Revista de Gestão

361

The role of business intelligence and digital capabilities in driving SME innovation in Latin America

Mauricio Castillo-Vergara and Cristian Geldes
Facultad de Economia y Negocios, Universidad Alberto Hurtado, Santiago, Chile, and
Ronald Mora and Juan Carlos Leiva
Escuela de Administración de Empresas, Instituto Tecnológico de Costa Rica, Cartago, Costa Rica

Received 28 January 2025
Revised 17 July 2025
3 September 2025
Accepted 11 September 2025

Abstract

Purpose – This study proposes a theoretical model to evaluate the direct and mediating relationships between business intelligence resources and digital capabilities and between strategic capabilities and small and medium-sized enterprises (SME) innovation across five Latin American countries.

Design/methodology/approach – Partial least squares structural equation modeling (PLS-SEM) was used to evaluate a general model with an entire sample of 480 SMEs from five Latin American countries for 2022.

Findings – The main findings show that business intelligence resources and digital capabilities positively affect SMEs' innovation and mediate the relationship between strategic capabilities and innovation in the entire sample of Latin American SMEs.

Research limitations/implications – Business intelligence resources and digital capabilities simultaneously promote innovation among SMEs in Latin American countries. Therefore, the development of public policies and organizational strategies should focus on enhancing the acquisition of business intelligence resources and developing digital capabilities. Institutional and market differences may explain the variations between countries.

Originality/value – This study contributes to the analysis of the relationship between resources and capabilities within the digital economy context of Latin American SMEs and in five specific countries. Specifically, it examines the direct and mediating effects of business intelligence resources and digital capabilities on the link between SMEs' strategic capabilities and innovation.

Keywords Innovation, Technological innovation, Small and medium-sized enterprises, SMEs, Strategic capabilities, Business intelligence, Digital capability, Digital transformation, Emerging economies, Latin America

Paper type Research article

1. Introduction

SMEs are relevant to the economy and employment, especially in emerging economies (Ayyagari & Demirguc-Kunt, 2007; OECD, 2019). In Latin America, these enterprises face significant challenges such as increasing international competition, difficulty accessing financing and skilled workers, limited participation in global value chains, and institutional issues. Innovation has become an important alternative for addressing these challenges. However, SMEs in Latin America show low innovation performance (Heredia, Geldes, Kunc, & Flores, 2019; Haddad, Williams, Hammoud, & Dwyer, 2020; Saunila, 2020; Escobar-Castillo & Velandia-Pacheco, 2023; Peres & Primi, 2024).

To foster innovation in Latin American SMEs, especially within the digital economy, Industry 4.0 technologies and digital transformation, they must develop strategic capabilities

Revista de Gestão
Vol. 32 No. 4, 2025
pp. 361-386
Emerald Publishing Limited
e-ISSN: 2177-8736
p-ISSN: 1809-2276
DOI 10.1108/REGE-01-2025-0018

to generate new resources and capabilities that enhance their innovative performance, competitiveness, and ability to gain advantages. However, in these SMEs, the process of digitization and adoption of digital technologies has been relatively slow, and little is known about their impact on innovation (Bianchi *et al*., 2017, 2019; Heredia *et al.*, 2022; Zhang, Xu, & Ma, 2022; Castillo-Vergara *et al.*, 2025).

In this context, business intelligence and digital capabilities are increasingly seen as strategic resources and capabilities that enable companies to generate, analyze, and use data to improve decision-making and innovation (Chen, Chiang, & Storey, 2012; Rialti, Marzi, Ciappei, & Busso, 2019). Business intelligence is a resource dedicated to external and internal data collection, analysis, and reporting to identify strategic insights and enhance decision-making (Işık, Jones, & Sidorova, 2013; Al-Khatib, 2025). Digital capabilities refer to the ability to mobilize and deploy IT-based resources together with other resources and capabilities (Bharadwaj *et al.*, 2000; Wang, Wang, Ju, & Rui, 2022; Castillo-Vergara *et al.*, 2025). Despite the importance of business intelligence and digital capabilities in Latin American SMEs, there is limited clarity and empirical research explaining their impact on innovation and, in particular, how these two elements interact (Stone & Woodcock, 2014; Heredia *et al.*, 2022; Davies, Bustinza, Parry, & Jovanovic, 2023; Castillo-Vergara *et al.*, 2025). Specifically, this study aims to answer the following question: How do business intelligence resources and digital capabilities affect and interact in the relationship between strategic capabilities and innovation in SMEs within emerging Latin American economies? Within this framework, this study examines the direct and mediating relationships between business intelligence resources and digital capabilities between strategic capabilities and SMEs' innovation across five emerging Latin American countries.

From a theoretical perspective, this study advances the discussion on new resources and capabilities in Latin American SMEs within the digital economy, grounded in business strategy theories, such as the resource-based view (Barney, 1991) and dynamic capabilities (Teece, Pisano, & Shuen, 1997). Additionally, it specifically enhances the understanding of how resources and capabilities interact by examining the mediating role of business intelligence resources and digital capabilities in the relationship between SMEs'strategic capabilities and innovation. From a practical point of view, this analysis supports the development of public policies and organizational strategies that foster innovation.

The following sections are presented below: literature review and hypotheses, data and methodology, Results, Discussion, and Conclusions and implications.

2. Literature review and hypotheses

Promoting innovation in Latin American SMEs is essential to enhance their contribution to the economy and job creation. To innovate within the digital economy, digital transformation, and Industry 4.0, SMEs must develop strategic capabilities that allow them to create new resources and skills (Bianchi *et al*., 2017, 2019; Heredia *et al.*, 2022; Zhang *et al.*, 2022; Sarango-Lalangui, Rodríguez Jhon, Karla, & Galarza, & Boris, 2023; Castillo-Vergara *et al.*, 2025).

Strategic capabilities are related to SMEs' innovation by detecting, seizing, and transforming practices, which are translated into routines for integrating and coordinating activities and technologies (Teece *et al.*, 1997; Haddad *et al.*, 2020; Saunila, 2020). Detection involves routines for acquiring new knowledge about market conditions, clients, participants, and suppliers, enabling the firm to recognize innovation opportunities. After identifying an opportunity, the seizing process adjusts the resources and capabilities to capitalize on it through innovation. Ultimately, transformation involves strategic decision-making and learning that enables SMEs to continually reconfigure their resources and capabilities to support innovation, driven by the connection between the firm and its external environment (Teece *et al.*, 1997; Mousavi, Bossink, & van Vliet, 2018).

In the digital economy, business intelligence and digital capabilities are viewed as strategic resources and capabilities that enable enterprises to collect, analyze, and utilize data to enhance

decision-making and foster innovation (Chen *et al.*, 2012; Rialti *et al.*, 2019; Münch, Marx, Benz, Hartmann, & Matzner, 2022; Davies *et al.*, 2023). However, in the case of SMEs in Latin American countries, there is limited knowledge and empirical research on the effects of business intelligence resources and digital capabilities on SMEs' innovation, and whether they have mediating effects between strategic capabilities and SMEs' innovation (Stone & Woodcock, 2014; Heredia *et al.*, 2022; Davies *et al.*, 2023; Morales, Haique, Cortez, Filippa, & Adra, 2024; Rojas-Segura, Faith-Vargas, & Martinez-Villavicencio, 2023; Castillo-Vergara *et al.*, 2025).

2.1 The mediating effects of business intelligence resources and digital capabilities

In this study, business intelligence resources are a collection of applications, technologies, and processes that firms use to detect challenges and opportunities, thus improving the decision-making process and monitoring performance (Suša Vugec, Bosilj Vukšić, Pejić Bach, Jaklič, & Indihar Štemberger, 2020). These technologies support decision-makers through external and internal data collection, analysis, and reporting and facilitate the analysis of large amounts of organizational data to extract strategic insights, thus fostering informed and enhanced decision-making (Işık *et al.*, 2013; Al-Khatib, 2025).

Business Intelligence Resources can enhance a firm's strategic capabilities owing to the diversity and mobility of the high volume of information they can generate. They allow firms to efficiently compile information from multiple sources such as consumers, suppliers, competitors, and the government (Cenamor, Parida, & Wincent, 2019; Lara-Pérez, Canibe-Cruz, & Duréndez, 2025). This identification and absorption of massive amounts of external information creates high internal data flow at a faster rate and with greater mobility (Partanen, Kohtamäki, Patel, & Parida, 2020; Orero-Blat, Palacios-Marqués, Leal-Rodriguez, & Ferraris, 2025). The diversity and mobility of this information offers companies new opportunities, diversified strategic decision processes, and innovation insights (Carayannis, Dumitrescu, Falkowski, Papamichail, & Zota, 2025; Zong, Anwar, Khan, Asmi, & Hussain, 2025). There is a growing interest in how business intelligence and digital technologies may influence the relationship between strategic capabilities and innovation performance (Münch *et al.*, 2022; Davies *et al.*, 2023; Rojas-Segura *et al.*, 2023). For instance, data can flow quickly between firms and stakeholders, thus supporting the decision-making process (Klein & Rai, 2009). The mobility of strategic information between firms and stakeholders boosts connectivity and innovation insights, and enriches the heterogeneity of resource information (Luo, Yu, & Jiang, 2019; Hongyun *et al.*, 2025). Consequently, based on these antecedents, the following hypotheses are proposed (Figure 1).

H1. Business Intelligence Resources positively mediate the relationship from Strategic Capabilities to SMEs' Innovation.

H1.1. Strategic Capabilities are positively related to Business Intelligence Resources.

H1.2. Business Intelligence Resources are positively related to SMEs' Innovation.

Following Bharadwaj *et al.* (2000), digital capability is conceived in this research as the firm's ability "to mobilize and deploy IT-based resources in combination or co-present with other resources and capabilities" '(p.171). It should also be noted that the concept of digital capabilities is evolving, with different similar approaches such as "IT capability" and "IT-enabled capability," which refer to dynamic capabilities in the context of the digital economy (Heredia *et al.*, 2022; Grego, Bartosiak, Palese, Piccoli, & Denicolai, 2025).

Regarding the analysis of digital capabilities in SMEs, especially in the Latin American context, evidence is still being determined (Ács, Lafuente, & Szerb, 2022). According to Eller, Alford, Kallmünzer, and Peters (2020), digital capabilities increase efficiency, decrease costs, and drive financial performance. Moreover, the development of digital capabilities requires skilled employees to absorb and generate new knowledge from digital resources. This in turn

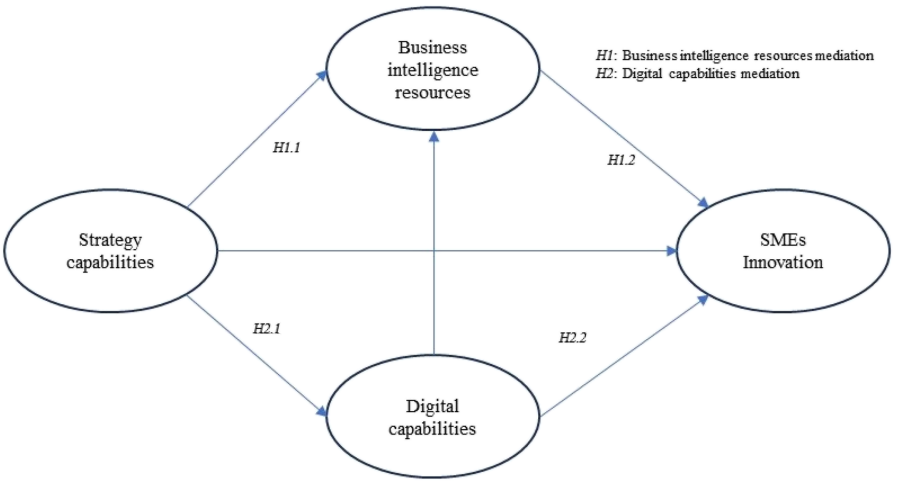

Figure 1. Theoretical model proposed. Source: Authors' own work

facilitates the permanent reconfiguration of resources and capabilities to support innovation performance (Teece *et al.*, 1997; Mousavi *et al.*, 2018). In this sense, Castillo-Vergara *et al.* (2025) indicate that digital capabilities and digital management capabilities facilitate the adoption of Industry 4.0, technologies that improve innovation performance in SMEs.

In addition, evidence has shown that using artificial intelligence negatively influences the emergence of radical innovations, and being an SME significantly moderates these effects (Grashof & Kopka, 2023). Carayannis *et al.* (2025) indicated that AI can strengthen the resilience and competitiveness of SMEs with applications such as predictive analysis, scenario planning, and risk identification. Moreover, digital capabilities should allow SMEs to integrate a large amount of information from digital resources into their innovation capabilities (Wang *et al.*, 2022). Digital resources enable companies to generate digitized data, which, in turn, transform into information that, by means of digital capabilities, will reshape their ability to meet new market demands (Liu, Long, Liu, Fan, & Wan, 2022).

According to Zhang *et al.* (2022), organizational capabilities serve as intermediaries in the influence of technological and environmental factors on digital transformation. Additionally, employee skills positively moderate the relationship between organizational capabilities and the success of digital transformation. Gonzalez-Tamayo, Maheshwari, Bonomo-Odizzio, Herrera-Avilés, and Krauss-Delorme (2023) state that the digital maturity has a positive indirect effect on the development level of firms, provided that workers with digital skills mediate this effect. Proksch, Rosin, Stubner, and Pinkwart (2021) demonstrate that merely having a digital strategy is not sufficient to achieve a high level of digitalization. Digital IT capabilities partially mediate the digitalization of products and services, and both digital IT capabilities and digital culture partially mediate the impact of digital technology on process digitalization.

In SMEs, limited access to resources and skilled workers are barriers to the digital economy (OECD, 2019; Zhang *et al.*, 2022). In this same vein, Heredia *et al.* (2022) found that digital capabilities only positively influence firm performance through technological capabilities, while digital skills in less developed human economies have a more significant indirect effect on firm performance than in highly developed ones. Prior antecedents and the following hypotheses were proposed:

H2. Digital Capabilities positively mediate the relationship from Strategic capabilities to SMEs' Innovation.

H2.1 Strategic Capabilities are positively related to the development of Digital Capabilities.

H2.2. Digital Capabilities are positively related to SMEs' innovation.

3. Data and methodology

To evaluate the proposed theoretical model and its hypotheses, a Partial Least Squares – Structural Equation Modeling (PLS-SEM) approach was chosen because it is suitable for exploratory studies involving complex models and relationships among multiple constructs and measured variables, without requiring specific distributional assumptions. This enabled the analysis of small samples and non-normal data. Its use is growing in the social sciences. This method evaluates measurement and structural models (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014, 2019; Cook & Forzani, 2023; Vaithilingam, Ong, Moisescu, & Nair, 2024). A model was evaluated using the entire sample (General Model) along with five models from each country (Argentina, Costa Rica, Ecuador, Mexico, and Uruguay). The data originates from an international project led by the Konrad-Adenauer-Stiftung Foundation (KAS) on the impact of digitalization, artificial intelligence, and Industry 4.0, on the work of SMEs.

3.1 Data

The dataset included 480 observations from five Latin American countries: Argentina, Costa Rica, Ecuador, Mexico, and Uruguay (96 samples each). The KAS Project established the following criteria to standardize the selection of an SME in the study: (1) in operation for more than four months, (2) salaried payroll, (3) more than five employees, (4) turnover of less than US$2,500,000, (5) domiciled in the study country (according to tax records), and (6) capacity to hire in the study country. Additionally, it employs a quota-stratified sampling strategy based on the sector in which SMEs operate: services (52.5%), retail (24.0%), and manufacturing (23.5%). The average firm age was 18.4 years (SD = 17.4). Most respondents had a university education (62.5%) and were between 30 and 59 years old (74.3%).

To assess whether the sample size used in this study was sufficient to detect meaningful effects in the proposed structural model, we conducted a post hoc statistical power analysis using the G*Power 3.1 software (Faul, Erdfelder, Buchner, & Lang, 2009). The model includes four latent variables (constructs) and six structural paths (Figure 1), with the most complex construct receiving two predictors, which determines the maximum number of arrows pointing at a single endogenous variable and influences the required sample size. Assuming a medium effect size ($f^2 = 0.15$), significance level of 5%, and power threshold of 0.80, the minimum sample size needed to detect such effects with two predictors was 68 observations. Our final sample consisted of 96 observations per country and 480 observations for the entire dataset, which significantly exceeded this requirement. As a result, the statistical power of the model is well above the recommended threshold (power >0.99), ensuring that the analysis can reliably detect medium to small effects within structural relationships. This supports the robustness of the findings and validity of the conclusions drawn from the PLS-SEM analysis.

The measurement instrument used in the KAS study and adopted in this research was collaboratively developed by academic experts and practitioners involved in the project. It drew on and adapted established frameworks from previous research on digital transformation and organizational capabilities. Specifically, the scales used in this study were adapted from Westerman, Tannou, Bonnet, Ferraris, and McAfee (2012), Kane, Palmer, Phillips, and Kiron (2015), Kane, Palmer, Phillips, Kiron, and Buckley (2017), and Argento (2019). The KAS questionnaire was designed to capture relevant constructs, including "Strategic Capabilities," "Digital Capabilities," the use of "Business Intelligence Resources," and "SMEs Innovation."

These constructs were measured using a combination of Likert-scale and dichotomous items, and validated in this study through a thorough psychometric evaluation using PLS-SEM. This involved tests of internal consistency (Cronbach's alpha, RhoA, and composite reliability), convergent validity (AVE), and discriminant validity (Fornell-Larcker and HTMT criteria).

3.2 Variables in the theoretical model

"SMEs Innovation" (Dependent variable). This latent construct is measured using six reflective items designed to capture how a firm has experienced and adapted to technological innovation across key functional areas. The first three items evaluated the perceived importance of technological innovations implemented over the past two years in three specific domains: Commercial, Human Resources, and Research and Development (R&D). Respondents rate each item on a 5-point Likert scale, from "1" (not important at all) to "5" (very important).

The remaining three items assess a firm's structural adaptability in incorporating technological innovations in the same three areas: Commercial, Human Resources, and R&D. These items are also rated on a 5-point Likert scale, where "1" means "Very Unadaptable" and "5" indicates "Very Adaptable." Together, these six indicators offer a multidimensional view of innovation performance, covering both the importance of technological change across departments and the organization's readiness to adopt and effectively implement such innovations.

In the case of independent variables, the theoretical model identifies three latent constructs: "strategic", "digital", and "Business Intelligence resources". Specifically, "Strategic Capabilities" reflect a firm's forward-looking capacity to align its internal priorities and analytical processes with the needs of a rapidly evolving environment. This construct was measured using six items that were divided into two dimensions. The first set of items evaluated the significance of topics such as technological innovation, human resource development, and new business models on the agendas of directors and managers. The second set assessed how often firms analyze strategic factors such as market competition, environmental changes, new business opportunities, and the company's technological status. Responses were collected on 5-point Likert scales, ranging from "1" (Not important at all/Very infrequently) to "5" (Very important/Very frequently).

"Digital Capabilities" captures the firm's investment in human capital related to digital transformation. Specifically, this measure assesses the amount of time the company has dedicated over the past two years to training its managerial, middle management, and operational supervisory staff in digital skills. Each item was rated using a 5-point Likert scale from "1" (Very little time) to "5" (A lot of time).

"Business Intelligence Resources" evaluate the technological infrastructure available for decision-making and operational efficiency. This was measured using four dichotomous items indicating whether the firm used specific digital systems, including computerized human resource systems, customer relationship management (CRM) systems, data analytics platforms, and business process management (BPM) or workflow systems. Each item is scored as "1" (Yes) or "0" (No).

Together, these constructs provide a multidimensional assessment of a firm's strategic orientation, digital preparedness, and technological sophistication, which are essential to understanding innovation dynamics in SMEs within the digital economy paradigm. All items exhibited satisfactory loadings (ranging from 0.707 to 0.945) (see Table 1).

3.3 Measurement and structural models

PLS-SEM estimations were conducted using the SMART-PLS software (version 4.0.0.3). Two models were analyzed: the measurement (or outer) model illustrates how observed variables relate to latent variables, and the structural (or inner) model depicts the strength and direction of the relationships between latent variables. The constructs are modeled in reflective mode (Hair *et al.*, 2014, 2019; Cook & Forzani, 2023). Six models were tested, considering a General Model with a complete dataset and each one for the five countries.

Table 1. Measures

Composite	Item	Loadings
Strategy Capabilities	How important is technological innovation on the directors' and managers' agenda?	0.772
	How important is the development of human resources – skills and talents, on the directors' and managers' agenda?	0.707
	How important is the development of new business models on the directors' and managers' agenda?	0.727
	How frequently are possible changes in competition and the environment analyzed?	0.732
	How frequently are threats and new business opportunities analyzed?	0.793
	How frequently is the technological status of your company analyzed?	0.771
Digital Capabilities	How do you rate, in the last 2 years, the time dedicated to training in digital skills of managerial-level staff?	0.889
	How do you rate, in the last 2 years, the time dedicated to training in digital skills of middle management-level staff?	0.945
	How do you rate, in the last 2 years, the time dedicated to training in digital skills of operational-level supervisory staff?	0.923
Business Intelligence Resources	Does your company make use of a computerized human resources system?	0.795
	Does your company make use of a CRM computerized system?	0.831
	Does your company make use of a computerized data analytics system?	0.871
	Does your company make use of a Workflow or BPM computerized system?	0.832
SMEs Innovation	How important were technological innovations in the commercial area in the last 2 years?	0.704
	How important were technological innovations in the human resources area in the last 2 years?	0.803
	How important were technological innovations in the R&D area in the last 2 years?	0.790
	How adaptable is the structure to the incorporation of technological innovations in the Commercial area?	0.714
	How adaptable is the structure to the incorporation of technological innovations in the Human Resources area?	0.756
	How adaptable is the structure to the incorporation of technological innovations in the R&D area?	0.771

Source(s): Authors' own work

In the measurement models, the items for each construct included in the proposed theoretical model were selected based on factor loadings above 0.700. For the composite reliability of the constructs, Cronbach's alpha, rhoA, and rhoC values of 0.700 or higher were considered acceptable. Regarding convergent validity, the AVE should be $\geq$ 0.500. Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT) statistic, which was $\leq$0.85. Concerning multicollinearity, the "collinearity statistics" (VIF) are $\leq$3.0, for all variables.

For structural models, bootstrapping was performed using 10,000 subsamples. The model fit indicators were SRMR $\leq$0.08, squared Euclidean distance (d_ULS), and geodesic distance (d_G). Hypotheses were evaluated based on the value of the path coefficient, the sign of the path coefficient (between -1 and $+1$), and the significance of the path coefficient by bootstrapping: (1) signed hypotheses, 1-tailed test: $p < 0.05$; CI percentile: 5%–95% (no change in sign at the extremes); (2) unsigned hypotheses, 2-tailed test: $p < 0.05$; CI percentile: 2.5%–97.5% (no change in sign at the extremes). The Determinant Coefficient ($0 < R2 < 1$). The total effect is classified as: (1) small effect for $0.02 \leq f2 < 0.15$; (2) moderate effect for $0.15 \leq f2 < 0.35$; (3) significant effect for $f2 \geq 0.35$ (Henseler, 2017; Hair *et al.*, 2019; Vaithilingam *et al.*, 2024).

To examine the robustness of the structural models across different countries and evaluate the potential structural heterogeneity in the relationships among strategic capabilities, business intelligence resources, digital capabilities, and innovation, a multigroup analysis (MGA) was conducted. Before conducting the MGA, the Measurement Invariance of Composite Models (MICOM) procedure proposed by Henseler (2017) was used to assess measurement invariance across groups (in this case, countries). The analysis was performed using the three-stage approach recommended in the literature: (1) configural invariance, (2) compositional invariance, and (3) evaluation of equality of means and variances. Once partial measurement invariance was established, multigroup analysis was conducted using the PLS multigroup permutation procedure. This method allowed for the comparison of path coefficients across countries and helped determine whether structural relationships differed significantly across different national contexts.

4. Results

First, it is confirmed that the General Model, incorporating the entire data sample, satisfies all requirements for a good fit of the structural model. The five models for each country also met acceptable model fit levels (Table 2).

Regarding the measurement model, the internal consistency and convergent validity of all the constructs (composites) across the six models met the statistical requirements (Cronbach's alpha, rho_A, reliability, and AVE), demonstrating satisfactory psychometric properties (Table 3).

Regarding the discriminant validity of the constructs, the Fornell-Larcker criterion and the heterotrait-monotrait ratio (HTMT) meet all statistical requirements in the six models, confirming that the constructs are distinct and provide strong evidence of the measurement model's validity across different contexts (Table 4). Additionally, to evaluate potential collinearity among the predictor constructs, we checked the inner VIF values in the structural model. All the VIFs were below the threshold of 3.3, indicating that multicollinearity was not an issue (Hair *et al.*, 2019).

Table 2. Model fit indicators

		SRMR	d_ULS	d_G
General Model	Model	0.040	0.340	0.095
	95%	0.031	0.184	0.069
	99%	0.033	0.212	0.076
	Model	0.066	0.833	0.303
Argentina	95%	0.072	0.980	0.449
	99%	0.079	1.177	0.521
	Model	0.061	0.719	0.315
Costa Rica	95%	0.072	0.998	0.478
	99%	0.080	1.208	0.553
	Model	0.061	0.709	0.371
Ecuador	95%	0.072	0.987	0.524
	99%	0.080	1.205	0.617
	Model	0.071	0.956	0.414
Mexico	95%	0.067	0.860	0.499
	99%	0.073	1.023	0.588
	Model	0.080	1.223	0.446
Uruguay	95%	0.071	0.944	0.482
	99%	0.077	1.123	0.557

Source(s): Authors' own work

Table 3. Internal consistency and convergent validity

Data set	Composite	Alpha de Cronbach	rho_A	Composite Reliability	AVE
General Model $n = 480$	Strategy Capabilities	0.847	0.853	0.886	0.564
	Digital Capabilities	0.908	0.909	0.942	0.845
	Business Intelligence Resources	0.852	0.863	0.900	0.693
	SMEs Innovation	0.851	0.855	0.889	0.573
Argentina $n = 96$	Strategy Capabilities	0.866	0.874	0.899	0.598
	Digital Capabilities	0.930	0.936	0.955	0.877
	Business Intelligence Resources	0.841	0.887	0.890	0.671
	SMEs Innovation	0.832	0.859	0.876	0.546
Costa Rica $n = 96$	Strategy Capabilities	0.848	0.853	0.887	0.569
	Digital Capabilities	0.904	0.916	0.940	0.840
	Business Intelligence Resources	0.808	0.858	0.871	0.630
	SMEs Innovation	0.798	0.802	0.855	0.516
Ecuador $n = 96$	Strategy Capabilities	0.841	0.860	0.880	0.552
	Digital Capabilities	0.916	0.921	0.947	0.856
	Business Intelligence Resources	0.819	0.834	0.880	0.648
	SMEs Innovation	0.886	0.890	0.913	0.638
Mexico $n = 96$	Strategy Capabilities	0.789	0.822	0.849	0.506
	Digital Capabilities	0.892	0.892	0.933	0.823
	Business Intelligence Resources	0.898	0.904	0.929	0.766
	SMEs Innovation	0.876	0.886	0.905	0.615
Uruguay $n = 96$	Strategy Capabilities	0.858	0.878	0.892	0.579
	Digital Capabilities	0.875	0.879	0.923	0.799
	Business Intelligence Resources	0.871	0.900	0.911	0.720
	SMEs Innovation	0.825	0.838	0.869	0.524

Source(s): Authors' own work

Table 5 presents the results of structural model analysis and hypothesis testing. For the General Model, all hypotheses are supported by statistically significant path coefficients and confidence intervals that exclude zero (H1 and H2). This provides strong evidence that supports the proposed relationship. However, country-specific analyses highlight certain specificities. For instance, in Argentina, the relationship between Strategic Capabilities and Business Intelligence Resources as well as between digital capabilities and SMEs' innovation was not significant. In Costa Rica, three hypotheses, including the link between business intelligence resources and SMEs' innovation, do not reach significance. Mexico does not support the direct effect of strategic capabilities on SMEs' innovation. Similarly, in Uruguay, the mediating role of Business Intelligence resources was not confirmed. These variations suggest that the robustness of the model may differ across countries, possibly because of differences in sample size (representativeness) and structural characteristics. Nevertheless, the General Model performs reliably overall, supporting its applicability to broader regional analyses.

To assess the explanatory power of the structural model, the coefficient of determination (R^2) for each endogenous construct was analyzed. Table 6 shows the R^2 values and their significance across the general and country-specific models. These values represent the proportion of the variance explained by the model for each dependent construct.

Additionally, to assess the contribution of each exogenous variable to the explained variance of endogenous constructs, we calculated the effect size (f^2). Table 7 presents the f^2 values for the General Model, indicating the relative strength of each predictor within the model: f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively. Together, these indicators provide a comprehensive understanding of the predictive accuracy of the model and the relevance of each structural path.

Table 4. Discriminant validity

Data set	Composite	HTMT 1	2	3	4	Fornell-Larcker 1	2	3	4
General Model $n = 480$	Strategy Capabilities (1)					0.751			
	Digital Capabilities (2)	0.569				0.509	0.919		
	Business Intelligence Resources (3)	0.289	0.380			0.255	0.337	0.833	
	SMEs Innovation (4)	0.546	0.519	0.312		0.476	0.463	0.276	0.757
Argentina $n = 96$	Strategy Capabilities (1)					0.773			
	Digital Capabilities (2)	0.527				0.489	0.937		
	Business Intelligence Resources (3)	0.201	0.321			0.155	0.307	0.819	
	SMEs Innovation (4)	0.540	0.385	0.321		0.463	0.348	0.282	0.739
Costa Rica $n = 96$	Strategy Capabilities (1)					0.754			
	Digital Capabilities (2)	0.553				0.495	0.916		
	Business Intelligence Resources (3)	0.324	0.340			0.286	0.306	0.794	
	SMEs Innovation (4)	0.520	0.398	0.170		0.454	0.352	0.087	0.704
Ecuador $n = 96$	Strategy Capabilities (1)					0.743			
	Digital Capabilities (2)	0.465				0.438	0.925		
	Business Intelligence Resources (3)	0.225	0.302			0.195	0.271	0.805	
	SMEs Innovation (4)	0.544	0.543	0.477		0.496	0.492	0.413	0.799
México $n = 96$	Strategy Capabilities (1)					0.697			
	Digital Capabilities (2)	0.640				0.568	0.907		
	Business Intelligence Resources (3)	0.409	0.476			0.366	0.427	0.875	
	SMEs Innovation (4)	0.527	0.596	0.439		0.461	0.543	0.416	0.784
Uruguay $n = 96$	Strategy Capabilities (1)					0.761			
	Digital Capabilities (2)	0.544				0.502	0.894		
	Business Intelligence Resources (3)	0.262	0.363			0.249	0.318	0.848	
	SMEs Innovation (4)	0.525	0.526	0.226		0.495	0.483	0.204	0.724

Source(s): Authors' own work

Table 8 presents the specific indirect effects derived from the structural model by using the General Model. The results reveal that several indirect relationships are statistically significant, offering insight into the mediating mechanisms between strategic capabilities and SMEs' innovation. Specifically, Strategic Capabilities exert an indirect influence on Business Intelligence Resources through Digital Capabilities ($\beta = 0.067$, $p < 0.001$) and on SMEs' innovation through the same mediator ($\beta = 0.137$, $p < 0.001$). Moreover, the path from digital capabilities to SMEs' innovation is partially mediated by Business Intelligence resources ($\beta = 0.029$, $p = 0.017$). The full serial mediation path from Strategic Capabilities → Digital Capabilities → Business Intelligence Resources → SMEs' innovation is also significant ($\beta = 0.015$, $p = 0.020$), although with a small effect size. Only the indirect path from Strategy Capabilities → Business Intelligence Resources → SMEs' innovation did not reach conventional levels of statistical significance ($p = 0.067$), suggesting that this two-step mediation may be less robust than the other pathways. These findings highlight the critical mediating role of digital and intelligent capabilities in translating strategic inputs into innovation outcomes within SMEs.

Table 5. Structural model

Data set	Hypotheses	Path coef	*p*-value	Confidence intervals 95% CIli	95% Cihi	Statistics *t* (|O/STDEV|)	Supported
General Model	1. Strategy Capabilities → 2. Digital Capabilities	0.509	0.000	0.450	0.571	13.878	Yes
	1. Strategy Capabilities → 3. Business Intelligence Resources	0.053	0.019	0.011	0.096	2.068	Yes
	1. Strategy Capabilities → 4. SMEs Innovation	0.313	0.000	0.226	0.399	5.958	Yes
	2. Digital Capabilities → 3. Business Intelligence Resources	0.132	0.000	0.093	0.172	5.465	Yes
	2. Digital Capabilities → 4. SMEs Innovation	0.268	0.000	0.186	0.350	5.397	Yes
	3. Business Intelligence Resources → 4. SMEs Innovation	0.223	0.008	0.073	0.375	2.405	Yes
Argentina	1. Strategy Capabilities → 2. Digital Capabilities	0.489	0.000	0.356	0.626	5.931	Yes
	1. Strategy Capabilities → 3. Business Intelligence Resources	0.003	0.477	−0.085	0.103	0.058	No
	1. Strategy Capabilities → 4. SMEs Innovation	0.384	0.004	0.142	0.618	2.624	Yes
	2. Digital Capabilities → 3. Business Intelligence Resources	0.145	0.003	0.054	0.231	2.699	Yes
	2. Digital Capabilities → 4. SMEs Innovation	0.101	0.210	−0.106	0.304	0.808	No
	3. Business Intelligence Resources → 4. SMEs Innovation	0.399	0.034	0.050	0.761	1.821	Yes
Costa Rica	1. Strategy Capabilities → 2. Digital Capabilities	0.495	0.000	0.361	0.630	5.965	Yes
	1. Strategy Capabilities → 3. Business Intelligence Resources	0.084	0.075	−0.016	0.175	1.442	No
	1. Strategy Capabilities → 4. SMEs Innovation	0.385	0.002	0.159	0.599	2.832	Yes
	2. Digital Capabilities → 3. Business Intelligence Resources	0.102	0.032	0.014	0.193	1.858	Yes
	2. Digital Capabilities → 4. SMEs Innovation	0.186	0.085	−0.036	0.409	1.370	No
	3. Business Intelligence Resources → 4. SMEs Innovation	−0.172	0.242	−0.590	0.227	0.700	No

(*continued*)

Table 5. Continued

Data set	Hypotheses	Path coef	*p*-value	Confidence intervals 95% CIli	95% Cihi	Statistics *t* (|O/STDEV|)	Supported
Ecuador	1. Strategy Capabilities → 2. Digital Capabilities	0.438	0.000	0.301	0.588	5.057	Yes
	1. Strategy Capabilities → 3. Business Intelligence Resources	0.043	0.236	−0.050	0.145	0.719	No
	1. Strategy Capabilities → 4. SMEs Innovation	0.322	0.001	0.158	0.498	3.137	Yes
	2. Digital Capabilities → 3. Business Intelligence Resources	0.105	0.027	0.014	0.193	1.929	Yes
	2. Digital Capabilities → 4. SMEs Innovation	0.276	0.002	0.117	0.423	2.956	Yes
	3. Business Intelligence Resources → 4. SMEs Innovation	0.604	0.002	0.259	0.962	2.811	Yes
Mexico	1. Strategy Capabilities → 2. Digital Capabilities	0.568	0.000	0.447	0.694	7.436	Yes
	1. Strategy Capabilities → 3. Business Intelligence Resources	0.080	0.066	−0.004	0.171	1.504	No
	1. Strategy Capabilities → 4. SMEs Innovation	0.189	0.070	−0.026	0.395	1.478	No
	2. Digital Capabilities → 3. Business Intelligence Resources	0.142	0.003	0.056	0.223	2.806	Yes
	2. Digital Capabilities → 4. SMEs Innovation	0.352	0.001	0.160	0.543	3.027	Yes
	3. Business Intelligence Resources → 4. SMEs Innovation	0.447	0.023	0.086	0.816	1.996	Yes
Uruguay	1. Strategy Capabilities → 2. Digital Capabilities	0.502	0.000	0.395	0.620	7.322	Yes
	1. Strategy Capabilities → 3. Business Intelligence Resources	0.058	0.184	−0.050	0.165	0.901	No
	1. Strategy Capabilities → 4. SMEs Innovation	0.336	0.000	0.194	0.488	3.747	Yes
	2. Digital Capabilities → 3. Business Intelligence Resources	0.127	0.017	0.031	0.224	2.124	Yes
	2. Digital Capabilities → 4. SMEs Innovation	0.307	0.001	0.148	0.456	3.272	Yes
	3. Business Intelligence Resources → 4. SMEs Innovation	0.045	0.417	−0.316	0.397	0.211	No

Source(s): Authors' own work

To address potential endogeneity issues in the structural model, we used the Gaussian copula procedures available in PLS-SEM software (Table 9). This approach enables the detection of nonlinear dependencies between predictor variables and error terms, thereby enhancing the robustness of causal inferences. These results do not account for endogeneity. Additionally, we include firm age as a control variable to evaluate its potential effect on SMEs'

Table 6. R^2 values

	Full sample		Argentina		Costa Rica		Ecuador		México		Uruguay	
	R^2	*p*-value	R^2	*p*-value	R^2	*p*-value	R^2	*p*-value	R^2	*p*-value	R^2	*p*-value
Digital Capabilities	0.260	0.000	0.239	0.001	0.245	0.001	0.192	0.006	0.322	0.000	0.252	0.000
Business Intelligence Resources	0.123	0.000	0.094	0.056	0.118	0.028	0.081	0.086	0.205	0.004	0.112	0.031
SMEs Innovation	0.302	0.000	0.267	0.002	0.233	0.005	0.410	0.000	0.360	0.000	0.319	0.000

Source(s): Authors' own work

Table 7. f^2 Values

Data set	Hypotheses	Path coef	*p*-value	95% CIli	95% Cihi
General Model	1. Strategy Capabilities → 2. Digital Capabilities	0.350	0.000	0.255	0.484
	1. Strategy Capabilities → 3. Business Intelligence Resources	0.011	0.170	0.001	0.036
	1. Strategy Capabilities → 4. SMEs Innovation	0.103	0.004	0.051	0.178
	2. Digital Capabilities → 3. Business Intelligence Resources	0.066	0.005	0.032	0.116
	2. Digital Capabilities → 4. SMEs Innovation	0.072	0.006	0.033	0.126
	3. Business Intelligence Resources → 4. SMEs Innovation	0.014	0.129	0.001	0.040

Source(s): Authors' own work

Table 8. Specific indirect effects

Data set	Hypotheses	Path coef	*p*-value	95% CIli	95% Cihi
General Model	1. Strategy Capabilities → 2. Digital Capabilities → 3. Business Intelligence Resources	0.067	0.000	0.046	0.092
	1. Strategy Capabilities → 3. Business Intelligence Resources → 4. SMEs Innovation	0.012	0.067	0.001	0.026
	1. Strategy Capabilities → 2. Digital Capabilities → 4. SMEs Innovation	0.137	0.000	0.093	0.184
	2. Digital Capabilities → 3. Business Intelligence Resources → 4. SMEs Innovation	0.029	0.017	0.009	0.054
	1. Strategy Capabilities → 2. Digital Capabilities → 3. Business Intelligence Resources → 4. SMEs Innovation	0.015	0.020	0.004	0.028

Source(s): Authors' own work

Table 9. Gaussian copulas

Composite	Original sample	Sample mean	*t*-statistics (|O/STDEV|)	*p*-value
Age → 4. SMEs Innovation	−0.035	−0.034	0.955	0.170
GC (1. Strategic Capabilities and Capability → 2. Digital Capabilities Development)	0.176	0.171	1.620	0.053
GC (1. Strategic Capabilities and Capability → 3. Business Intelligence)	0.042	0.042	1.000	0.181
GC (1. Strategic Capabilities and Capability → 4. Innovation)	0.240	0.219	1.624	0.052
GC (2. Digital Capabilities Development → 3. Business Intelligence)	−0.085	−0.083	1.514	0.065
GC (2. Digital Capabilities Development → 4. Innovation)	0.124	0.139	1.089	0.138

Source(s): Authors' own work

innovation. As shown in the results, the path coefficient for age → SMEs' innovation was not statistically significant ($\beta = -0.035$, $p = 0.170$), indicating that age does not introduce bias in the proposed model and supports the robustness of the structural relationships.

The results of the Measurement Invariance of Composite Models (MICOM) analysis confirmed that compositional invariance was established in all ten country-pair comparisons,

thereby fulfilling the minimum requirement for conducting multigroup comparisons (Henseler, 2017). This shows that the composite scores of the constructs maintain their latent meaning equivalently across national groups, allowing for valid comparisons of the structural relationships between countries. Additionally, full measurement invariance (compositional, mean, and variance invariance) was established in two comparisons, Argentina–Costa Rica and Costa Rica–Mexico. In the other eight comparisons, only partial measurement invariance was observed. While this partial invariance still allows for a valid comparison of structural paths, it advises caution when interpreting differences in mean levels or variances across constructs (Table 10).

Following the establishment of measurement invariance through the MICOM procedure, permutation-based multigroup analysis (PLS-MGA) was conducted to assess whether the structural relationships in the model differed significantly across different national contexts. Ten pairwise country comparisons were performed using a two-tailed permutation test with 10,000 resamples, and significant differences were identified at $P < 0.05$. The results show that in seven of the ten comparisons, no statistically significant differences were found in any of the structural path coefficients, indicating a high degree of consistency in the interactions among strategic capabilities, digital resources, and innovation across Latin American countries. However, the three comparisons revealed statistically significant differences, as detailed below.

Costa Rica vs. Ecuador: A significant difference was observed in the path from business intelligence resources to SMEs' innovation. The impact was negative and not significant in Costa Rica ($\beta = -0.172$), but positive and strong in Ecuador ($\beta = 0.604$), with a difference of -0.775 and $p = 0.011$. This finding suggests that business intelligence plays a more important and effective role in promoting innovation among Ecuadorian SMEs than among their Costa Rican counterparts.

Costa Rica versus Mexico: Although most relationships were similar, the path from business intelligence resources to SMEs' innovation also showed a marginally significant difference. In Costa Rica, the effect was again negative ($\beta = -0.172$), whereas in Mexico, it was moderately positive ($\beta = 0.447$), resulting in a difference of -0.618 and p-value of 0.050. This pattern reinforces the idea that the innovation-driving role of business intelligence resources is context-dependent and varies with the maturity and strategic use of data-driven practices in each country.

Ecuador vs. Uruguay: A significant difference was identified in the same structural path: Business Intelligence Resources → SMEs innovation. The impact was strongly positive in Ecuador ($\beta = 0.604$), but notably weaker in Uruguay ($\beta = 0.045$), resulting in a difference of 0.558 and $p = 0.049$. This reinforces the idea that the strategic use of business intelligence is a differentiating factor in how innovation is realized across SMEs in different Latin American settings.

Taken together, these findings indicate that, while the core model is structurally robust across most countries, Business Intelligence Resources play a heterogeneous role in shaping SME innovation. The cross-national variability in this relationship may reflect differences in technological adoption, data culture, or institutional support for analytics-driven decision-making.

5. Discussion

In the first term, the results support the hypotheses of the proposed model. This indicates that a mediating role of Business Intelligence Resources (H1) exists between strategic capabilities" and innovation." These resources enable SMEs to access, filter, and transform vast and dynamic information flows into organizational knowledge (Liu *et al.*, 2022; Partanen *et al.*, 2020), thereby supporting innovation by facilitating the rapid detection of opportunities and risks. Similarly, the positive mediating role of Digital Capabilities (H2) confirms previous evidence, suggesting that firms with stronger digital skills are better positioned to absorb

Table 10. MICOM results

		Configural invariance			Equal mean values				
Countries	Composite	Original Correlation	Confidence Interval	Partial measurement Invariance established	Difference of Mean value	Confidence Interval	Difference of Variances ratio	Confidence Interval	Full measurement Variance established
Argentina – Costa Rica	Strategy Capabilities (1)	1.000	[0.989; 1.000]	Yes	−0.196	[−0.284; 0.279]	0.095	[−0.398; 0.405]	Yes
	Digital Capabilities (2)	0.999	[0.999; 1.000]	Yes	−0.042	[−0.286; 0.283]	−0.084	[−0.330; 0.339]	Yes
	Business Intelligence Resources (3)	0.998	[0.962; 1.000]	Yes	−0.059	[−0.136; 0.135]	0.103	[−0.251; 0.247]	Yes
	SMEs Innovation (4)	0.992	[0.976; 1.000]	Yes	0.083	[−0.290; 0.279]	0.089	[−0.336; 0.333]	Yes
Argentina – Ecuador	Strategy Capabilities (1)	0.997	[0.990; 1.000]	Yes	−0.527	[−0.279; 0.275]	0.137	[−0.442; 0.431]	No
	Digital Capabilities (2)	1.000	[0.999; 1.000]	Yes	−0.531	[−0.278; 0.290]	−0.085	[−0.328; 0.314]	No
	Business Intelligence Resources (3)	0.986	[0.986; 1.000]	Yes	−0.141	[−0.132; 0.130]	0.184	[−0.243; 0.276]	No
	SMEs Innovation (4)	0.994	[0.992; 1.000]	Yes	−0.408	[−0.279; 0.295]	−0.122	[−0.328; 0.330]	No
Argentina – Mexico	Strategy Capabilities (1)	0.997	[0.982; 1.000]	Yes	−0.278	[−0.278; 0.275]	0.218	[−0.420; 0.419]	Yes
	Digital Capabilities (2)	1.000	[0.999; 1.000]	Yes	−0.128	[−0.267; 0.276]	−0.122	[−0.319; 0.334]	Yes
	Business Intelligence Resources (3)	0.996	[0.991; 1.000]	Yes	−0.167	[−0.130; 0.125]	0.072	[−0.256; 0.266]	No
	SMEs Innovation (4)	0.983	[0.996; 1.000]	No					

(*continued*)

Table 10. Continued

Countries	Composite	Configural invariance			Equal mean values				
		Original Correlation	Confidence Interval	Partial measurement Invariance established	Difference of Mean value	Confidence Interval	Difference of Variances ratio	Confidence Interval	Full measurement Variance established
Argentina – Uruguay	Strategy Capabilities (1)	0.997	[0.986; 1.000]	Yes	0.081	[−0.281; 0.276]	0.054	[−0.383; 0.391]	Yes
	Digital Capabilities (2)	1.000	[0.998; 1.000]	Yes	0.233	[−0.284; 0.274]	0.068	[−0.324; 0.316]	Yes
	Business Intelligence Resources (3)	0.994	[0.978; 1.000]	Yes	0.044	[−0.140; 0.136]	−0.076	[−0.186; 0.196]	Yes
	SMEs Innovation (4)	0.973	[0.984; 1.000]	No					
Costa Rica – Ecuador	Strategy Capabilities (1)	0.998	[0.987; 1.000]	Yes	−0.357	[−0.297; 0.304]	0.042	[−0.430; 0.415]	No
	Digital Capabilities (2)	1.000	[0.999; 1.000]	Yes	−0.484	[−0.285; 0.292]	−0.002	[−0.337; 0.304]	No
	Business Intelligence Resources (3)	0.988	[0.978; 1.000]	Yes	−0.074	[−0.132; 0.137]	0.082	[−0.306; 0.275]	Yes
	SMEs Innovation (4)	1.000	[0.996; 1.000]	Yes	−0.487	[−0.274; 0.295]	−0.193	[−0.312; 0.307]	No
Costa Rica – México	Strategy Capabilities (1)	0.996	[0.981; 1.000]	Yes	−0.079	[−0.279; 0.283]	0.102	[−0.429; 0.441]	Yes
	Digital Capabilities (2)	0.999	[0.999; 1.000]	Yes	−0.086	[−0.295; 0.289]	−0.043	[−0.327; 0.325]	Yes
	Business Intelligence Resources (3)	0.996	[0.990; 1.000]	Yes	−0.107	[−0.127; 0.138]	−0.048	[−0.297; 0.297]	Yes
	SMEs Innovation (4)	0.997	[0.986; 1.000]	Yes	−0.023	[−0.283; 0.293]	−0.253	[−0.326; 0.327]	Yes

(*continued*)

Table 10. Continued

Countries	Composite	Configural invariance			Equal mean values				
		Original Correlation	Confidence Interval	Partial measurement Invariance established	Difference of Mean value	Confidence Interval	Difference of Variances ratio	Confidence Interval	Full measurement Variance established
Costa Rica – Uruguay	Strategy Capabilities (1)	0.997	[0.988; 1.000]	Yes	0.273	[−0.279; 0.307]	−0.051	[−0.375; 0.364]	Yes
	Digital Capabilities (2)	0.998	[0.999; 1.000]	No					
	Business Intelligence Resources (3)	0.998	[0.980; 1.000]	Yes	0.108	[−0.137; 0.136]	−0.190	[−0.218; 0.221]	Yes
	SMEs Innovation (4)	0.992	[0.978; 1.000]	Yes	0.145	[−0.302; 0.278]	0.096	[−0.359; 0.377]	Yes
Ecuador – Mexico	Strategy Capabilities (1)	0.995	[0.976; 1.000]	Yes	0.289	[−0.298; 0.271]	0.083	[−0.468; 0.446]	No
	Digital Capabilities (2)	1.000	[0.999; 1.000]	Yes	0.399	[−0.297; 0.286]	−0.041	[−0.312; 0.325]	No
	Business Intelligence Resources (3)	0.997	[0.991; 1.000]	Yes	−0.039	[−0.135; 0.121]	−0.114	[−0.342; 0.353]	Yes
	SMEs Innovation (4)	0.997	[0.998; 1.000]	Yes	0.427	[−0.289; 0.291]	−0.105	[−0.309; 0.290]	No
Ecuador – Uruguay	Strategy Capabilities (1)	0.992	[0.989; 1.000]	Yes	0.588	[−0.293; 0.270]	−0.068	[−0.389; 0.401]	No
	Digital Capabilities (2)	0.999	[0.999; 1.000]	Yes	0.736	[−0.295; 0.277]	0.147	[−0.286; 0.292]	No
	Business Intelligence Resources (3)	0.997	[0.989; 1.000]	Yes	0.177	[−0.141; 0.131]	−0.268	[−0.212; 0.229]	No
	SMEs Innovation (4)	0.994	[0.993; 1.000]	Yes	0.601	[−0.308; 0.285]	0.254	[−0.296; 0.310]	No

(*continued*)

Table 10. Continued

Countries	Composite	Configural invariance: Original Correlation	Configural invariance: Confidence Interval	Partial measurement Invariance established	Equal mean values: Difference of Mean value	Equal mean values: Confidence Interval	Difference of Variances ratio	Confidence Interval	Full measurement Variance established
Mexico – Uruguay	Strategy Capabilities (1)	0.986	[0.983; 1.000]	Yes	0.364	[−0.320; 0.293]	−0.166	[−0.426; 0.396]	No
	Digital Capabilities (2)	1.000	[0.999; 1.000]	Yes	0.353	[−0.294; 0.283]	0.189	[−0.335; 0.320]	No
	Business Intelligence Resources (3)	0.998	[0.995; 1.000]	Yes	0.209	[−0.137; 0.140]	−0.162	[−0.228; 0.227]	No
	SMEs Innovation (4)	0.999	[0.996; 1.000]	Yes	0.148	[−0.283; 0.281]	0.363	[−0.350; 0.343]	Yes

Source(s): Authors' own work

knowledge and integrate it into their innovation processes (Eller *et al.*, 2020; Wang *et al.*, 2022; Castillo-Vergara *et al.*, 2025). In addition, the combined effect further indicates that Business Intelligence Resources and Digital Capabilities are complementary in reconfiguring a firm's resources to innovate (Kane *et al.*, 2015; Mousavi *et al.*, 2018).

From a theoretical viewpoint, the results confirm the positive impact of Strategy Capabilities on SMEs' innovation (Branzei & Vertinsky, 2006; Bianchi *et al.*, 2017, 2019; Haddad *et al.*, 2020; Saunila, 2020). Additionally, the findings contribute to the theoretical debate on innovation in SMEs within the context of a digital economy in emerging countries (Bianchi *et al.*, 2017; Heredia *et al.*, 2022; Castillo-Vergara *et al.*, 2025). Specifically, they highlight the importance of acquiring valuable resources, such as Business Intelligence Resources, from the perspective of the Resource-based View (Barney, 1991), and the development of dynamic capabilities as Digital Capabilities to identify, utilize, and reconfigure resources in response to environmental changes (Teece *et al.*, 1997).

Regarding the structural models for each country, the results revealed both shared patterns and significant heterogeneity across Latin American countries. While the General Model validates the hypothesized mediating roles of Business Intelligence resources and digital capabilities in the relationship between Strategic Capabilities and SME innovation, country-specific analyses present differences. These variations can be interpreted through the lens of the strategic tripod framework (Peng, Sun, Pinkham, & Chen, 2009), which emphasizes the interaction between institutional conditions, industry-based dynamics, and firm-specific capabilities in shaping innovation processes in emerging economies. In this regard, cross-country differences align with disparities in Global Innovation Index (GII) components (WIPO, 2022), particularly in terms of business sophistication, ICT infrastructure, and human capital.

For instance, Costa Rica and Mexico, despite having similar rankings in overall innovation (68 and 58, respectively), show divergent performance in ICT access and use, which may explain why Business Intelligence Resources are more strongly associated with innovation in Costa Rica than in Mexico. Conversely, countries such as Ecuador and Uruguay exhibit weaker or even negative relationships on the same path, suggesting that the mere presence of technological tools is insufficient without complementary absorptive capacities or managerial readiness.

Beyond the national context, configurational analysis reveals three distinct innovation pathways among Latin American SMEs.

(1) Strategy – Digital Capabilities Configuration: This pathway highlights the importance of a clear strategic orientation in shaping digital capabilities, which, in turn, fosters innovation. This is consistent with the notion that strategic foresight guides the digital transformation journey, particularly in SMEs that actively engage in knowledge-intensive sectors (Bianchi *et al.*, 2019; Menchini, Russo, Slavov, & Souza, 2022).

(2) Digital Capabilities – Business Intelligence Configuration: In this configuration, innovation arises from the integration of digital infrastructure with analytics and business intelligence practices. This supports the idea that data without processing capacity are inert, and digital systems need to be complemented with tools and skills that translate data into insights (Suša Vugec *et al.*, 2020; Castillo-Vergara *et al.*, 2025).

(3) Strategy–Business Intelligence Configuration: The third configuration highlights a more traditional yet effective route to innovation, where the strategic direction is paired with the intelligent use of data. Here, SMEs utilize business intelligence not just as a technological tool but also as an enabler of strategic alignment, market sensing, and decision support (Radicic & Petković, 2023).

These findings challenge the notion of a universal formula for innovation among SMEs. Instead, they emphasize the importance of contextualizing innovation strategies by considering

digital maturity, institutional support, and managerial capacity (Heredia *et al.*, 2022; Zhang *et al.*, 2022). The research thus contributes not only to the development of theory for SMEs' innovation in emerging economies, but also to actionable insights for practitioners and policymakers seeking to foster innovation ecosystems tailored to national strengths and weaknesses.

Regarding multigroup analysis, additional contributions have emerged in the literature on SME innovation and capability development in emerging economies. First, the confirmation of measurement invariance (MICOM) across ten country pairs, four of which show full invariance, strengthens the comparability of constructs and supports the generalizability of the model across diverse Latin American contexts. This methodological rigour enables more confident theoretical inferences regarding the role of strategic capabilities and digital assets in driving innovation.

Second, the multigroup analysis revealed three statistically significant differences in the structural paths across countries, underscoring the context-dependent nature of innovation mechanisms. Notably, the relationship between Business Intelligence Resources and innovation was significantly stronger in Costa Rica than in both Ecuador ($\Delta\beta = 0.775$; $p = 0.011$) and Mexico ($\Delta\beta = 0.618$; $p = 0.050$), whereas an inverse pattern was observed in the Ecuador–Uruguay comparison ($\Delta\beta = 0.558$; $p = 0.049$). These results suggest that the mediating role of business intelligence is not uniform and that it is particularly salient in specific national environments, possibly due to differences in data infrastructure, analytics adoption, or organizational learning cultures. This supports and extends the literature that posits information systems as contingent enablers of innovation (e.g. Mikalef, Boura, Lekakos, & Krogstie, 2019; Dubey *et al.*, 2021).

Third, the non-significant differences in most structural paths reaffirm the robustness of the proposed model, indicating that despite institutional and infrastructural disparities, the foundational mechanisms linking strategic and digital capabilities to innovation are shared across Latin American SMEs. This finding suggests the potential for developing a regional theoretical framework that encompasses both the common and divergent dynamics of capability-based innovation.

6. Conclusions and implications

In the first term, this study contributes to the theoretical and practical discussion on the innovation development of SMEs in emerging digital economies, particularly in Latin American countries with less technological development and where these firms play an important role in economic growth and employment.

In the first term, it is concluded that strategy capabilities have a positive and significant effect on SMEs' innovation. Reinforcing the need to develop public and business policies that enhance the strategic capabilities, particularly in the Latin American context.

It is also concluded that according to the General Model, Business Intelligence Resources and Digital Capabilities have a statistically mediating effect on the relationship between strategic capabilities and innovation in SMEs, particularly in the context of emerging economies. Furthermore, it is worth noting that these mediation effects occur simultaneously, highlighting the complementarity of resources and capacity building.

Additionally, the mediating effects of Business Intelligence Resources and Digital Capabilities on the relationship between Strategic Capabilities and Innovation in SMEs vary across the countries studied: Argentina, Costa Rica, Ecuador, Mexico, and Uruguay. The institutional and market differences between countries can explain this finding.

6.1 Implications

This study's results have several managerial implications. First, it reinforces the need to strengthen the strategic capabilities to innovate, generating greater competitiveness and

performance. It also highlights that companies should simultaneously evaluate and enhance their development of Business Intelligence Resources and Digital Capabilities to improve their innovation performance.

Additionally, SMEs should design Business Intelligence Resources that consider multiple sources of data, both internal and external, and collect, process, and deliver valuable information to drive innovation. Moreover, it is necessary to clearly define information requirements for innovation purposes. SMEs should also consider aligning their digital capabilities with the routines outlined above, for which purpose they likely need to support and train their employees in digital skills.

From a managerial perspective, the results suggest that investments in Business Intelligence Resources may yield disproportionately higher innovation outcomes in certain countries such as Costa Rica. Managers in these contexts should prioritize not only data infrastructure, but also the development of analytical capabilities and decision-making systems that translate information into innovation. Conversely, in countries where this relationship is weaker or even detrimental (as observed in Ecuador and Uruguay), efforts may need to focus on enhancing absorptive capacity and organizational culture to effectively leverage data.

The finding that digital capabilities do not universally enhance innovation cautions against one-size-fits-all digitalization strategies. For instance, the weaker effect of digital capabilities on innovation in Costa Rica compared to Mexico (though not statistically significant) hints at latent institutional or human capital constraints. Policymakers in such contexts should consider complementary investments in digital talent, infrastructure, and SME-specific training programs to unlock the innovation potential of digital technologies. Further, the consistent strength of the relationship between strategic capabilities and innovation across countries reinforces the importance of long-term orientation, market sensing, and strategic flexibility as pillars of innovation. Managers should cultivate these capabilities through strategic planning, scenario analysis, and stakeholder engagement.

Regarding policy implications, there is a clear need to establish public policies that enhance innovation in SMEs in Latin American countries. These policies should simultaneously focus on developing strategic capabilities, acquiring business intelligence resources, and building digital capabilities.

The cross-national differences uncovered in this study provide evidence-based guidance for public policies. Rather than promoting uniform innovation policies, national governments should design tailored interventions that reflect the maturity of business intelligence systems, digital readiness of SMEs, and their strategic management capabilities. For countries such as Costa Rica and Mexico, strengthening innovation ecosystems through data-sharing platforms and business analytics incubators could be particularly effective. By contrast, for countries such as Ecuador and Uruguay, policy efforts may be better directed towards institutional support mechanisms that bridge the gap between digital investment and actual innovation outcomes.

6.2 Limitations and future research

Despite the robustness of the General Model and confirmation of partial or full measurement invariance across countries, a key limitation of this study lies in the interpretation of country-level differences. While the multigroup analysis allowed us to detect statistically significant variations in specific structural paths, the sample sizes per country were not sufficiently large to ensure equal statistical power across all comparisons. This may have reduced the sensitivity of the analysis in detecting subtle effects, especially in countries with smaller subsamples. Additionally, although the MICOM procedure supported comparability at the construct level, contextual variables not directly included in the model, such as digital maturity, institutional frameworks, or industry composition, may influence structural relationships, potentially limiting the generalizability of country-specific findings. Consequently, the results should be interpreted with caution, particularly when drawing causal or prescriptive conclusions at a national level. Future studies could address this limitation by incorporating larger and more

balanced samples as well as country-level moderators or multilevel modeling techniques that better capture institutional and structural heterogeneity.

To the best of our knowledge, this study is among the earliest to examine business intelligence resources and digital capabilities in relation to strategic capabilities and SME innovation in the Latin American context. Therefore, its limitations present opportunities for additional research in various ways. Future studies could expand the scope in multiple directions.

Because it was cross-sectional, the results of our study offer only a snapshot of reality. A more longitudinal approach would provide a broader view of the short- and long-term effects of business intelligence resources and the development of digital capabilities on the links between strategic capabilities and innovation in SMEs. Another limitation is the sample size and non-probabilistic selection. Including more countries and companies in future research could provide a more complete understanding of the diversity inherent in different sectors and regions.

Acknowledgments

We dedicate this paper to our colleague and friend, Dr Jorge Heredia Pérez (in memoriam), who brought our team together.

References

Ács, Z. J., Lafuente, E., & Szerb, L. (2022). A note on the configuration of the digital ecosystem in Latin America. *Tec Empresarial*, *16*(1), 1–19. doi: 10.18845/te.v16i1.5926.

Al-Khatib, A. W. (2025). How big data-driven organizational capabilities shape innovation performance? An empirical study from small and medium manufacturing enterprises. *Kybernetes*, *54*(1), 456–482. doi: 10.1108/k-06-2023-1070. Available from: https://doi.tec.elogim.com/10.1108/K-06-2023-1070

Argento, R. (2019). Organizational transformation in the digital paradigm: A model for companies in mature sectors in the province of Córdoba. Doctoral Thesis. Faculty of Economics, National University of Córdoba.

Ayyagari, M., Beck, T., & Demirguc-Kunt, A. (2007). Small and medium enterprises across the globe. *Small Business Economics*, *29*(4), 415–434. doi: 10.1007/s11187-006-9002-5.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120. doi: 10.1177/014920639101700108.

Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: An empirical investigation. *MIS Quarterly*, *24*(1), 169–196. doi: 10.2307/3250983.

Bianchi, C., Glavas, C., & Mathews, S. (2017). SME international performance in Latin America: The role of entrepreneurial and technological capabilities. *Journal of Small Business and Enterprise Development*, *24*(1), 176–195. doi: 10.1108/JSBED-09-2016-0142.

Bianchi, C., Mingo, S., & Fernandez, V. (2019). Strategic management in Latin America: Challenges in a changing world. *Journal of Business Research*, *105*, 306–309. doi: 10.1016/j.jbusres.2018.10.022

Branzei, O., & Vertinsky, I. (2006). Strategic pathways to product innovation capabilities in SMEs,. *Journal of Business Venturing*, *21*(1), 75–105. doi: 10.1016/j.jbusvent.2004.10.002.

Carayannis, E. G., Dumitrescu, R., Falkowski, T., Papamichail, G., & Zota, N. R. (2025). Enhancing SME resilience through artificial intelligence and strategic foresight: A framework for sustainable competitiveness. *Technology in Society*, *81*, 102835. doi: 10.1016/j.techsoc.2025.102835.

Castillo-Vergara, M., Duarte Valdivia, D., Muñoz-Cisterna, V., Álvarez-Marín, A., Geldes, C., & Ortiz-Henriquez, R. E. (2025). Digital capabilities of SMEs: Driving the industry 4.0 revolution and measuring its innovative effects. *Academia. Revista Latinoamericana de Administración*, *38*(1), 74–75. doi: 10.1108/arla-08-2023-0137. Available from: https://doi.tec.elogim.com/10.1108/ARLA-08-2023-0137

Cenamor, J., Parida, V., & Wincent, J. (2019). How entrepreneurial SMEs compete through digital platforms: The roles of digital platform capability, network capability and ambidexterity. *Journal of Business Research*, *100*, 196–206. doi: 10.1016/j.jbusres.2019.03.035.

Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly*, *36*(4), 1165–1188. doi: 10.2307/41703503.

Cook, R. D., & Forzani, L. (2023). On the role of partial least squares in path analysis for the social sciences. *Journal of Business Research*, *167*, 114132. doi: 10.1016/j.jbusres.2023.114132.

Davies, P., Bustinza, O. F., Parry, G., & Jovanovic, M. (2023). Unpacking the relationship between digital capabilities, services capabilities, and firm financial performance: A moderated mediation model. *Industrial Marketing Management*, *115*, 1–10. doi: 10.1016/j.indmarman.2023.09.005.

Dubey, R., Gunasekaran, A., Childe, S. J., Fosso Wamba, S., Roubaud, D., & Foropon, C. (2021). Empirical investigation of data analytics capability and organizational flexibility as complements to supply chain resilience. *International Journal of Production Research*, *59*(1), 110–128. doi: 10.1108/JEIM-07-2022-0251.

Eller, R., Alford, P., Kallmünzer, A., & Peters, M. (2020). Antecedents, consequences, and challenges of small and medium-sized enterprise digitalization. *Journal of Business Research*, *112*, 119–127. doi: 10.1016/j.jbusres.2020.03.004.

Escobar-Castillo, A., & Velandia-Pacheco, G. (2023). Categorizing the effects of knowledge management practices on SMES: A literature review. *Tec Empresarial*, *18*(1), 23–42. doi: 10.18845/te.v18i1.6948.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*(4), 1149–1160. doi: 10.3758/BRM.41.4.1149.

Gonzalez-Tamayo, L. A., Maheshwari, G., Bonomo-Odizzio, A., Herrera-Avilés, M., & Krauss-Delorme, C. (2023). Factors influencing small and medium size enterprises development and digital maturity in Latin America. *Journal of Open Innovation: Technology, Market, and Complexity*, *9*(2), 100069. doi: 10.1016/j.joitmc.2023.100069

Grashof, N., & Kopka, A. (2023). Artificial intelligence and radical innovation: An opportunity for all companies?. *Small Business Economics*, *61*(2), 771–797. doi: 10.1007/s11187-022-00698-3.

Grego, M., Bartosiak, M., Palese, B., Piccoli, G., & Denicolai, S. (2025). Disentangling the 'digital': A critical review of information technology capabilities, information technology–enabled capabilities and digital capabilities in business research. *International Journal of Management Reviews*, *27*(2), 238–260. doi: 10.1111/ijmr.12389.

Haddad, M. I., Williams, I. A., Hammoud, M. S., & Dwyer, R. J. (2020). Strategies for implementing innovation in small and medium-sized enterprises. *World Journal of Entrepreneurship, Management and Sustainable Development*, *16*(1), 12–29. doi: 10.1108/WJEMSD-05-2019-0032.

Hair, J. F., Jr, Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, *26*(2), 106–121. doi: 10.1108/EBR-10-2013-0128.

Hair, J. F., Sarstedt, M., & Ringle, C. M. (2019). Rethinking some of the rethinking of partial least squares. *European Journal of Marketing*, *53*(4), 566–584. doi: 10.1108/EJM-10-2018-0665.

Henseler, J. (2017). Partial least squares path Modeling. In P. Leeflang, J. Wieringa, T. Bijmolt, & K. Pauwels (Eds.), *Advanced Methods for Modeling Markets. International Series in Quantitative Marketing*. Cham: Springer. doi: 10.1007/978-3-319-53469-5_12.

Heredia, J., Geldes, C., Kunc, M. H., & Flores, A. (2019). New approach to the innovation process in emerging economies: The manufacturing sector case in Chile and Peru. *Technovation*, *79*, 35–55. doi: 10.1016/j.technovation.2018.02.012.

Heredia, J., Castillo-Vergara, M., Geldes, C., Gamarra, F. M. C., Flores, A., & Heredia, W. (2022). How do digital capabilities affect firm performance? The mediating role of technological capabilities in the 'new normal'. *Journal of Innovation & Knowledge*, *7*(2), 100171. doi: 10.1016/j.jik.2022.100171.

Hongyun, T., Sohu, J. M., Khan, A. U., Junejo, I., Shaikh, S. N., Akhtar, S., & Bilal, M. (2025). Navigating the digital landscape: Examining the interdependencies of digital transformation and big data in driving SMEs' innovation performance. *Kybernetes*, *54*(3), 1797–1825. doi: 10.1108/k-07-2023-1183. Available from: https://doi.tec.elogim.com/10.1108/K-07-2023-1183

Işık, Ö., Jones, M. C., & Sidorova, A. (2013). 'Business intelligence success: The roles of BI capabilities and decision environments', *Information & Management*, *50*(1), 13–23. doi: 10.1016/j.im.2012.12.001.

Kane, G. C., Palmer, D., Phillips, A. N., & Kiron, D. (2015). Is your business ready for a digital future?. *MIT Sloan Management Review*, *56*(4), 37.

Kane, G., Palmer, D., Phillips, A., Kiron, D., & Buckley, N. (2017). Achieving digital maturity. MIT Sloan Management Review and Deloitte University Press.

Klein, R., & Arun, R. (2009). Interfirm information flow in logistics supply chain relationships. *MIS Quarterly*, *33*(4), 735–762. doi: 10.2307/20650325.

Lara-Pérez, J. A., Canibe-Cruz, F., & Duréndez, A. (2025). How the interaction of innovation and ERP systems on business intelligence affects the performance of Mexican manufacturing companies. *Information Technology & People*, *38*(3), 1403–1429. Available from: https://doi.tec.elogim.com/10.1108/ITP-04-2022-0262

Liu, L., Long, J., Liu, R., Fan, Q., & Wan, W. (2022). Examining how and when digital platform capabilities drive technological innovation: A strategic information perspective. *Journal of Enterprise Information Management*, *36*(2), 553–582. doi: 10.1108/JEIM-01-2022-0033.

Luo, J., Yu, D., & Jiang, L. (2019). Information flow–sustainability and performance implications. *Journal of the Operational Research Society*, *70*(8), 1253–1274. doi: 10.1080/01605682.2018.1489347.

Menchini, F., Russo, P. T., Slavov, T. N. B., & Souza, R. P. (2022). Strategic capabilities for business model digitalization. *Revista de Gestão*, *29*(1), 2–16. doi: 10.1108/REGE-10-2020-0086.

Mikalef, P., Boura, M., Lekakos, G., & Krogstie, J. (2019). Big data analytics capabilities and innovation: The mediating role of dynamic capabilities and moderating effect of the environment. *British Journal of Management*, *30*(2), 272–298. doi: 10.1111/1467-8551.12343

Morales, P., Haique, A., Cortez, E., Filippa, L., & Adra, R. (2024). Determining factors in the implementation of industry 4.0 in Argentine SMEs. *Journal of Technology Management and Innovation*, *19*(1), 66–78. doi: 10.4067/S0718-27242024000100066.

Mousavi, S., Bossink, B., & van Vliet, M. (2018). Dynamic capabilities and organizational routines for managing innovation towards sustainability. *Journal of Cleaner Production*, *203*, 224–239. doi: 10.1016/j.jclepro.2018.08.215.

Münch, C., Marx, E., Benz, L., Hartmann, E., & Matzner, M. (2022). Capabilities of digital servitization: Evidence from the socio-technical systems theory. *Technological Forecasting and Social Change*, *176*, 121361. doi: 10.1016/j.techfore.2021.121361.

OECD.. (2019). *OECD SME and entrepreneurship Outlook 2019*. Paris: OECD Publishing. doi: 10.1787/34907e9c-en.

Orero-Blat, M., Palacios-Marqués, D., Leal-Rodriguez, A. L., & Ferraris, A. (2025). Beyond digital transformation: A multi-mixed methods study on big data analytics capabilities and innovation in enhancing organizational performance. *Review of Managerial Science*, *19*(2), 649–685. doi: 10.1007/s11846-024-00768-8.

Partanen, J., Kohtamäki, M., Patel, P. C., & Parida, V. (2020). Supply chain ambidexterity and manufacturing SME performance: The moderating roles of network capability and strategic information flow. *International Journal of Production Economics*, *221*, 107470. doi: 10.1016/j.ijpe.2019.08.005.

Peng, M. W., Sun, S. L., Pinkham, B., & Chen, H. (2009). The institution-based view as a third leg for a strategy tripod. *Academy of Management Perspectives*, *23*(3), 63–81. doi: 10.5465/amp.2009.43479264.

Peres, W., & Primi, A. (2024). Industrial policy in Latin America. In *The New Palgrave Dictionary of Economics* (pp. 1–11). London: Palgrave Macmillan.

Proksch, D., Rosin, A. F., Stubner, S., & Pinkwart, A. (2021). The influence of a digital strategy on the digitalization of new ventures: The mediating effect of digital capabilities and digital culture. *Journal of Small Business Management*, *62*(1), 1–29. doi: 10.1080/00472778.2021.1883036.

Radicic, D., & Petković, S. (2023). Impact of digitalization on technological innovations in small and medium-sized enterprises (SMEs). *Technological Forecasting and Social Change*, *191*, 122474. doi: 10.1016/j.techfore.2023.122474.

Rialti, R., Marzi, G., Ciappei, C., & Busso, D. (2019). Big data and dynamic capabilities: A bibliometric analysis and systematic literature review. *Management Decision*, *57*(8), 2052–2068. doi: 10.1108/MD-07-2018-0821.

Rojas-Segura, J., Faith-Vargas, M., & Martinez-Villavicencio, J. (2023). Conceptualizing digital transformation using semantic decomposition. *Tec Empresarial*, *17*(3), 63–75. doi: 10.18845/te.v17i3.6850.

Sarango-Lalangui, P., Rodríguez Jhon, T. C., Tapia Carreño, K., & Galarza, B. (2023). Evolution and trends in SME digitization research: A bibliometric analysis. *Journal of Technology Management and Innovation*, *18*(1), 53–66. doi: 10.4067/S0718-27242023000100053.

Saunila, M. (2020). Innovation capability in SMEs: A systematic review of the literature. *Journal of Innovation & Knowledge*, *5*(4), 260–265. doi: 10.1016/j.jik.2019.11.002.

Stone, D., & Woodcock, D. (2014). Interactive, direct and digital marketing: A future that depends on better use of business intelligence. *Journal of Research in Interactive Marketing*, *8*(1), 4–17. doi: 10.1108/JRIM-07-2013-0046.

Suša Vugec, D., Bosilj Vukšić, V., Pejić Bach, M., Jaklič, J., & Indihar Štemberger, M. (2020). Business intelligence and organizational performance: The role of alignment with business process management. *Business Process Management Journal*, *26*(6), 1709–1730. doi: 10.1108/BPMJ-08-2019-0342.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509–533. doi: 10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z.

Vaithilingam, S., Ong, C. S., Moisescu, O. I., & Nair, M. S. (2024). Robustness checks in PLS-SEM: A review of recent practices and recommendations for future applications in business research. *Journal of Business Research*, *173*, 114465. doi: 10.1016/j.jbusres.2023.114465.

Wang, G., Wang, Y., Ju, X., & Rui, X. (2022). Effects of political networking capability and strategic capability on exploratory and exploitative innovation: Evidence from traditional manufacturing firms in China. *Journal of Manufacturing Technology Management*, *33*(3), 618–642. doi: 10.1108/JMTM-07-2021-0237.

Westerman, G., Tannou, M., Bonnet, D., Ferraris, P., & McAfee, A. (2012). The digital advantage: How digital leaders outperform their peers in every industry. *MITSloan Management and Capgemini Consulting*, *2*, 2–23. MA. Available from: https://ide.mit.edu/sites/default/files/The_Digital_Advantage__How_Digital_Leaders_Outperform_their_Peers_in_Every_Industry.pdf

World Intellectual Property Organization (WIPO) (2022). Global Innovation Index 2022: What is the future of innovation-driven growth?. Geneva: WIPO. doi: 10.34667/tind46596

Zhang, X., Xu, Y., & Ma, L. (2022). Research on successful factors and influencing mechanism of the digital transformation in SMEs. *Sustainability*, *14*(5), 2549. doi: 10.3390/su14052549

Zong, Z., Anwar, M. A., Khan, S., Asmi, F., & Hussain, N. (2025). Big-data AI analytics in value-chain innovation and international marketing strategy: Insights from SMEs in cultural and creative industries. *International Marketing Review*, *42*(4), 556–584. Available from: https://doi.tec.elogim.com/10.1108/IMR-02-2024-0049

Corresponding author
Juan Carlos Leiva can be contacted at: jleiva@itcr.ac.cr

Associate editor: Rafael Palazzi