digital technologies, such as an e-commerce platform, a mobile app, a Customer Relationship Management (CRM) system, and social media marketing. Digitalization cannot be understood through a single technology because companies combine some of them to better exploit their advantages.

Finally, Oduro et al. (2023) demonstrate that the relationship between digitalization and firm performance is stronger for emerging economies, such as Ecuador, than for advanced economies. They suggest that developed countries have relatively mature enterprises, with less room for more development. However, most emerging countries are at the initial phase of digitalization, with a greater need for operational efficiency and flexibility.

Therefore, we posit:

H2: Digitalization mediates the effect of environmental dynamism on Ecuadorian SMEs performance.

2.4 Environmental dynamism, digital capability, and firm performance

Managers mobilize digital technologies to reduce costs, introduce new products or processes, or improve operational efficiency (Zhai et al., 2022). An effective mobilization of these resources is what we call digital capability. It is not common; however, it highlights managerial wisdom, and separates effective from ineffective digitalization (Björkdahl, 2020).

For example, organizations using digital technologies to provide remote support and enhance customer experience need not only the appropriate tools (e.g., videoconferencing software, mobile apps, augmented reality technology) but should also have the ability to mobilize these resources to meet customer expectations through the appropriate channels. These channels may include a real person working remotely, who provides remote service and is available for immediate attention via videoconferencing or mobile apps, or a chatbot powered by artificial intelligence (Parise et al., 2016). Choosing how to respond to different customers is a managerial decision that can enhance or hinder the impact of digital technologies on firm performance (Holmlund et al., 2020).

In this sense, there is evidence that SMEs showing digital capability improve their performance. For example, Saridakis et al. (2018) find that investments in E-commerce technology do not increase SMEs performance equally. They suggest that larger cost savings on marketing and advertising are achieved when managerial decisions are made to match the information intensity in their industries with the appropriate E-commerce technology. Similarly, according to Muntinga et al. (2011), SMEs using Facebook reduce their costs associated with advertisement, promotions, and campaigns when corporate brand profiles are managed to encourage customers to creating content and share information with others.

Scholars also find that investing in digital technologies is not enough to improve SMEs' innovation performance (Dörr et al., 2023). Only organizations that have made managerial decisions to correctly deploy these technologies improve their capacity to innovate, introduce new products, and improve performance. Examples include decisions to use social media technologies to absorb external information from competitors instead of from customers (Pérez-González et al., 2017), policies aimed at integrating new tasks and routines derived from digital investments into the current organizational culture and processes (Ardito et al., 2021), or decisions to integrate various digital technologies to serve the same market need instead of focusing on only one (Hassan et al., 2024). Therefore, we posit:

H3: Digital capability mediates the relationship between environmental dynamism and performance of Ecuadorian SMEs.

2.5 Digitalization, digital capability, and firm performance

The final relationship in our model links digitalization and digital capability. According to [Herhausen et al. \(2020\)](#), to comprehend how companies react to the pressures created by digital technologies, it is crucial to understand how digital resources and the ability to execute specific tasks and processes with them are interconnected.

[Sirmon and Hitt \(2009\)](#) discovered that firms achieve optimal performance by aligning their resource investment and deployment strategies, rather than solely focusing on maximizing one or the other. Furthermore, firms that update and enhance their resource base more frequently and efficiently have a better performance ([Stadler et al., 2013](#)). The competitive value of these decisions lies in companies resource configuration ([Eisenhardt & Martin, 2000](#)). As such, resources and capabilities are highly interrelated, suggesting that digital capability and digitalization are as well. Consequently,

H4: Digitalization mediates the relationship between digital capability and the performance of Ecuadorian SMEs.

H5: Digitalization and digital capability together mediate the impact of environmental dynamism on the performance of Ecuadorian SMEs.

3. Methods

3.1 Setting and data collection

The study targeted recent graduates of one of the researcher's affiliated university, focusing on the past five cohorts of MBA graduates and two preceding cohorts of undergraduate business students. A questionnaire facilitated the assessment of participants' comprehension of their organizations' digital practices and actual implementation thereof. The sampled companies, spanning 16 industries encompassing manufacturing and services sectors, provided a diverse representation of economic activities and environmental dynamism, thus broadening the scope of the study.

To develop the questionnaire, in-depth interviews were conducted with SME executives who have successfully implemented digital transformation initiatives in the country. Participants provided insights into digital capability, suitable digital technologies for their organizational context, and expected transformation outcomes. Following a comprehensive literature review, necessary modifications were made. A second iteration was reviewed by an expert with extensive experience in digital technology implementation within the financial sector for clarity and precision, along with an academic from the researcher's institution. A pilot study with MBA students assessed instrument reliability before final use, following established guidelines to ensure validity and reliability ([Lambert & Newman, 2023](#)).

The survey was distributed via personalized email invitations, ensuring respondent privacy by not collecting identifiable information. One hundred and nine out of the 423 individuals invited provided valid responses, yielding a 26% response rate. Companies reported average annual

sales of USD 18.9 million and an average workforce of 126 full-time employees, thus highlighting the dataset's substantive nature. Respondents had an average tenure of nine years at their company (see [Table 1](#) for a data profile).

3.2 Measures

We prioritized the use of pre-existing measures with established psychometric properties. While certain adjustments were made to align them with the study's specific context, we also developed novel measures for constructs lacking suitable existing instruments (see [Appendix A](#), for item details). All measurement items were anchored on a five-point Likert scale ranging from "very weak/strongly disagree" to "very strong/strongly agree."

Environmental dynamism. We used and adapted the environmental dynamism construct developed by [Lee et al. \(2015\)](#). This four-items scale captured the rate and unpredictability of change in a firm's external environment.

Digital capability. Drawing upon the work of [Zhou and Wu \(2010\)](#), we developed a new scale for digital capability. While the original scale focused on technological capability, we change it to reflect the demands associated with a digital environment. Digital transformation researchers have found that the expected results of these efforts are cost reduction, operational efficiency, and innovation in products, services and processes ([Zhai et al., 2022](#)). The resultant four-items scale assesses the firm's digital capability.

Digitalization. This is a new scale. Its theoretical domain was derived from the digital transformation literature ([Kraus et al., 2021](#)). The resulting eight-item scale captured the level of companies' digitalization.

Firm Performance. While there is consensus on the imperative need to assess the outcomes of digital solutions, methodologies for evaluation and measurement remain subjects of debate due to their inherent complexities ([Pfister & Lehman, 2023](#)). Moreover, identifying optimal measures for a firm's performance is inherently problematic, akin to obtaining other sensitive data. The potential competitive implications of disclosing such information as profitability and ROI often lead to respondent reluctance. To circumvent this issue, we employed an indirect data collection approach. Rather than requesting direct reports of objective performance measures, respondents were asked to compare their firm's performance to competitors in areas like product development, profitability, innovation, competitive response, and digital readiness. This indirect method aligns with prior strategy research (e.g., [Tippins & Sohi, 2003](#)) that encountered similar challenges with financial data.

Additionally, given the dynamic nature of digital transformation ([Vial, 2019](#)), a broader performance evaluation is essential, emphasizing innovation, profitability, and proactive market response ([Zhai et al., 2022](#)). Our five-item scale assesses firm performance in relation to these digital transformation dimensions.

Control variables. We also used two demographic variables: annual income and number of employees. These were used as control variables in the PLS analysis.

Table 1. Data Profile

Gender		Numer of employees (median)	51-250 workers
Male	68%	Annual Income (median)	2-10 USD million
Female	32%	Company owned by	
Age (median)	25-34 years	National	73%
Experience (median)	6-10 years	Foreign	27%
Education		Main Activity	
Graduate	45%	B2B	26%
Undergraduate	55%	B2C	24%
Position		Both	50%
General Manager / CEO	18%	Business Nature	
Marketing Director	11%	Finance and Insurance	17%
Finance Director	6%	Manufacturing	13%
Sales Director	6%	Health	10%
Other Area Director	59%	Retail	8%
IT, Communication, R&D, Production, Innovation, Customer Experience.		Other	51%
		Education, Hospitality, Communication, Technology, Construction, Petroleum and Gas, Personal Services.	
Knowledge about the digital practices' implementation of the company		Has implemented digital practices	
Moderate to a very greater extent	80%	Yes	91%
Very lesser to lesser extent	20%	No	9%

Source: own elaboration

4. Results

4.1 Assessment of the measurement model

To rigorously assess the reliability and validity of the measurement model, we applied SmartPLS to follow established methodological frameworks (Chanda et al., 2025). Our analysis confirmed robust internal consistency and reliability, as evidenced by Cronbach's alpha and composite reliability scores. We verified indicator reliability through outer loadings and established both convergent validity (via AVE) and discriminant validity (using HTMT and Fornell-Larcker criteria) across all latent constructs (Hair et al., 2014). Appendix A details Cronbach's alpha values for each latent construct, ranging from 0.72 to 0.94, composite reliability (ρ_a) values from 0.73 to 0.94, and composite reliability (ρ_c) values between 0.82 and 0.95. AVE values across constructs ranged from 0.54 to 0.81, thereby proving the constructs' internal reliability within the research framework.

To mitigate common method bias, a prevalent issue in survey-based research, we employed dual validation strategies. Harman's single-factor test demonstrated that no single factor accounted for more than 50% of the variance (Podsakoff et al., 2003). Additionally, VIF collinearity values for all factors remained within acceptable limits; therefore, common method bias did not compromise the model's integrity. We established discriminant validity by applying the HTMT ratio, a rigorously endorsed metric in the literature (Chanda et al., 2025), alongside the Fornell-Larcker criterion. Table 2 demonstrates that each construct's HTMT values remain below the 0.90 threshold, showing adherence to the HTMT criteria. The Fornell-Larcker criterion requires that the square root of each

construct's AVE surpasses the construct's correlations with other constructs (Fornell & Larcker, 1981).

Table 3 verifies compliance with this criterion across all constructs, evidencing that each construct has greater shared variance with its indicators than with those of alternative constructs.

4.2 Assessment of the structural model in PLS-SEM

We evaluated the explained variance and path coefficients of the endogenous constructs and the hypothesized relationship via adjusted R^2 , beta coefficients, and p-values metric (Gil-Cordero et al., 2024). Adjusted R^2 for firm performance stands at 0.61 (see Figure 1), thus denoting substantial model robustness and evidencing that the model accounts for over 60% of the variance in firm performance—an impressive outcome for a parsimonious structural model (Gil-Cordero et al., 2024).

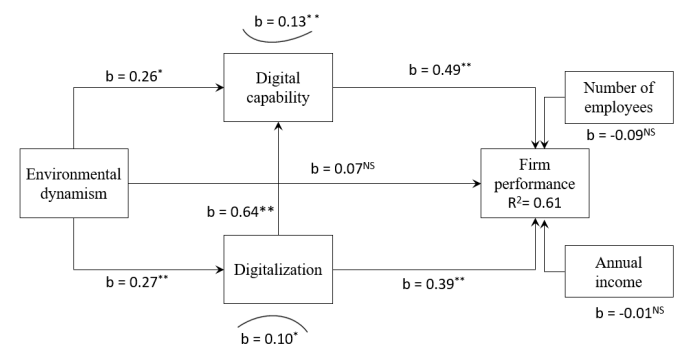


Figure 1. Research model with beta coefficients and significance.
Source: own elaboration.

Table 2. Discriminant validity (Heterotrait-monotrait ratio – HTMT)

	Digital Capability	Digitalization	Environmental Dynamism	Firm Performance
Digital capability				
Digitalization	0,82			
Environmental Dynamism	0,55	0,33		
Firm Performance	0,87	0,77	0,42	

Source: own elaboration.

Table 3. Discriminant validity (Fornell-Larcker criterion)

	Digital Capability	Digitalization	Environmental Dynamism	Firm Performance
Digital capability	0,80			
Digitalization	0,71	0,74		
Environmental Dynamism	0,44	0,26	0,74	
Firm Performance	0,77	0,71	0,36	0,90

Source: own elaboration.

Path coefficients, as displayed in Table 4, were derived through bootstrapping procedures with 5,000 resamples to enhance reliability (Hair Jr et al., 2014). Findings in Table 4 show that digital capability and digitalization exert a direct and statistically significant influence on firm performance.

Table 4. Path coefficients and p-values for direct relationships.

Relationships	Path coefficient (B)	P values
Digital capability -> Firm performance	0,49	0,00
Digitalization -> Digital capability	0,64	0,00
Digitalization -> Firm performance	0,39	0,00
Environmental dynamism -> Digital capability	0,26	0,00
Environmental dynamism -> Digitalization	0,27	0,00
Environmental dynamism -> Firm performance	0,07	0,30
Income -> Firm performance	-0,01	0,93
Employee -> Firm performance	-0,09	0,25

Source: own elaboration.

Contrary to H1, data did not reveal a statistically significant relationship between environmental dynamism and firm performance ($\beta = 0.07$, $p = 0.30$); therefore, there is no empirical support for Hypothesis 1. This outcome implies a more nuanced relationship where environmental dynamism's influence on firm performance is likely mediated by intervening variables. Thus, we suggest including mediators, as demonstrated by the findings of subsequent hypotheses (H2 to H5), to capture these indirect effects.

I presents specific indirect effects (mediating effects) and their statistical significance, as indicated by confidence intervals and p-values. The analysis reveals that the impact of environmental dynamism on firm performance is mediated by digitalization ($\beta = 0.10$, $p < 0.05$) and digital capability ($\beta = 0.13$, $p < 0.05$). Therefore, Hypotheses 2 and 3 are confirmed. Moreover, findings indicate that digital capability serves as a mediator in the relationship between digitalization and firm performance ($\beta = 0.32$, $p < 0.05$). Lastly, digitalization and digital capability function as joint

mediators in the pathway from environmental dynamism to firm performance ($\beta = 0.08$, $p < 0.05$), thus proving the statistical significance of Hypothesis 5.

Table 5. Specific indirect effects with path coefficients, p-values, and bias-corrected confidence intervals.

Relationship	B	Confidence interval		P-values	Supported
		2,5%	97,5%		
Environmental dynamism -> Digitalization -> Firm performance (H2)	0,10	0,03	0,22	0,02	Yes
Environmental dynamism -> Digital capability -> Firm performance (H3)	0,13	0,05	0,22	0,00	Yes
Digitalization -> Digital capability -> Firm performance (H4)	0,32	0,18	0,45	0,00	Yes
Environmental dynamism -> Digitalization -> Digital capability -> Firm performance (H5)	0,08	0,03	0,16	0,01	Yes

Source: own elaboration.

4.3 PLSpredict

We applied PLSpredict to evaluate the predictive relevance of our model using a 10-fold cross-validation approach (Shmueli et al., 2019) to generate case-level predictions at item and construct levels. According to Shmueli et al. (2019), a model demonstrates strong predictive power when RMSE differences between PLS and linear models (LM) are minimal. High RMSE values for all PLS items relative to LM indicate poor predictive power, while higher RMSE for LM suggests moderate predictive relevance. In this study, as shown in Table 6, most PLS RMSE values were higher than LM, evidencing strong predictive accuracy for the model (Chanda et al., 2025).

Table 6. Results of predictive power assessment using PLSpredict

Item	Q2 predict	RMSE	
		PLS	LM
Firm performance1	0,13	1,06	1,09
Firm performance2	0,13	1,04	1,06
Firm performance3	0,05	1,17	1,21
Firm performance4	0,05	1,12	1,15
Firm performance5	0,02	1,23	1,26

Source: own elaboration.

5. Conclusions

This study was motivated by the limited research on how digital factors influence the relationship between increased environmental change and firm performance, specifically within the context of rapidly evolving and resource-constrained environments in emerging economies like Ecuador. Our findings offer novel insights into the critical role of digitalization and digital capabilities in enhancing the performance of small and medium-sized companies. Furthermore, they underscore the synergistic relationship between these two factors as key drivers of improved performance.

Prior research indicates that investing in digital technologies can positively impact large firms' performance, particularly in terms of innovation, efficiency, and cost reduction (Leão & da Silva, 2021). However, empirical evidence regarding the influence of digital technologies on Small and Medium-Sized Enterprises performance remains limited and fragmented (Hanelt et al., 2021). Indeed, these effects may be more pronounced in emerging economies because they need more flexibility compared to developed economies (Oduro et al., 2023).

Therefore, based on our literature review, we sought to identify the mechanisms that enable Small and Medium-Sized Enterprises to effectively respond to dynamic environmental changes and to explain resulting performance disparities. Our findings demonstrate that digitalization and digital capabilities mediate the impact of environmental dynamism on the performance of Ecuadorian small companies. Specifically, companies whose managers possess the acumen to effectively leverage the organization's portfolio of digital resources are better positioned to thrive in dynamic environments.

Consequently, our study emphasizes the importance of simultaneously considering both resource endowments and managerial decision-making processes to ensure successful digital transformation. By testing the roles of both digitalization (technology) and digital capability (managerial wisdom), this research moves beyond isolated views to offer a comprehensive, actionable framework for navigating the complexities of digital change.

5.1 Theoretical contributions

Our study put forward three contributions. First, our study contributes to the digital transformation literature (Verhoef et al., 2021), as we suggest that digitalization

and digital capability mediate the impact of environmental dynamism on Small and Medium-Sized Enterprises' performance. Digital transformation carries inherent risks and may not guarantee successful results (Vial, 2019). To remain competitive, companies need to actively search for the latest technological developments. This requires building and maintaining effective mechanisms, which can be resource intensive. However, building a strong portfolio of digital resources may not be enough: companies must understand ways in which they can leverage these resources to improve performance.

Second, we contribute to research on digitalization and firm performance (Björkdahl, 2020). Building upon Björkdahl's (2020) findings, which suggest that firms' ability to effectively orchestrate and exploit digital resources influences their capacity to benefit from digitalization, we demonstrate a robust positive relationship between digitalization and performance when considering the interplay between digitalization and digital capability. However, our findings diverge from those of Sánchez-Riofrío et al. (2022), who observed that many Latin American firms fail to realize the potential benefits of digitalization, even experiencing negative performance outcomes, due to slow responses to digital changes. We posit that the relationship between digitalization and performance is more nuanced, requiring a comprehensive perspective that incorporates both environmental dynamism and managerial decisions regarding the strategic deployment of digital resources, as reflected in our proposed model.

Third, our study resonates with regional studies that stress the importance of mediation to understand the adoption of technologies and performance. Placing these findings within the broader Latin American context strengthens the comparative relevance of this study and highlights how shared institutional and resource constraints shape the mechanisms linking digitalization, digital capability, and performance across emerging economies. For instance, it has been shown that absorptive capacity (Cuevas-Vargas et al., 2022) and frugal innovation (Cuevas-Vargas et al., 2022) mediate the relationship between technology adoption and performance in Colombian SMEs. Similarly, in Peru, Espina-Romero et al. (2024) find that digital competencies strongly determine digital transformation outcomes in small and medium companies, which supports our focus on managerial capability as a mediator. Finally, Cassaro et al. (2024) report that while digital transformation positively affects innovation in Small and Medium-Sized Brazilian Enterprises, significant implementation barriers reduce the effect, which aligns with our result that digital capability moderates the relationship between digitalization and performance.

These findings echo our argument that technological investment alone is insufficient: managerial capabilities determine how digital resources are mobilized to achieve performance outcomes. By comparing our results from Ecuador with regional studies, we contribute to a growing Latin American dialogue on how SMEs in emerging economies convert digital transformation efforts into competitive advantage.

5.2 Managerial contributions

This study offers two managerial implications for decision-makers in Small and Medium-Sized Enterprises. First, it underscores the critical role of managerial digital literacy. A key challenge in digital transformation stems from the pervasiveness of digital technology, which can obscure effective leverage points. Identifying these points requires a robust understanding of digital technology's potential. Managers must comprehend how digital tools can advance organizational objectives; consequently, foundational digital literacy is essential.

Second, the integrated framework presented here—incorporating environmental dynamism, digitalization, and digital capability—provides a more holistic and actionable approach for Small and Medium-Sized Enterprises navigating the complexities of digital transformation. Specifically, small firms should prioritize cultivating digital literacy and strategic thinking among their management teams to maximize the likelihood of successful digital transformation. While advanced digital tools and systems establish the infrastructural foundation for innovation, their true value is realized through strategic managerial decisions that effectively use their capabilities. Conversely, even managers possessing exceptional digital acumen will be constrained without appropriate technological infrastructure to facilitate process optimization, data access, and effective collaboration.

5.3 Limitations and further research

This study, like all research, has its limitations. First, its scope was restricted to Ecuadorian Small and Medium-Sized Enterprises, so caution is warranted when generalizing the findings. Even within Latin America, significant differences exist in technological adoption and digital skills across countries (Santiago, Freire & Lavopa, 2023). Future research should therefore validate and extend our model in other emerging economies and, ideally, compare it with evidence from developed and non-Spanish-speaking contexts to assess how institutional, cultural, and technological differences shape the mediation mechanisms observed here.

Second, since performance is not only economic, but future studies should also investigate how digital technology adoption supports sustainability alongside profitability. Estrada and Reyes Álvarez (2023) suggest that environmental and social outcomes depend on “green” organizational capabilities, echoing our result that environmental dynamism enhances performance only indirectly, through digitalization and digital capability. Toscano Jara et al. (2023) emphasize institutional support in tourism, whereas our evidence highlights managerial capability in non-tourism SMEs. It suggests sectoral differences are worth further study.

Third, this study relies on self-reported data, which is susceptible to bias. Managers may, for example, have

overstated their companies' investments to justify their digital efforts or reported only favorable information. Although the questionnaire was carefully designed, such limitations remain. Finally, the model tests only one dimension of resource orchestration: resource mobilization. More nuanced conclusions could be drawn by analyzing resource orchestration across the firm's scope, at different stages of maturity, and at multiple organizational levels (Barney et al., 2011). Digital transformation is a complex and multifaceted process that would benefit from this broader analytical approach.

Conflict of interest

The authors declare no conflict of interest.

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Statement on the Use of AI

The authors declare that they used generative artificial intelligence (AI) tools solely as support in the manuscript writing process. ChatGPT was used for editing style. All content was subsequently reviewed, validated, and edited by the authors, who assume full responsibility for the accuracy, originality, and validity of the work presented.

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Appendix A

Table A1. Summary of data on variables and measurement items (N=109)

Construct names and items	Factor loading
Environmental dynamism	
Cronbach's alpha – 0.72; Average variance extracted (AVE) – 0.54; Composite reliability (rho_a) – 0.73; Composite reliability (rho_c) – 0.82	
The strategic actions of my competitors in their main markets are changing rapidly.	0,79
Technological changes in our industry are changing rapidly.	0,74
Customer product/service preferences are changing rapidly.	0,69
Our customers/consumers have adopted the use of technological tools	0,71
Digital capability	
Cronbach's alpha – 0.82; Average variance extracted (AVE) – 0.65; Composite reliability (rho_a) – 0.84; Composite reliability (rho_c) – 0.88	
Our customers/consumers have adopted the use of technological tools.	0,70
We master cutting-edge digital technologies.	0,89
Customer product/service preferences are changing rapidly.	0,87
We have the technological capability to facilitate the development of in-novative products (goods and services) and processes in the company.	
Our technological capability has allowed us to reduce operational costs.	0,74
Digitalization	
Cronbach's alpha – 0.88; Average variance extracted (AVE) – 0.55; Composite reliability (rho_a) – 0.89; Composite reliability (rho_c) – 0.90	
E-Commerce: We have a strategic multichannel e-commerce plan (web, mobile, and integration with physical stores, if applicable) with corresponding KPIs.	0,65
Big Data: We have the ability to obtain relevant information for the company and process large amounts of data, with a specific strategy and technology to exploit that knowledge.	0,83
Internet of Things (IoT) and 5G: We leverage connectivity technologies throughout the value chain: production, commercial, and logistics to achieve more efficiency; and we analyze the conversion of products through connectivity.	0,8
Virtual & Augmented Reality: We understand, explore, and apply opportunities to improve customer experience and new business models through Virtual & Augmented Reality.	0,71
Artificial and Cognitive Intelligence: We understand and apply Artificial Intelligence and Machine Learning in certain marketing processes.	0,78
Cloud & Virtualization: We integrate Cloud technology into our business processes and explore new opportunities to optimize our management through virtualization.	0,8
Cybersecurity: We understand and manage the new challenges and threats of digitalization regarding security.	0,71
Blockchain: We understand the technology and its impact on the decentralization of processes and business models.	0,58
Firm performance	
Cronbach's alpha – 0.94; Average variance extracted (AVE) – 0.81; Composite reliability (rho_a) – 0.94; Composite reliability (rho_c) – 0.95	
The process of incorporating digital technologies has led to more success in the development of new products (goods and services) and processes.	0,88
Our technological infrastructure has allowed us to achieve more profitability in the products (goods and services) we offer.	0,89
Our technological infrastructure has allowed us to introduce more innovative products (goods and services).	0,90
Our technological infrastructure has allowed us to react quickly to competitors' actions.	0,91
Our technological infrastructure has allowed us to be better prepared for future digital challenges.	0,91

Source: own elaboration.