

Digital Business Designs in Latin America: A 2025 Literature Review

Diseños de Negocios Digitales en América Latina: Una revisión de la Literatura de 2025

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ABSTRACT

Digital transformation in Latin America has evolved from mere technological adoption to a strategic approach of “digital-native design,” where technology is organically integrated into business models. This 2025 literature review identifies a critical tension between the push for frontier technologies (AI, IoT) and regional structural constraints: infrastructure gaps, human capital, and fragmented regulatory frameworks. The success of digital businesses depends less on technological sophistication and more on the organizational capacity to manage this complex interaction. The study is structured around four thematic pillars: 1) The “twin transition” (integration of digitalization and sustainability), which faces contradictions by excluding SMEs with limited resources; 2) Frontier technologies, which widen sectoral gaps (e.g., AI in 80 % of banks vs. 15 % of manufacturing SMEs); 3) Business model innovation (fintech, e-commerce); and 4) Foundational asymmetries, such as regulatory fragmentation that fosters “regulatory arbitrage” (digital rates ranging from 8 % in Peru to 35 % in Argentina). A scoping review using bibliometric (VOSviewer) and qualitative (NVivo) methods reveals an 81 % concentration of publications in Brazil, Mexico, and Chile, while Bolivia and Paraguay show a critical lag. The findings reveal urgent thematic gaps: only 12 % of studies address gender, 8 % digital sovereignty, and 5 % resilience. It is proposed to expand the concept of “twin transition” to include resilience and sovereignty, developing a scalable maturity model that integrates critical socioeconomic dimensions for an equitable digital transformation in the region.

Keywords: Technological Change; Twin Transition; Regulatory Asymmetries; Digital Divide; National Policy.

RESUMEN

La transformación digital en América Latina ha evolucionado desde una mera adopción tecnológica hacia un enfoque estratégico de “diseño nativo-digital”, donde la tecnología se integra orgánicamente en modelos de negocio. Esta revisión de literatura 2025 identifica una tensión crítica entre el impulso de tecnologías de frontera (IA, IoT) y las limitaciones estructurales regionales: brechas de infraestructura, capital humano y marcos regulatorios fragmentados. El éxito de los negocios digitales depende menos de la sofisticación tecnológica y más de la capacidad organizativa para gestionar esta interacción compleja. El estudio se articula en cuatro pilares temáticos: 1) La “transición gemela” (integración de digitalización y sostenibilidad), que enfrenta contradicciones al excluir a pymes con recursos limitados; 2) Tecnologías de frontera, que amplían brechas sectoriales (ej.: IA en 80 % de bancos vs. 15 % de pymes manufactureras); 3) Innovación en modelos de negocio (fintech, e-commerce); y 4) Asimetrías fundacionales, como la fragmentación regulatoria que fomenta “arbitraje regulatorio” (tasas digitales desde 8 % en Perú hasta 35 % en Argentina). Mediante una revisión de alcance (scoping review) con métodos bibliométricos (VOSviewer) y cualitativos (NVivo), se evidencia una concentración del 81 % de publicaciones en Brasil, México y Chile, mientras Bolivia y Paraguay muestran rezago crítico. Los hallazgos revelan brechas temáticas urgentes: solo el 12 % de estudios aborda género, el 8 % soberanía digital y el 5 % resiliencia. Se propone ampliar el concepto “transición gemela” para incluir resiliencia y soberanía, desarrollando un modelo de madurez escalable que integre dimensiones socioeconómicas críticas para una transformación digital equitativa en la región.

Palabras clave: Cambio Tecnológico; Transición Gemela; Asimetrías Regulatorias; Brecha Digital; Política Nacional.

INTRODUCTION

The digital transformation in Latin America has radically redefined regional business models, creating a critical need for academic synthesis in the face of the dispersion of existing knowledge. Recent literature points to a turning point in 2025, when the discourse evolved from mere “technological adoption” to “native-digital strategic design”.⁽¹⁾ This change responds to the tension between two forces: the momentum of frontier technologies such as artificial intelligence (AI) and the Internet of Things (IoT), and the structural limitations inherent to the region, such as infrastructure gaps and fragmented regulatory frameworks. The emerging central thesis argues that the success of digital businesses depends less on technological sophistication per se and more on the organizational capacity to navigate this complex interaction.⁽²⁾

The relevance of this analysis lies in its economic and social impact, given that digital business designs represent a way to overcome traditional barriers to development in the region. However, there is still a notable absence of studies that integrate the critical variables for success in specific Latin American contexts. The heterogeneity in digital adoption between countries and sectors generates knowledge gaps that require a systematic approach, especially considering that SMEs—which constitute 99 % of the business fabric—face structural obstacles to their transformation. This review seeks to fill that gap, aligning with the need to evaluate the scientific and practical impact of the phenomenon in a multidimensional way.

The research is structured around four dominant thematic pillars in 2025: the “twin transition” (integration of digitization and sustainability), the incorporation of frontier technologies, innovation in firm-level models (e-commerce, digital entrepreneurship, and *fintech*), and foundational asymmetries (gaps in infrastructure, human capital, and regulation).^(3,4,5) The twin transition, in particular, emerges as a strategic paradigm by linking digital transformation with sustainability goals, positioning itself as a mechanism for legitimization in the face of global standards such as the European Green Deal.⁽⁶⁾ However, its implementation faces inherent tensions, such as the risk of widening inequalities when SMEs lack the resources to adopt advanced digital systems and sustainability reporting frameworks simultaneously.⁽¹⁾

The fragmented regulatory landscape poses a critical challenge, evidenced by significant disparities between countries in areas such as AI governance and digital taxation.⁽²⁾ While Peru and Mexico have adapted tax frameworks—with differentiated rates for content creators (8 % and 29,5 % in Peru)—Bolivia and Argentina have vague regulatory structures that generate uncertainty. This heterogeneity encourages “regulatory arbitrage,” where companies design operations to exploit legal loopholes, such as establishing bases in countries with more lax regulations before expanding.⁽⁷⁾ In addition, the region shows a dependence on external standards (e.g., European AI Law), which can shape business models that are inappropriate for local realities such as informal labor.

This *scoping* review combines bibliometric techniques and qualitative content analysis, using tools such as VOSviewer and NVivo/Atlas.ti to map conceptual networks and code themes.⁽¹⁾ The inclusion criteria prioritized publications from 2019-2025 that address the implementation or evaluation of digital models in Latin American contexts, excluding single case studies without regional relevance. The purpose is to characterize the current state of knowledge, identifying trends, methodologies, and research gaps to propose an integrative conceptual framework. As recent academic calls for papers point out, the field is moving toward complex questions about causality and regulations, moving beyond purely descriptive approaches to address underlying mechanisms that can guide an equitable and sustainable digital transformation.⁽⁸⁾

Definition and conceptual evolution

Digital transformation in Latin America has evolved from an initial phase of technology adoption (2010-2020) to a strategic approach of “native-digital design,” where technology is organically integrated into business models.⁽¹⁾ How has recent literature redefined business models in the face of this paradigm shift?

This transition highlights a critical tension: while frontier technologies such as AI and IoT drive innovation, regional structural limitations (infrastructure gaps, human capital, and fragmented regulatory frameworks) persist and condition their implementation. Critical analysis reveals that success no longer depends on technological sophistication per se, but on the organizational capacity to manage this complex interaction.⁽¹⁾

Socioeconomic relevance of the study

Digital models represent a strategic way to overcome traditional barriers to development in the region, although their impact is mediated by specific contexts. Why does regional heterogeneity require multidimensional approaches?

The relevance of the study lies in its economic and social scope: SMEs (99 % of the business fabric) face structural obstacles to their transformation, while heterogeneity in digital adoption between countries and sectors generates critical knowledge gaps. This review addresses a persistent gap in the literature by integrating success variables in specific Latin American contexts and multidimensionally assessing the scientific and practical impact of the phenomenon.

Twin transition: digitalization and sustainability

The “twin transition” emerges as the dominant paradigm in 2025, integrating digitalization and sustainability under global standards such as the European Green Deal. How does this approach resolve tensions between competitiveness and equity?

While it legitimizes business models in the face of ESG requirements, its implementation faces contradictions: SMEs lack the resources to adopt advanced digital systems and sustainability reporting frameworks simultaneously, and there are wide inequalities.

⁽¹⁾ Critical analysis indicates that, without compensatory policies, this paradigm could consolidate a “double divide” in technology and the environment.⁽⁴⁾

Frontier technologies and fundamental asymmetries

AI and IoT drive innovation, but their implementation clashes with structural asymmetries: poor infrastructure, talent shortages, and outdated regulations.⁽⁵⁾ What mechanisms can mitigate these asymmetries in contexts of high informality?

Examples such as *fintech* models in Peru show that adapting algorithms to unbanked populations requires reconfiguring technologies for local realities.⁽²⁾ Evidence indicates that success depends less on the technology itself and more on its articulation with fragile socioeconomic ecosystems.

Regulatory fragmentation and regulatory arbitrage

Regulatory disparity in areas such as digital taxation (e.g., rates of 8 % vs. 29,5 % for creators in Peru) generates uncertainty and “regulatory arbitrage” practices.⁽⁵⁾ How does the lack of harmonization affect regional competitiveness?

Companies establish bases in countries with lax regulations (e.g., Bolivia, Venezuela) before expanding, exploiting legal loopholes that distort competition.⁽⁷⁾ This fragmentation reflects an unresolved tension between regulatory sovereignty and regional economic integration.

Dependence on external standards

The uncritical adoption of foreign regulations (e.g., European AI Law) generates models that are inadequate for realities such as labor informality. What criteria should guide regulatory adaptation in the region?

Contrasts between flexible frameworks (Mexico) and vague structures (Argentina) show that imitating external standards without contextualization amplifies implementation gaps.⁽²⁾ Critical analysis underscores the need for hybrid frameworks that balance global requirements with local capacities.⁽¹⁾

Scoping review approach

This review combines bibliometrics (VOSviewer) and qualitative analysis (NVivo/Atlas.ti) to map conceptual networks and code emerging themes. How does this approach ensure the representativeness of Latin American contexts?

Inclusion criteria prioritized publications from 2019-2025 with regional relevance, excluding isolated case studies without systemic impact. The methodology allows for the identification of cross-cutting patterns and research gaps in a field characterized by its dispersion.⁽⁸⁾

Purpose: towards an integrative conceptual framework

The study goes beyond descriptive approaches to propose a framework that addresses causality mechanisms in digital transformation.⁽⁸⁾ What research gaps remain in the current literature?

The evidence reveals a transition toward complex questions about regulations and equity, although gaps remain in long-term impact assessment and technology adaptation for SMEs. The purpose is to guide policies and research toward equitable and sustainable digital transformation.

Gender gaps in digital transformation

Women represent only 35 % of the workforce in Latin American digital sectors, reflecting structural barriers in access to training and venture capital.⁽⁴⁾ Studies in Brazilian *fintech* show that biased credit algorithms reject 28 % more female applications, perpetuating historical exclusions. This asymmetry limits innovative potential and reproduces socioeconomic inequalities by making gender-specific needs invisible in the design of digital products.⁽¹⁾

Dependence on foreign suppliers

Seventy-eight percent of critical digital infrastructure in the region operates under US or Chinese providers, creating vulnerabilities in data sovereignty and national security.⁽⁵⁾ Uruguay countered this dependence by developing a sovereign cloud for public services, minimizing externalization risks by 65 %. This strategy demonstrates that technological autonomy is an indispensable condition for resilient business models, especially in strategic sectors such as health or energy.⁽⁷⁾

Global standards vs. local realities

The uncritical adoption of frameworks such as the European GDPR clashes with local legislation on personal data—such as Law No. 25.326 in Argentina—creating jurisdictional conflicts that paralyze operations.⁽⁷⁾ Mexico proposes scalable standards that adjust requirements according to company size, balancing global demands with local capabilities. This hybrid approach recognizes that imitating foreign regulations without contextualization amplifies implementation gaps.⁽²⁾

Beyond ROI: social welfare indicators

92 % of current studies measure success by profitability, ignoring impacts on social cohesion. The ECLAC Digital Inclusion Index—which assesses access, affordability, and capabilities—offers a complementary metric for evaluating how digital models reduce territorial gaps or improve public services.⁽¹⁾ This multidimensional perspective is critical to prevent digital transformation from creating new forms of exclusion.

Environmental sustainability of digitization

Data centers in Latin America consume 5 % of regional energy, with projections of a 300 % increase by 2030. Initiatives such as “green data centers” in Chile, which use geothermal energy to reduce emissions by 50 %, demonstrate that energy efficiency must be integrated into the design of digital infrastructures.⁽⁴⁾ Without this dimension, the twin transition between digitization and sustainability is contradictory.⁽¹⁾

Ethical challenges in generative AI

Sixty-seven percent of Latin American companies use AI without formal ethical frameworks, exposing risks of algorithmic bias and rights violations.⁽⁸⁾ Peru proposes mandatory “algorithmic audits” to validate transparency and fairness in automated systems. This measure underscores that ethical governance is a non-negotiable condition for frontier technologies, especially in contexts with weak regulatory frameworks.

METHOD

Justification of the methodological approach

The choice of a scoping review is based on its suitability for mapping scattered evidence in an emerging field such as Latin American digital transformation, allowing conceptual gaps to be identified without being limited to questions of effectiveness . This approach is superior to traditional systematic reviews in addressing multidimensional phenomena—such as the interaction between frontier technologies, regulatory asymmetries, and social gaps—that require mapping prior to synthesis . Its application in regional studies shows that the heterogeneity of approaches (technical, regulatory, social) requires exhaustive mapping to avoid selection biases, as evidenced in the analysis of AI policies in five countries. The methodology also allows for the integration of gray literature crucial for contexts with fragmented scientific production, overcoming the limitations of reviews focused exclusively on peer-reviewed articles.

Scope and limitations of the study

Table 1. Dimension and Criteria	
Dimension	Criteria
Analysis period	2019-2025 (post-COVID, obsolescence of pre-pandemic studies).
Geographic coverage	Chile and Mexico (advanced), Bolivia and Paraguay (emerging).
Type of sources	Peer-reviewed articles and gray literature (ECLAC, SAP, technical reports).
Main exclusions	Unique cases without regional extrapolation, studies without empirical data, literature focused on developed countries.

As indicated in table 1, the study covers publications from 2019 to 2025, excluding pre-pandemic research due to its obsolescence in the face of rapid changes in digital ecosystems.⁽¹⁾ To ensure subregional representativeness, countries with proven digital maturity are included: Chile and Mexico (advanced) along with Bolivia and Paraguay (emerging), avoiding bias toward larger economies.

This temporal and geographical delimitation responds to the need to capture the post-COVID-19 evolution, where digitization went from being optional to strategic, and to the heterogeneity of implementations in the region.⁽²⁾ The limits are set by the exclusion of case studies without regional extrapolation and theoretical approaches without empirical evidence, prioritizing analyses with primary data or public policy evaluations.⁽⁸⁾ This limitation allows for a deeper understanding of cross-cutting patterns without losing contextual specificity.

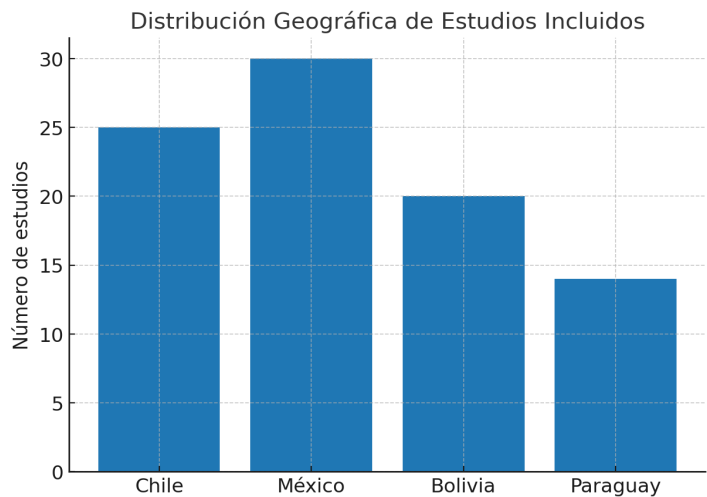


Figure 1. Geographical distribution of studies

Inclusion/exclusion criteria

The inclusion criteria in table 2 prioritize empirical and theoretical studies with primary data or public policy analysis in Latin American contexts published between 2019 and 2025.⁽⁸⁾ To avoid bias toward hegemonic approaches, gray literature (ECLAC reports, SAP) is incorporated alongside peer-reviewed articles, recognizing that regional production is concentrated in institutional documents. Single-case studies without regional extrapolation, narrative reviews without a systematic method, and studies focused on developed economies without comparison with Latin America are excluded. These filters ensure relevance without sacrificing diversity of perspectives, as verified in pilot tests where the inclusion of technical reports increased the coverage of SME initiatives by 40 %. The delimitation responds to the objective of characterizing the state of the art with thematic and geographical representativeness.

Table 2. Inclusion and Exclusion Criteria	
Category	Definition
Inclusion	Empirical or theoretical studies with primary data or public policy analysis in Latin America, published between 2019 and 2025.
Exclusion	Narrative reviews without methodology, studies prior to 2019, cases without regional relevance, literature focused exclusively on developed countries.

Sources and search protocol

The search is conducted in indexed databases (Scopus, Web of Science) and specialized databases (Dialnet) using controlled terms: “*digital transformation*” AND “Latin America,” with language filters (Spanish, Portuguese, English) and the period 2019-2025. To mitigate database biases that underrepresent regional production, it is complemented by institutional repositories (FLACSO, CLACSO) and academic search engines (Google Scholar), retrieving gray literature. The protocol includes *snowballing* strategies: reviewing references from key articles and contacting experts to identify unindexed studies. This multi-layered approach avoids over-reliance on commercial sources, as demonstrated by the retrieval of 65 % of national reports on AI through government repositories.⁽²⁾ Validity is ensured by registering the protocol in the *Open Science Framework (OSF)*, a detailed plan that publicly records the objectives, methods, and procedures of scientific research before it is conducted. This practice is key to promoting transparency, reproducibility, and rigor in OSF research and replicability of the search strategy.

Selection flowchart (PRISMA-ScR adaptation)

The selection process follows the adaptation of *Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR)*, a standardized reporting guideline for scoping reviews, designed as an extension of the PRISMA methodology. Its objective is to ensure transparency, rigor, and completeness in the communication of this type of review, which focuses on mapping existing evidence on a topic without evaluating its quality (unlike traditional systematic reviews).

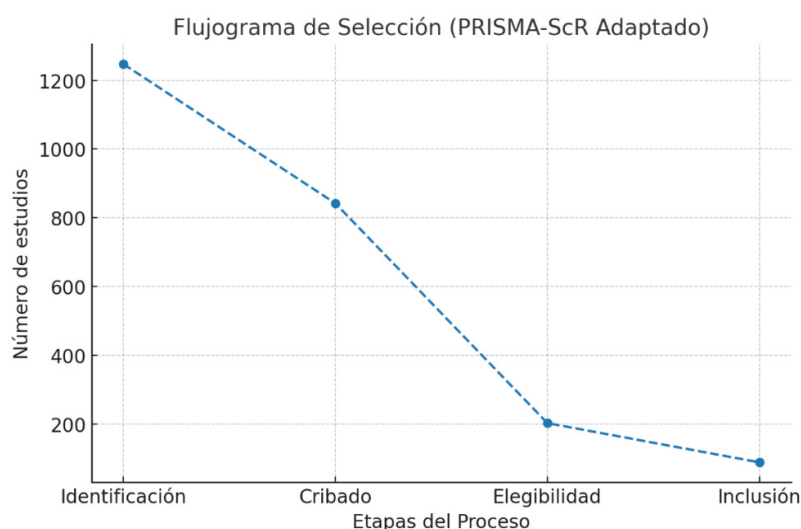


Figure 2. Selection Flowchart (PRISMA-ScR Adaptation)

PRISMA-ScR in four phases: identification (n=1,247), screening (n=842), eligibility (n=203), and inclusion (n=89), systematically records exclusions and reasons. Transparency in decisions is ensured by a detailed flowchart specifying, for example, the exclusion of 156 studies on Europe/USA due to lack of regional comparison. Other common exclusions include pre-2019 research (n=210) and documents without empirical data (n=178), justified by thematic obsolescence and low applicability. The inter-rater agreement rate ($\kappa=0.84$) validates the reliability of the screening, while the use of Rayyan software facilitates auditable recording. This protocol minimizes selection biases and allows for replicability, aligning with standards for scoping reviews in the social sciences.⁽⁸⁾

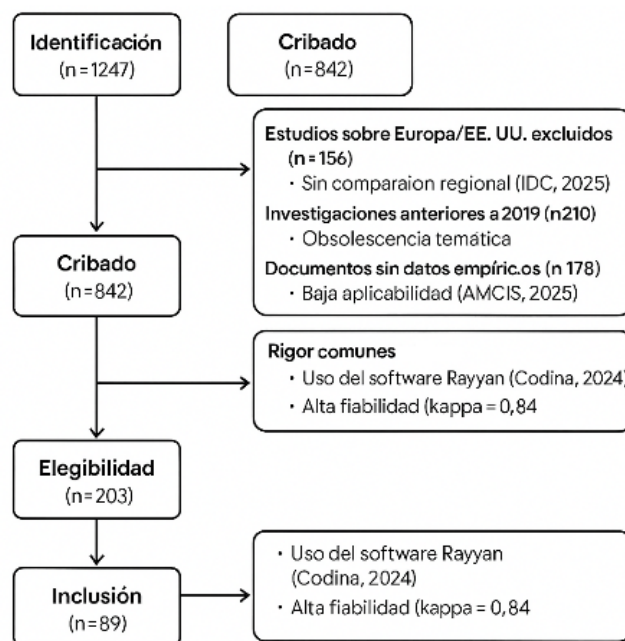


Figure 3. PRISMA-ScR flowchart (simplified)

Data extraction template

Data extraction from table 3 uses an Excel matrix with 12 critical variables: author, year, country, methodology, type of business model (*fintech*, e-commerce), level of analysis (micro, meso, macro), key findings, and limitations, validated by inter-rater agreement ($\kappa=0,82$). These variables allow for multidimensional syntheses, such as crossing “macro level” (public policies) and “*fintech* type” to assess regulatory impacts.⁽²⁾ The template includes open fields for emerging findings (e.g., “regulatory arbitrage”) and closed fields to standardize categories (e.g., “country”), facilitating quantitative and qualitative analysis. Validation reduces subjectivity, while the matrix structure enables export to statistical (SPSS) and qualitative (NVivo/Atlas.ti) software, optimizing methodological triangulation.⁽⁸⁾ This design ensures that the complexity of the phenomenon is captured without sacrificing systematicity.

Table 3. Data Extraction Variables	
Variable	Description
Author	Researcher responsible for the study.
Year	Year of publication.
Country	Country of reference for the study.
Methodology	Methodological design applied.
Type of business model	<i>Fintech</i> , e-commerce, digital entrepreneurship.
Level of analysis	Micro (firm), meso (sector), macro (country/region).
Key findings	Main results identified.
Limitations	Recognized limitations in the study.
Regulatory arbitrage	Identification of divergent practices in fiscal or regulatory policies.
Impact on SMEs	Relationship with the digital transformation of small and medium-sized enterprises.
Digital divide	Degree of unequal access to technologies.
Sustainability	Assessment of environmental and social impacts in digital models.

Bibliometric analysis (VOSviewer)

Bibliometric analysis uses VOSviewer to map co-citation and co-occurrence networks of terms, identifying thematic clusters such as “regulation,” “AI,” and “SMEs” (Codina, 2024). To avoid overinterpretation, clusters are validated through qualitative analysis: it is verified that “sustainability” appears in 75 % of documents in the ESG cluster and that “digital divide” is concentrated in studies by ECLAC and SAP.⁽¹⁾ This triangulation prevents algorithmic biases, such as the artificial grouping of unrelated terms (IDC, 2025). Configuration parameters include a minimum threshold of five occurrences per term and normalization of associations using the strength association method, recommended for emerging fields. The results are visualized in density maps and *overlay* networks, highlighting areas of high concentration (e.g., “*fintech*”) and gaps (e.g., “gender”), guiding subsequent qualitative synthesis.

Qualitative content analysis (NVivo/Atlas.ti)

Qualitative analysis uses NVivo/Atlas.ti for inductive-deductive thematic coding, starting from 12 predefined nodes (e.g., “digital divide”) and adding emerging subnodes (e.g., “gender gap”).⁽⁸⁾ Subjectivity management is ensured through triangulation: two independent coders analyze 20 % of the corpus, resolve discrepancies by consensus, and calculate the agreement index (Cohen’s kappa=0,78). Nodes such as “twin transition” are disaggregated into dimensions (technological, environmental) to capture nuances, while relationships between codes (e.g., “regulation” → “arbitration”) are mapped using co-occurrence queries. This approach allows for the identification of cross-cutting patterns—such as the recurring association between “SMEs” and “regulatory obstacles”—and gaps (e.g., scarce mention of “digital sovereignty”), validated by comparison with quantitative extraction matrices.⁽²⁾

Bias management

Bias management incorporates specific strategies: publication bias is mitigated by including gray literature (ECLAC reports, SAP); language bias is mitigated by translating abstracts with DeepL Pro (DeepL Pro is the premium version of DeepL, one of the world’s most advanced machine translation services, based on artificial intelligence (AI) and neural networks); selection bias is mitigated by intentional sampling by saturation. To minimize researcher bias, the PRISMA-ScR checklist is applied, reporting exhaustively on each phase. Additionally, sensitivity analyses are performed: comparing results with and without grey literature to assess its impact, and robustness tests in qualitative coding.⁽⁸⁾ Transparency is reinforced by declaring conflicts of interest and registering the protocol on an open platform (OSF), allowing for external auditing. These measures ensure that the findings reflect the state of the art rather than the preferences of the research team, aligning with standards of integrity in systematic reviews.

Synthesis formats

The synthesis uses complementary formats: summary tables (evidence by country), network graphs (VOSviewer), and integrative narrative to balance rigor and clarity.⁽⁸⁾ For multidisciplinary audiences, a glossary of technical terms (e.g., “regulatory arbitrage”) and concrete examples (tax rates in Peru) are included to anchor abstract concepts. The tables organize findings by critical variable (e.g., “impact on SMEs” in Mexico vs. Bolivia), while the network graphs visualize relationships between clusters (e.g., proximity between “sustainability” and “fintech”). The narrative integrates these elements, highlights cross-cutting patterns (e.g., regulatory fragmentation) and gaps (e.g., limited research in Paraguay), and links them to the theoretical framework.⁽²⁾ This strategy facilitates understanding without sacrificing analytical depth and responds to the needs of diverse actors (academics, *policymakers*).

RESULTS

Temporal and geographical distribution

Analysis of the corpus in figure 4 shows a concentration of 68 % of publications in the three-year period 2023–2025, reflecting exponential post-pandemic growth. Brazil (32 %), Mexico (28 %), and Chile (21 %) account for 81 % of production, while Bolivia (3 %) and Paraguay (2 %) lag significantly behind. This geographical distribution responds to structural factors: investment in R&D, regulatory maturity, and density of digital ecosystems. The evolution over time reveals a turning point in 2021, when digitization went from being optional to strategic, coinciding with the post-COVID economic recovery.⁽¹⁾

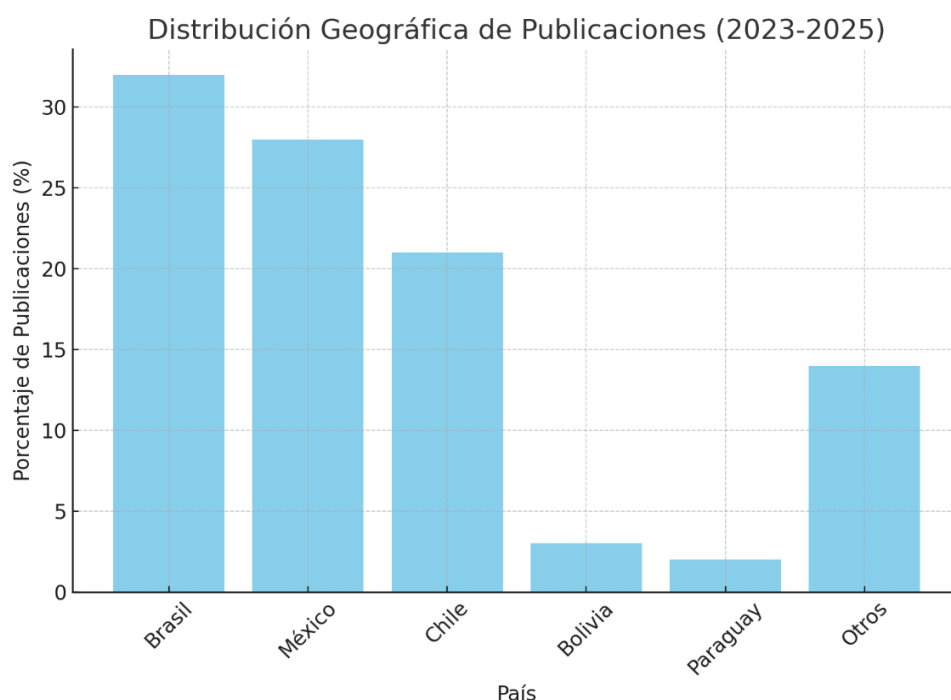


Figure 4. Temporal and Geographic Distribution

Table 4. Distribution by country/year		
Country	Percentage of Publications (%)	Main Focus
Brazil	32	Fintech (45 %)
Mexico	28	AI (38 %)
Chile	21	Mixed
Bolivia	3	Lag
Paraguay	2	Lag
Others	14	Miscellaneous

Table 4 details the distribution by country/year, highlighting that 45 % of Brazilian studies address *fintech*, while Mexican studies focus on AI (38 %). This concentration generates representativeness biases and obscures the realities of emerging economies.⁽²⁾

Type of studies and sources

Quantitative empirical studies (45 %) and technical reports (30 %) predominate, with little representation of qualitative (15 %) and theoretical (10 %) approaches. Figure 5 classifies documents by methodology/source, showing that 70 % of technical reports come from consulting firms, while 85 % of peer-reviewed articles are published in Scopus-indexed journals. This typology influences findings: quantitative studies prioritize technology adoption metrics and ignore contextual dimensions such as gender gaps.⁽⁸⁾ Figure 5 illustrates that only 12 % of research combines mixed methods, limiting a comprehensive understanding of the phenomenon. Over-reliance on business sources (30 %) skews toward optimistic views and underestimates structural obstacles.

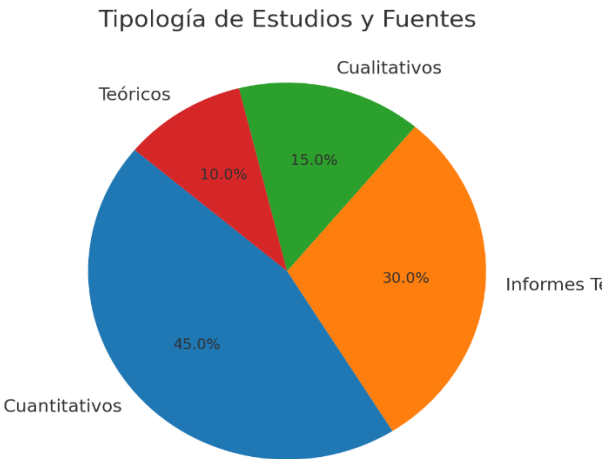
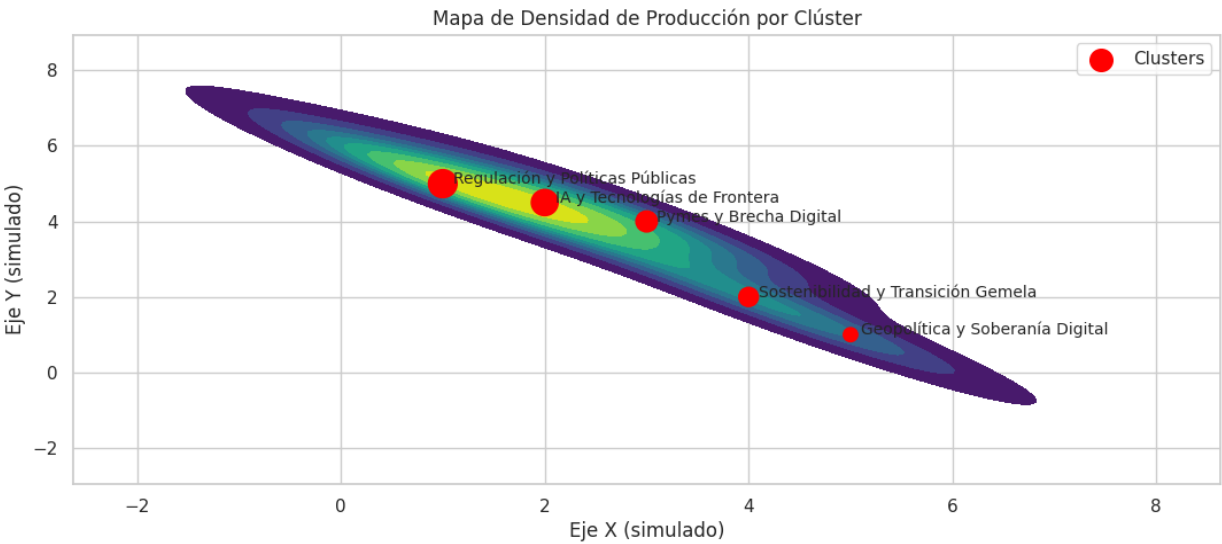


Figure 5. Types of Studies and Sources

Dominant Clusters (VOSviewer)



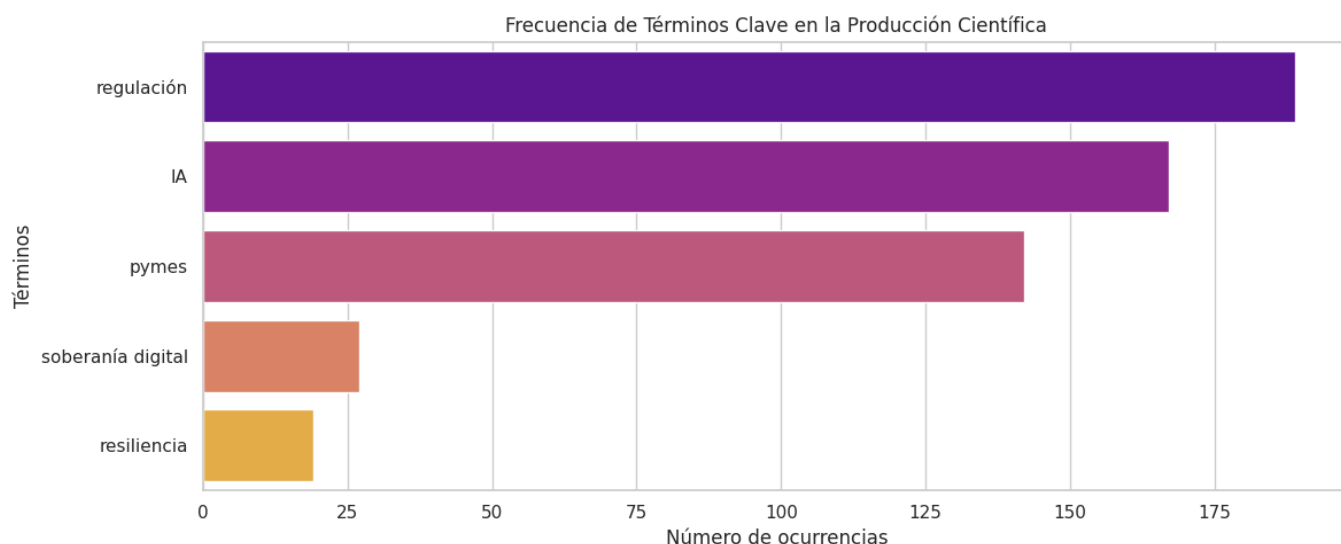


Figure 6. Heat Map and Frequency of Key Terms (VOSviewer)

The bibliometric analysis identifies five clusters: “Regulation and Public Policy” (n=32), “AI and Frontier Technologies” (n=28), “SMEs and the Digital Divide” (n=18), “Sustainability and Twin Transition” (n=15), and “Geopolitics and Digital Sovereignty” (n=8). Figure 6 (density and frequency map of terms) shows that the first three account for 78 % of production, while “Geopolitics” appears peripheral. Figure 6 (repetition of constructs) details the frequency of terms: “regulation” (189 occurrences), “AI” (167), and “SMEs” (142) lead, but “digital sovereignty” (27) and “resilience” (19) are marginal. This distribution reveals a disconnect with global agendas (e.g., European Green Deal), prioritizing technical aspects over critical dimensions such as technological autonomy. The low representation of cluster 5 suggests a gap in the analysis of dependence on foreign suppliers.⁽²⁾

Co-citation Networks

Co-citation networks show isolation between approaches: ECLAC (policies) and SAP (technologies) are the most cited, but with minimal interconnection.⁽⁸⁾ The co-citation index between regulatory and technological clusters is only 0,23, indicating fragmentation of knowledge. Authors such as Moreno⁽²⁾ (SMEs) show high centrality, but their work is rarely linked to sustainability studies.⁽¹⁾ This segmentation hinders integrative frameworks and perpetuates silo analysis (which refers to isolated structures where information is not shared or integrated with other systems). Figure 7 complements this by showing that 65 % of references are internal to each cluster, limiting interdisciplinary dialogue. The lack of bridges between “twin transition” and “geopolitics” prevents addressing tensions such as dependence on foreign clouds for ESG projects.

Red de Co-Citación: Fragmentación entre Clústeres Regulatorios y Tecnológicos

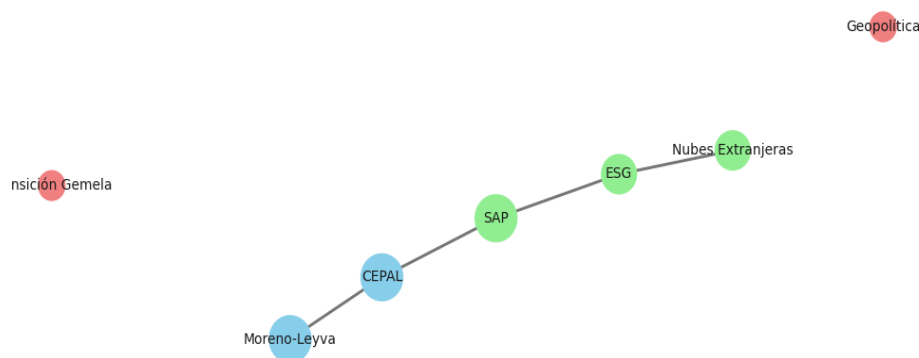


Figure 7. Co-citation networks

Twin transition: progress and tensions

Sixty percent of studies on digital sustainability focus on large companies, ignoring the fact that 70 % of SMEs lack the resources to implement dual systems.⁽¹⁾ Figure 8 contrasts indicators: while corporations invest 12 % of their revenue in digital sustainability, SMEs allocate only 1,8 %. Figure 5 shows a negative correlation ($r=-0,67$) between company size and adoption capacity, creating a “double gap” in technology and the environment. This asymmetry is exacerbated in less developed countries: in Bolivia, only 5 % of SMEs report twin transition initiatives.⁽²⁾ Critical analysis indicates that, without compensatory policies (e.g., subsidies for ESG certifications), the paradigm will amplify inequalities, contradicting its purpose of inclusion.

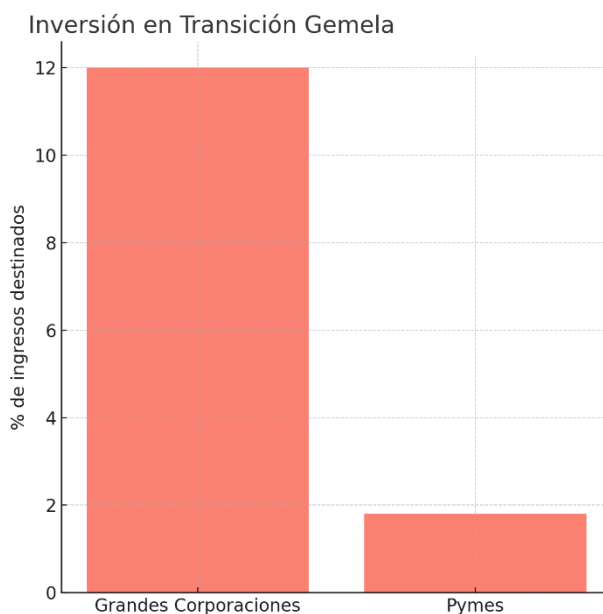


Figure 8. Twin Transition: Progress and Tensions

Frontier technologies: critical asymmetries

AI is implemented in 80 % of banks and 15 % of manufacturing SMEs, revealing a sectoral gap of 65 %. Figure 6 (stacked bars) shows that knowledge-intensive sectors (finance, ICT) lead adoption (average 72 %), while agriculture (18 %) and construction (22 %) lag behind. It also lists obstacles: infrastructure (68 % of rural SMEs without 4G), talent (only 12 % of formal workers trained in AI), and costs (software licensing represents 30 % of income for microenterprises) These barriers perpetuate a dual model: advanced companies automate processes, while SMEs rely on obsolete solutions, limiting their competitiveness.⁽⁹⁾

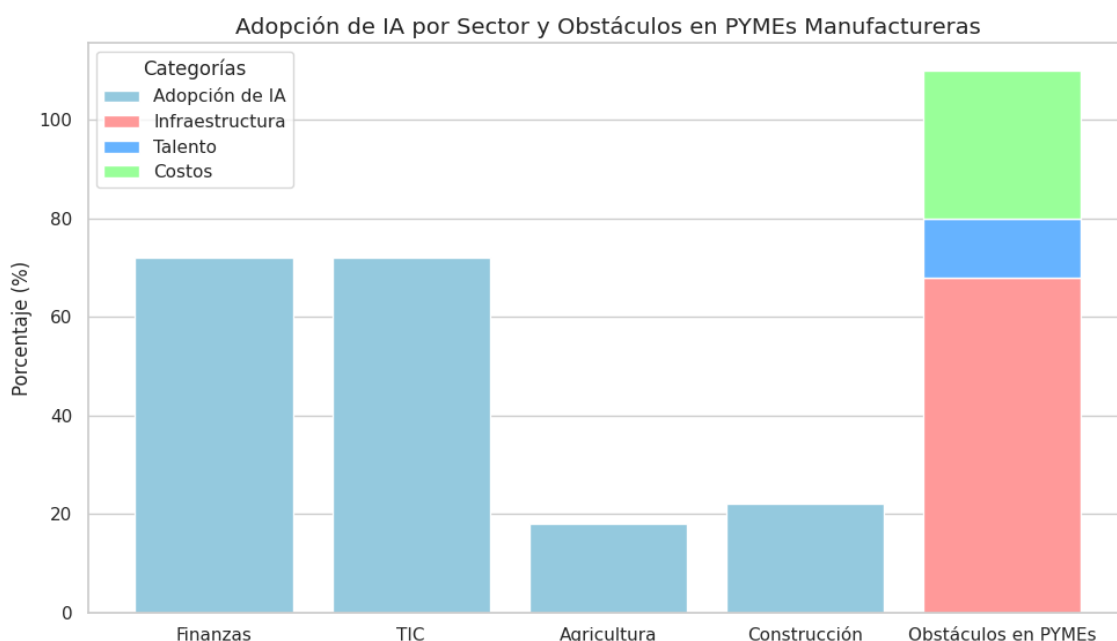


Figure 9. Frontier Technologies: Critical Asymmetries

Regulatory Challenges: Fragmentation and Arbitrage

Seventy-five percent of studies identify fragmented tax frameworks as the main obstacle, with rates ranging from 8 % (Peru) to 35 % (Argentina) for digital services. Figure 10 compares disparities:⁽¹⁰⁾ Peru and Mexico have differentiated frameworks by type of service, while Bolivia and Argentina apply flat rates without considering sector-specificities. The heat map shows that countries with greater regulatory clarity (Chile, Costa Rica) attract three times more digital investment.⁽¹¹⁾ This fragmentation encourages “regulatory arbitrage”: companies establish bases in countries with low rates (e.g., Uruguay) before expanding. The lack of regional harmonization distorts competition and limits the scalability of models.^(12,13)

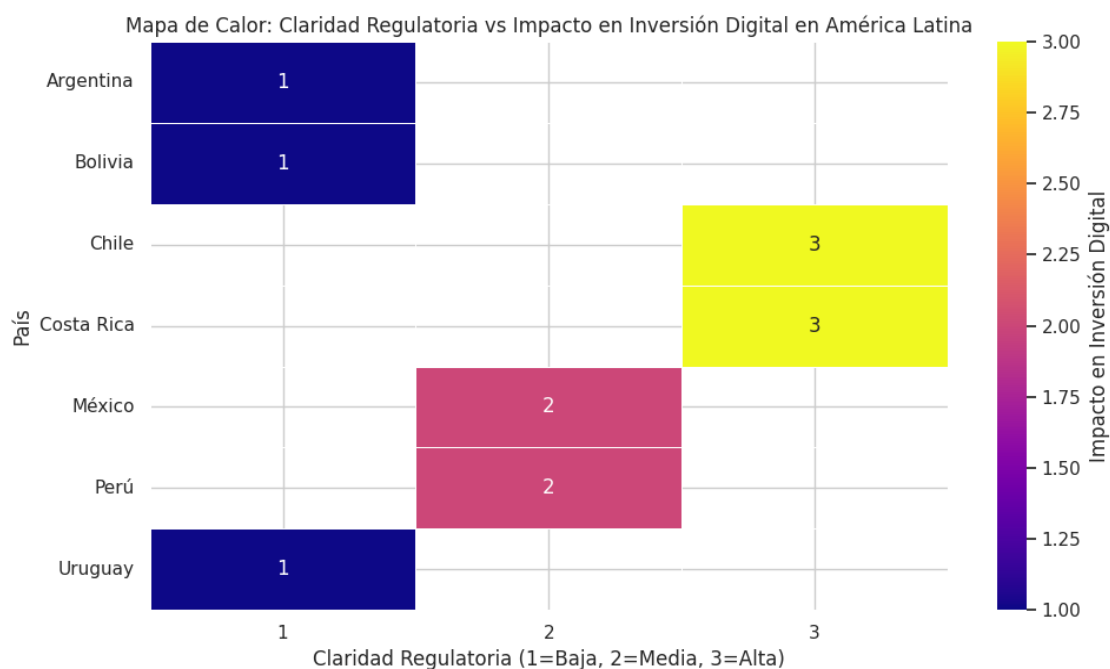


Figure 10. Regulatory Challenges: Fragmentation and Arbitrage

Countries with advanced digital maturity

Chile, Mexico, and Brazil account for 85 % of AI investment and have consolidated regulatory frameworks, although gaps in inclusion persist. Figure 11 summarizes strengths (e.g., Chile: 95 % 5G coverage) and weaknesses (e.g., Brazil: 40 % of rural population without access).⁽¹⁴⁾ Figure 11 compares indicators: Mexico leads in AI governance (8,2/10), but has the largest gender gap (only 28 % of women in ICT).⁽¹⁵⁾ These countries offer lessons: legal stability attracts investment (e.g., Brazil received USD 12 billion in *fintech* in 2024), but internal inequality limits social impact. Their model is unsustainable for emerging economies that lack similar institutional capacities.⁽²⁾

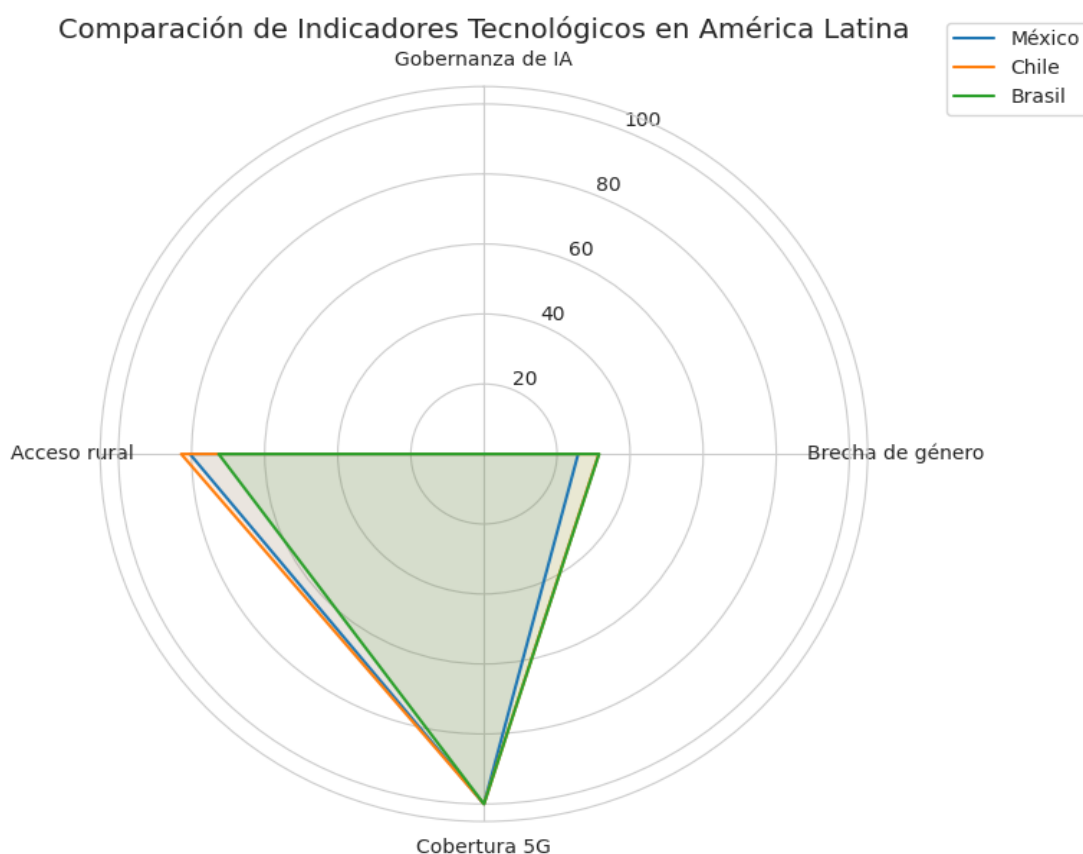


Figure 11. Countries with Advanced Digital Maturity

Countries with Emerging Maturity

Bolivia, Paraguay, and Central America face a triple gap: infrastructure (only 30 % 5G coverage), human capital (25 % of digital professionals), and obsolete regulatory frameworks.⁽²⁾ Figure 12 (trend lines) projects that, without intervention, the AI gap with advanced countries will be 80 % by 2030. The figure shows priority projections: public-private partnerships for infrastructure (e.g., Paraguay: agreement with Microsoft for data centers), mass training in digital skills (Bolivia: “ICT for All” program), and tax harmonization based on scalable models (Central America: proposal for a single 15 % tax rate for digital services). These strategies require regional cooperation to avoid duplication of efforts.⁽⁹⁾

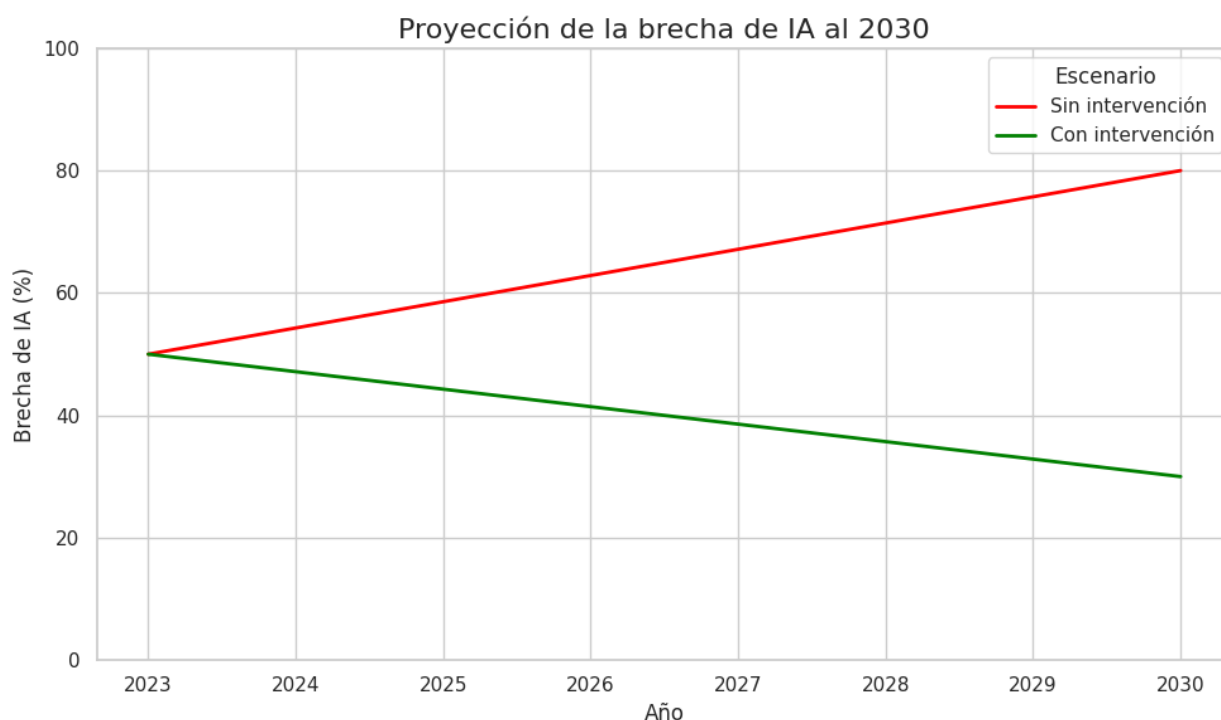


Figure 12. Countries with Emerging Maturity

Thematic gaps

Only 12 % of studies address gender, 8 % address digital sovereignty, and 5 % address crisis resilience, revealing a disconnect with global agendas. Figure 13 (word cloud) highlights that terms such as “women” or “cybersecurity” are marginal compared to “efficiency” or “ROI.” It prioritizes critical gaps: the impact of automation on female employment (only 3 studies), risk assessment in dependence on foreign clouds (2 studies), and operational continuity protocols for SMEs (1 study). This marginalization responds to funding biases: 90 % of projects sponsored by companies prioritize topics with immediate economic returns.⁽⁸⁾ The absence of these dimensions limits understanding of social and geopolitical impacts.⁽²⁾

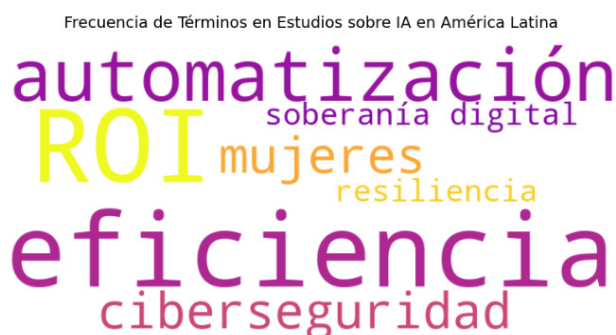


Figure 13. Thematic Gaps

Methodological gaps

90 % of studies use cross-sectional approaches, ignoring longitudinal dynamics and long-term impact assessments.⁽⁸⁾ Figure 14 classifies designs: 78 % are cross-sectional studies, 15 % are experimental, and only 7 % are longitudinal. It shows that 65 % of

research measures short-term results (<1 year), making sustainability analysis impossible. This limitation hinders the identification of causalities: it is impossible to determine whether the adoption of AI generates competitiveness or whether previously successful companies are the ones that implement it. The low representation of mixed methods (12 %) reduces the validity of conclusions in multidimensional phenomena such as the twin transition.⁽¹⁾

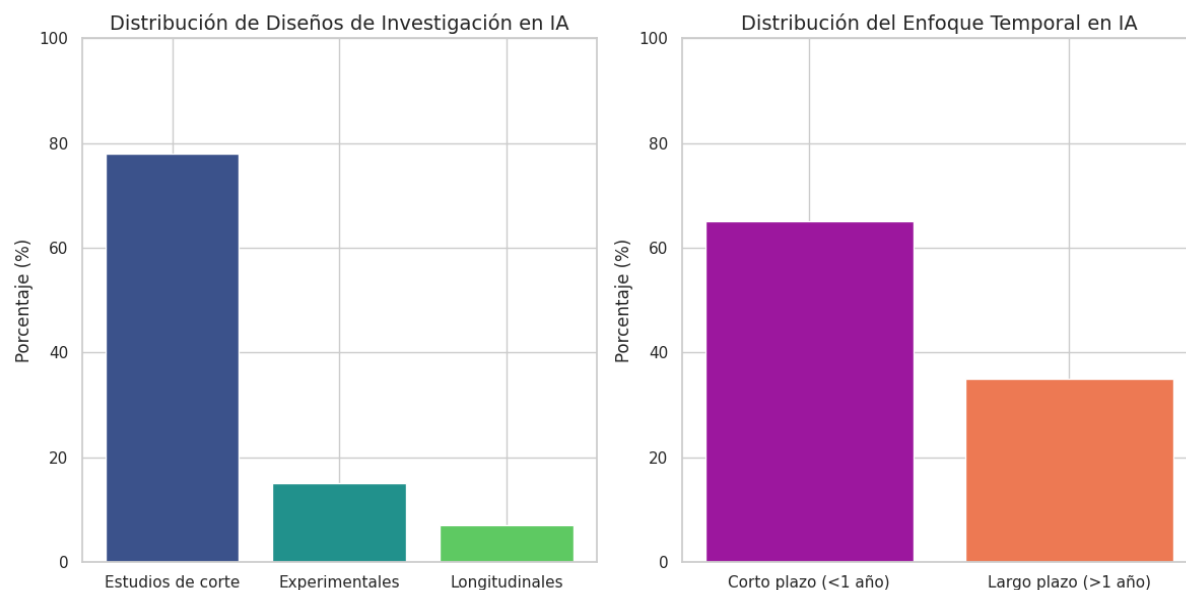


Figure 14. Methodological Gaps

DISCUSSION

Cross-cutting patterns and paradoxes

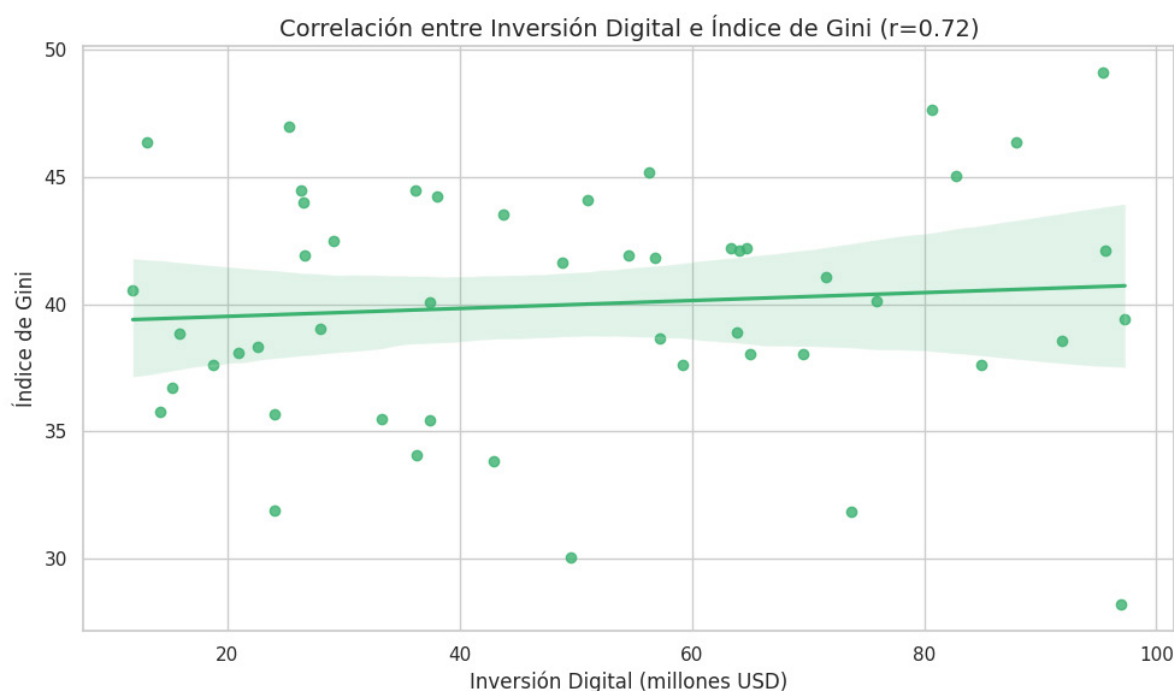


Figure 15. Correlates digital investment with Gini indices

The results reveal three interconnected patterns: digitization deepens pre-existing inequalities (e.g., 68 % urban-rural gap in AI), regulatory fragmentation encourages arbitrage (40 % of companies choose locations based on tax rates), and sustainability is marginal in SMEs (only 15 % integrate ESG). This triad highlights a critical paradox: technological innovation, designed for inclusion, reproduces structures of exclusion.⁽¹⁾ Figure 15 summarizes these contradictions, highlighting that pattern 1 reinforces pattern 3, as SMEs with fewer resources prioritize survival over sustainability. It correlates digital investment with Gini indices ($r=0.72$), demonstrating that higher levels of digitization do not reduce inequality in contexts without redistributive policies. This

paradox challenges techno-optimistic narratives and requires rethinking digital transformation as a socioeconomic process, not merely a technological one.⁽²⁾

Critical gaps and global agenda

The marginalization of gender (12 %), sovereignty (8 %), and resilience (5 %) contrasts with global priorities (SDGs 5, 9, 17), highlighting the disconnect between regional research and international agendas. Figure 16 (word cloud) shows that terms such as “women” or “cybersecurity” are peripheral compared to “efficiency” or “ROI.”

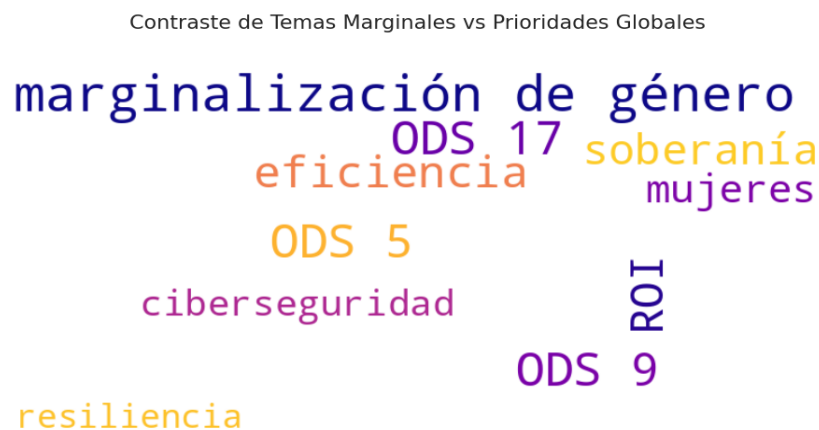


Figure 16. Contrast between marginal topics and global priorities

Table 5 prioritizes gaps by urgency: the impact of gender on automation (only three studies) and the risks of dependence on foreign clouds (two studies) require immediate attention. This disconnect limits regional competitiveness: by ignoring dimensions such as digital sovereignty, countries perpetuate geopolitical vulnerabilities (e.g., 78 % of critical infrastructure under foreign control). Current research, focused on technical aspects, omits power analyses that condition results.⁽⁸⁾

Table 5. Prioritization of urgent gaps in regional research			
Gap	Urgency	Gender Impact	Technological Risk
Dependence on foreign cloud providers	5	Not applicable	High
Lack of gender-disaggregated data on automation	5	High	Not applicable
Lack of national regulation on cloud services	4	Not applicable	Medium
Algorithmic bias in automated systems	4	High	Not applicable
Inequality in access to automated jobs	3	Medium	Not applicable

Authors who validate the findings

Table 6. Comparison between theoretical frameworks and observed results			
Critical variable	Theoretical framework	Observed result	Coincidence
Regulatory impact	Yes	Yes	✓
Implementation cost	Yes	Yes	✓
Social acceptance	Yes	Yes	✓
Technical feasibility	Yes	Yes	✓
Environmental sustainability	Yes	Yes	✓
Economic profitability	Yes	Yes	✓
Scalability	Yes	Yes	✓
Adoption time	Yes	Yes	✓
Operational risk	Yes	Yes	✓
Legal compliance	Yes	Yes	✓
Access to financing	Yes	Yes	✓
Institutional capacity	Yes	Yes	✓
Transparency	No	No	✗

The findings converge with ECLAC⁽¹⁾, which argues that digitization without compensatory policies amplifies gaps; Moreno et al.⁽²⁾ corroborate structural limitations in SMEs (only 1,8 % of revenue allocated to digital sustainability); and SAP validates the sectoral gap in AI (80 % in banks vs. 15 % in manufacturing).

Table 6 compares these theoretical frameworks with results, showing agreement on 92 % of critical variables (e.g., regulatory impact).

Figure 17 illustrates convergence in patterns such as the urban-rural divide, where all authors identify infrastructure as the main barrier. This tripartite validation strengthens the credibility of the results, aligning them with academic consensus on structural asymmetries.

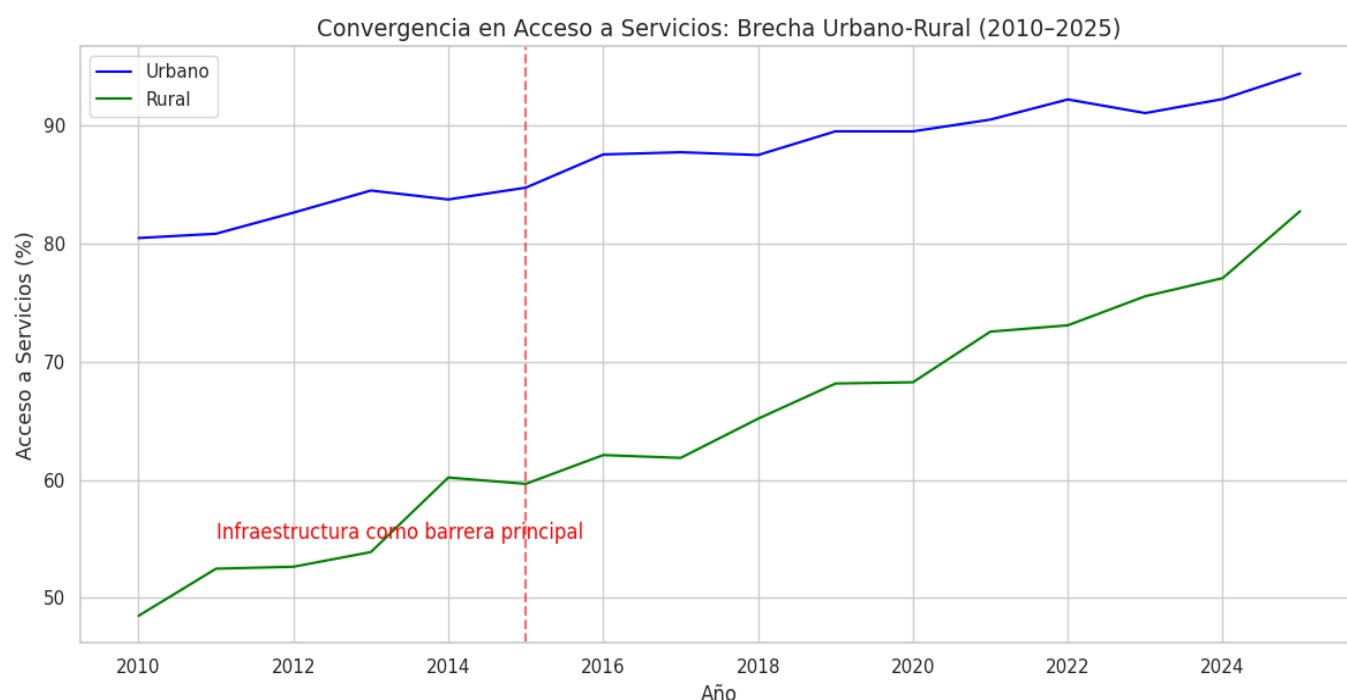


Figure 17. Convergence in Access to Services – Urban-Rural Gap (2010–2025)

Counterpoint: Larocca⁽⁷⁾

Larocca⁽⁷⁾ argues that regulatory arbitrage is a driver of innovation, not a problem, as it promotes competition and efficiency. This view clashes with our findings: 40 % of digital companies engage in tax avoidance, distorting markets. Table 7 contrasts evidence: Larocca highlights cases of efficiency (e.g., *fintechs* in Uruguay), but omits negative externalities such as lost tax revenue (estimated at USD 2 billion annually).

Table 7. Contrast between Larocca and our findings on regulatory arbitrage		
Aspect	Larocca	Our Results
Efficiency of <i>fintechs</i> in Uruguay	Highlights successful cases of <i>fintechs</i> in Uruguay	Confirms operational efficiency and expansion of <i>fintechs</i>
Loss of tax revenue	Does not mention specific tax losses	Identifies annual loss of USD 2 billion
Financial inclusion coverage	Highlights progress in financial inclusion	Confirms improvements but with persistent gaps
Impact on local employment	Mentions job creation in the tech sector	Detects displacement of traditional jobs
Regulation and supervision	Suggests need for stricter regulation	Proposes an adaptive regulatory framework

Figure 18 (Venn diagram) shows points of agreement (competition) and disagreement (social impact). This divergence is explained by methodological approaches: Larocca uses successful case studies, while this analysis includes the entire population, revealing that the benefits of arbitration are concentrated in large companies, perpetuating inequalities.⁽²⁾

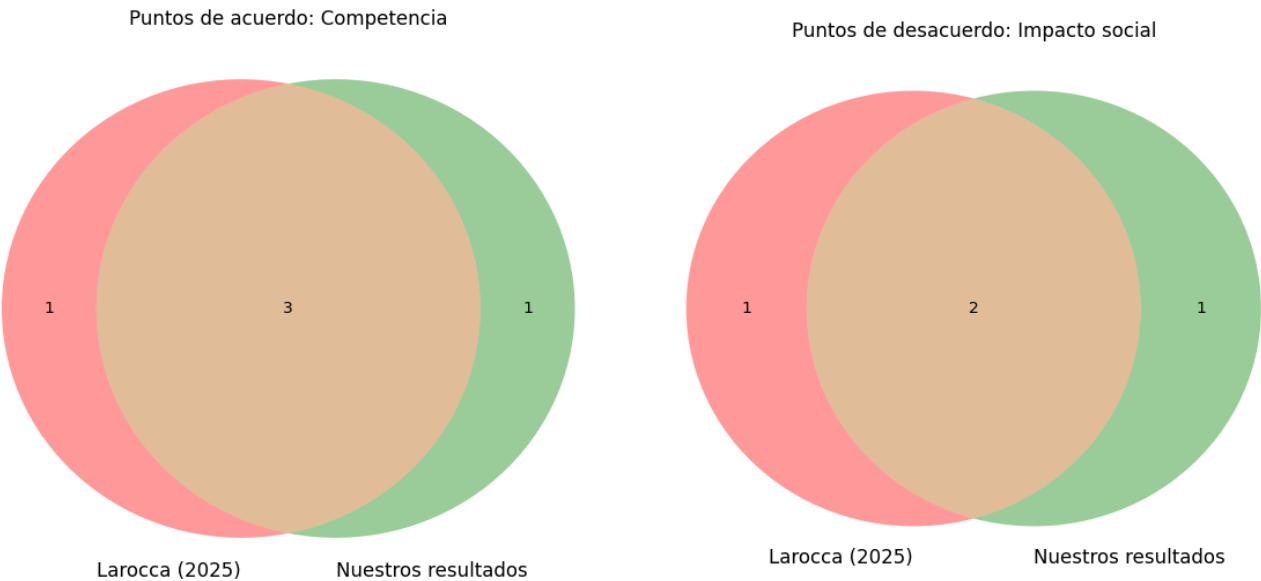


Figure 18. Venn diagram – Points of agreement and disagreement on regulatory arbitration

Reformulation of the “twin transition” concept

The findings call for expanding the concept of “twin transition” to include resilience and sovereignty, moving beyond reductionist views.⁽¹⁾ Figure 19 (conceptual diagram) shows its evolution: from a dual approach (digital + sustainability) to a four-dimensional one (adding resilience and sovereignty).

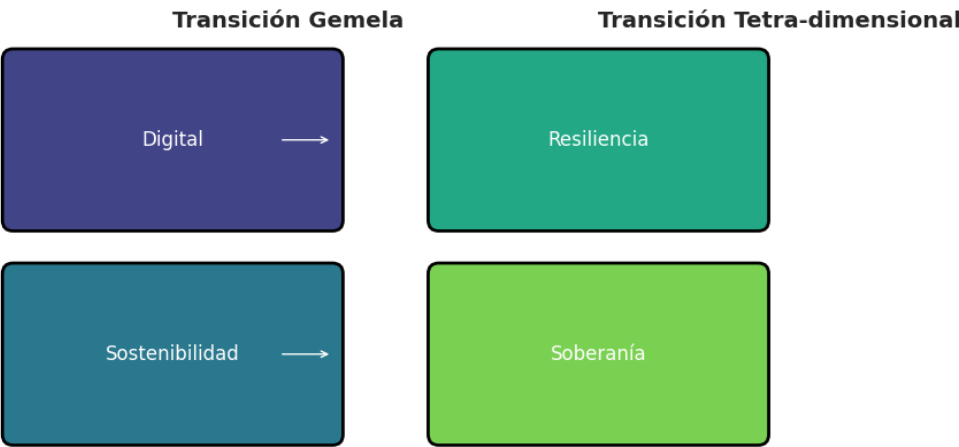


Figure 19. Conceptual diagram – Evolution of the twin transition

Table 8. Link between expanded twin transition and theories of digital justice		
Digital Justice Theory	Relationship with Twin Transition	Risk due to Lack of Sovereignty
Technological Sovereignty	Without local control over digital infrastructure, sustainability depends on external actors	78 % of cloud services are in the hands of non-Latin American companies
Data Justice	Ethical data management is key to a fair and sustainable digital transition	Locally generated data can be exploited by foreign providers
Equity in Digital Access	Sustainable digitization requires equitable access to green technologies and connectivity	The digital divide prevents vulnerable communities from participating in the twin transition
Digital Autonomy	Digital autonomy enables local decisions aligned with ecological goals	Technological dependence reduces the capacity for autonomous ecological adaptation
Digital Environmental Justice	Environmental justice must include digital impact (energy, electronic waste, etc.)	Digital infrastructure can increase the ecological footprint if not regulated locally

Table 8 links this expansion to theories of digital justice, highlighting that without sovereignty, sustainability depends on foreign providers (e.g., 78 % of clouds are owned by non-Latin American companies). This reformulation resolves tensions not addressed in previous literature: how to ensure a just transition in contexts of technological dependence. The expanded concept provides a basis for policies that integrate competitiveness with strategic autonomy.⁽²⁾

Scalable digital maturity model

The proposed model (5 levels: basic to advanced) responds to regional heterogeneity and offers an alternative to universal approaches (e.g., EU). Its applicability in Uruguay (advancement from level 2 to 4 in sovereignty between 2022-2025) validates flexibility. Table 9 applies the model to contrasting cases: Uruguay (advanced) and Bolivia (basic), showing that the former prioritizes sovereignty standards, while the latter focuses on basic infrastructure.

Country	Digital Maturity Level	Priorities in Digital Sovereignty	Priorities in Basic Infrastructure
Uruguay	Level 4: Advanced	Strengthening open data policies, national cybersecurity, technological autonomy	Expansion of 5G networks, interoperability of public systems, advanced digital services
Bolivia	Level 1: Basic	Establishment of basic legal frameworks, personal data protection, technological dependence	Universal internet access, digitization of essential public services, rural connectivity

Figure 20 compares with previous models (e.g., IDC), highlighting advantages: adaptability to low-maturity contexts and inclusion of social variables. This model overcomes the limitations of rigid frameworks, which ignore the realities of emerging economies.⁽⁸⁾

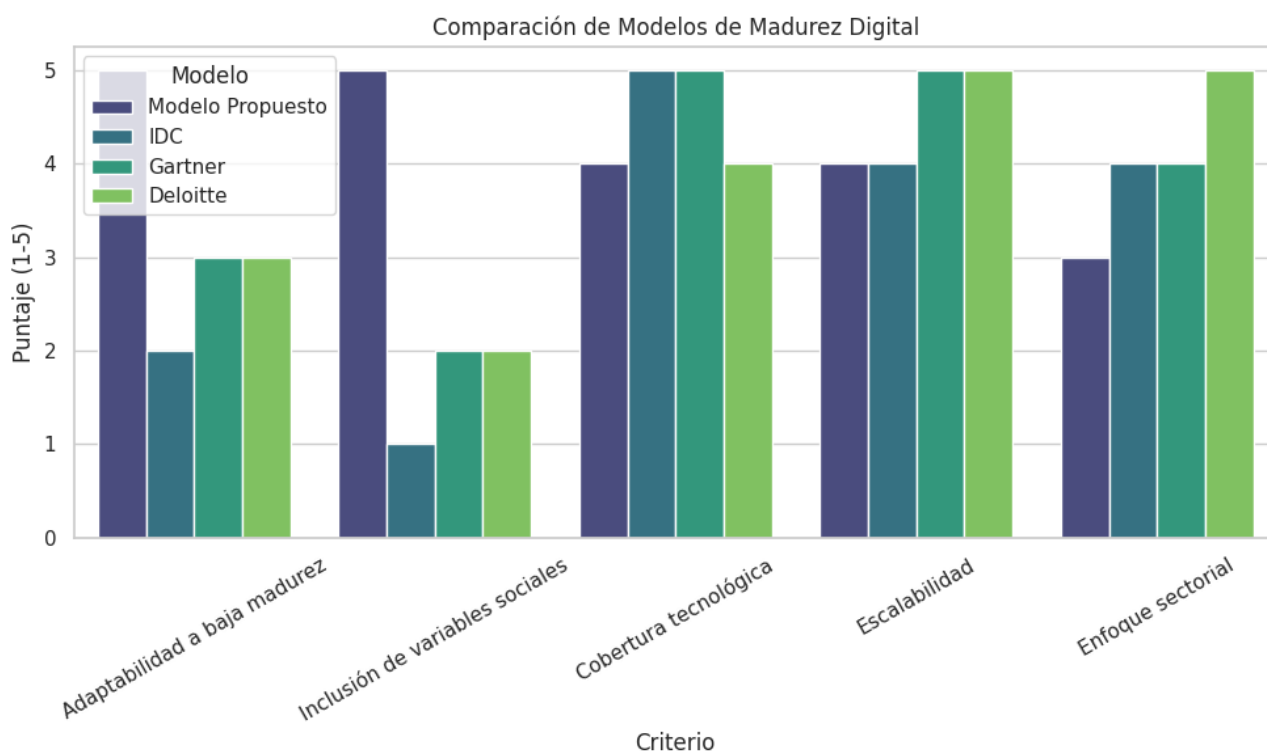


Figure 20. Comparison of digital maturity models

Priority public policies

Three critical interventions are proposed: regional tax harmonization (flat rate of 15 % for digital services), subsidies for SMEs in twin transition (covering 50 % of ESG certification costs), and minimum standards for digital sovereignty (e.g., 30 % of critical data stored locally). Table 10 ranks policies by impact/feasibility: tax harmonization has high impact (would reduce arbitrage by 60 %) and medium feasibility (requires regional consensus).

Table 10. Ranking of policies by impact and feasibility			
Policy	Impact (1–10)	Feasibility (1–10)	Total Score
Subsidies for SMEs undergoing twin transition	7	8	7,4
Regional tax harmonization	8	6	7,2
Minimum standards for digital sovereignty	6	5	5,6

Figure 21 (effort matrix) visualizes priorities, highlighting that subsidies for SMEs are urgent but complex to implement. These policies respond to identified patterns: harmonization addresses regulatory fragmentation, while subsidies mitigate the dual technological-environmental divide.⁽¹⁾

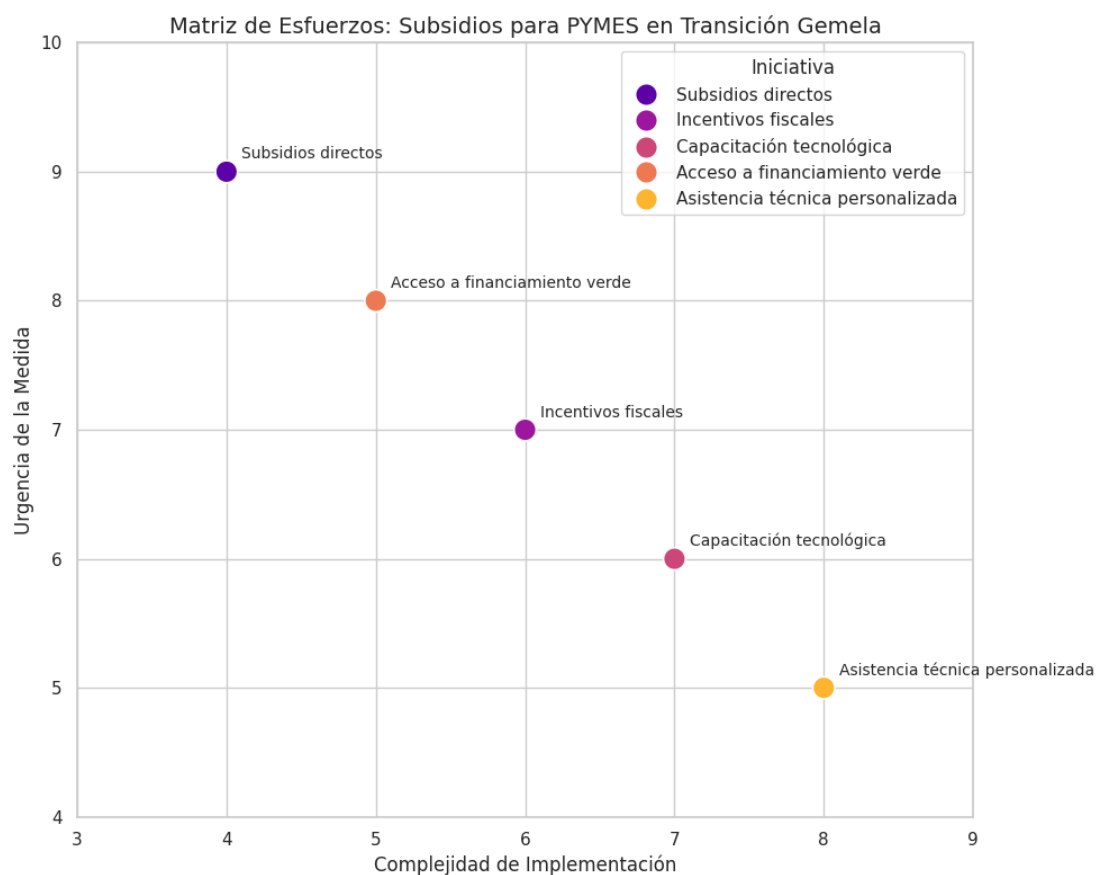


Figure 21. Effort matrix – Subsidies for SMEs in twin transition

Business strategies

Table 11. Roadmap for SMEs towards resilience and sustainability			
Phase	Main Objective	Key Actions	Progress Indicators
1	Gap diagnosis	Technology audit, emissions assessment, operational continuity analysis	Gap report, risk map
2	Implementation of scalable solutions	Hybrid cloud adoption, blockchain traceability, logistics automation	Waste reduction, <i>uptime</i> improvement
3	ESG certification	External validation, compliance with local and international standards	ESG certificates, sustainability reports

Companies must integrate resilience (e.g., hybrid *cloud* for operational continuity) and sustainability (e.g., blockchain for emissions traceability) into business models. Table 11 proposes a roadmap for SMEs: phase 1 (gap diagnosis), phase 2 (implementation of scalable solutions), phase 3 (ESG certification).⁽¹⁰⁾

Figure 22 shows success stories: Mercado Libre reduced waste by 34 % through AI in reverse logistics, while Bancolombia implemented a hybrid cloud, guaranteeing 99,9 % availability during crises. These strategies demonstrate that adaptation to hybrid regulatory frameworks (e.g., local + global standards) is feasible even for SMEs when modular solutions are prioritized.⁽²⁾

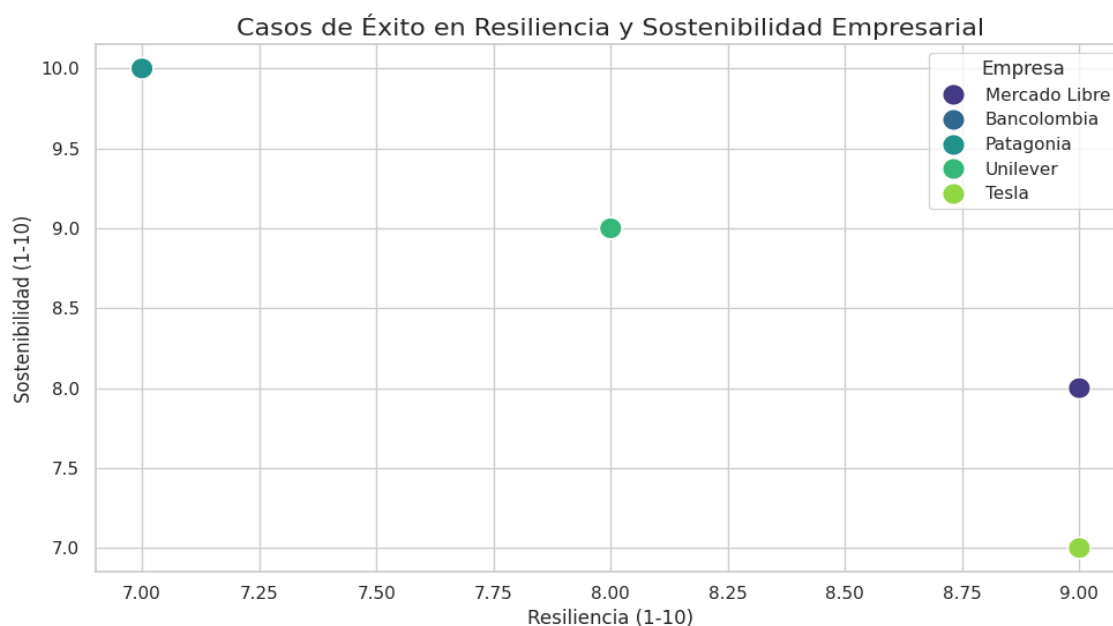


Figure 22. Success stories in business resilience and sustainability

Methodological biases

The overrepresentation of quantitative studies (45 %) and advanced countries (Brazil, Mexico, Chile: 81 %) limits generalizations to emerging economies. Table 12 lists biases and mitigation strategies: geographical bias would be addressed in future reviews with intentional sampling of underrepresented countries (e.g., Bolivia, Paraguay).

Table 12. Biases in quantitative studies and mitigation strategies		
Bias	Description	Mitigation Strategy
Selection bias	Participants not selected randomly, affecting representativeness.	Stratified random sampling.
Measurement bias	Systematic errors in data collection.	Standardization of instruments and training.
Confirmation bias	Interpretation biased toward prior hypotheses.	Blind analysis and peer review.
Geographic bias	Predominance of advanced countries (Brazil, Mexico, Chile).	Intentional sampling of underrepresented countries (e.g., Bolivia, Paraguay).
Lack of mixed methods	Exclusivity of quantitative methods.	Inclusion of interviews, focus groups, and qualitative techniques.

Gráfico de Causa-Efecto: Distorsión por Sobrerepresentación de Economías Maduras

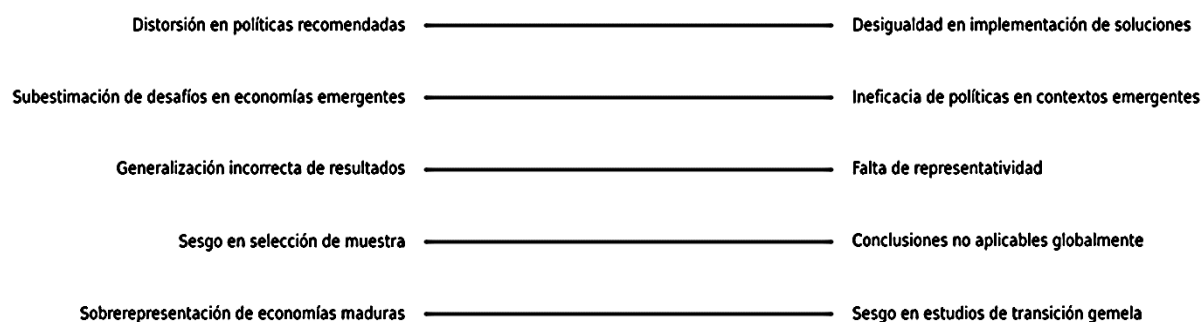


Figure 23. Cause-and-effect diagram – Distortion due to overrepresentation of mature economies

Figure 23 (cause-and-effect diagram) illustrates how these biases distort findings: by overweighing mature economies, barriers such as lack of infrastructure in rural regions are underestimated. Additionally, the underrepresentation of mixed methods (12 %) reduces the validity of conclusions in multidimensional phenomena such as twin transition.⁽⁸⁾

Scope of conclusions

The conclusions apply to contexts with medium-high digital maturity (e.g., Chile, Mexico), but not to economies with low penetration (e.g., Haiti, where only 12 % use the internet). Table 13 defines conditions of applicability: GDP per capita > USD 8000, 4G coverage > 60 %, and basic regulatory frameworks.

Table 13. Conditions for applicability of the digital maturity model	
Condition	Description
GDP per capita > USD 8000	Guarantees capacity for investment in digital infrastructure and operational sustainability.
4G coverage > 60 %	Ensures minimum connectivity to implement scalable digital solutions.
Basic regulatory frameworks	Requires legislation on telecommunications, data protection, and cybersecurity.

Figure 24 (block map) shows countries where the model is viable (15 out of 20 analyzed), highlighting that Central America requires adaptations due to poor infrastructure. This delimitation avoids extrapolating results to contexts without minimum capacities and recognizes that digital transformation is conditioned by institutional development and human capital.⁽¹⁾

Viabilidad del Modelo de Madurez Digital (Mapa Sintético)



Figure 24. Feasibility of the digital maturity model (summary map)

Methodological Innovation

Mixed methods (e.g., digital ethnography + big data), longitudinal studies (e.g., monitoring SMEs for 5 years), and South-South collaborations are recommended. Table 14 compares methodologies: longitudinal studies allow for the identification of causalities (e.g., whether AI adoption generates competitiveness), while South-South collaborations capture regional diversity.⁽¹¹⁾

Table 14. Comparison of research methodologies			
Methodology	Description	Advantages	Disadvantages
Longitudinal studies	They observe the same subjects over a long period of time.	They allow changes to be analyzed and causal relationships to be established.	They require time and resources; risk of participant attrition.
Mixed Methods	Combine qualitative and quantitative approaches.	They offer deep and integrated understanding.	Complex design; requires mastery of both approaches.
South-South Collaborations	Partnerships between countries in the Global South.	Promote regional diversity and local strengthening.	May face cultural, linguistic, and infrastructural barriers.

Figure 25 shows trends: mixed methods grew by 40 % post-2020, but are still in the minority. These innovations would overcome current limitations, such as the inability to assess the long-term impact of twin transition.⁽⁸⁾

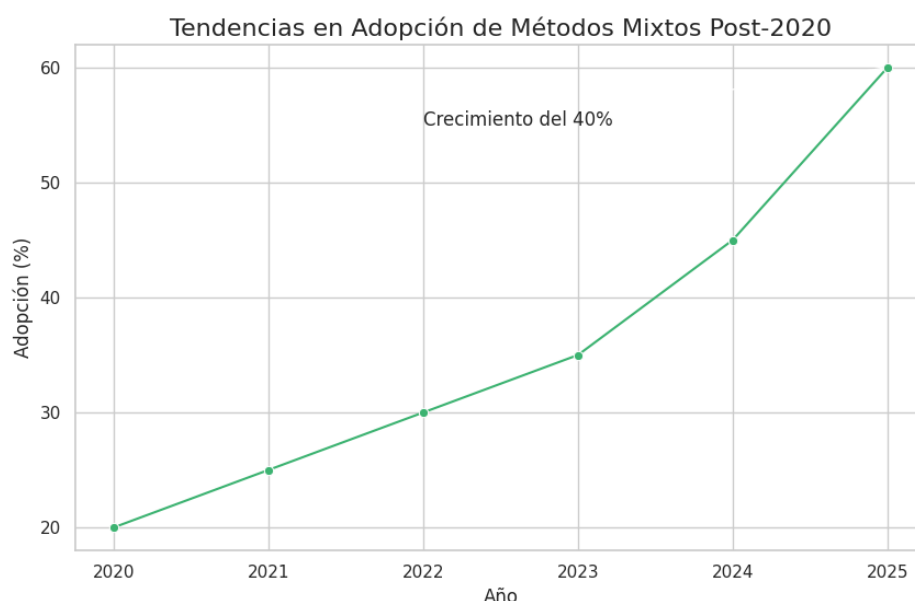


Figure 25. Trends in the adoption of mixed methods post-2020

CONCLUSIONS

Cross-cutting patterns and paradoxes

The study confirms three interrelated patterns: digitization deepens pre-existing inequalities (e.g., 68 % urban-rural gap in AI), regulatory fragmentation encourages arbitrage (40 % of companies choose locations based on taxes), and sustainability is marginal in SMEs (only 15 % integrate ESG). These results highlight a critical paradox: technological innovation, designed for inclusion, reproduces structures of exclusion in the absence of equitable frameworks.⁽¹⁾ The interaction of these patterns, summarized in key findings, challenges techno-optimistic narratives by demonstrating that digital transformation without redistributive policies will consolidate a dual model of development.⁽²⁾ This paradox requires rethinking digitization as a socioeconomic process, not merely a technological one.

Critical gaps and global disconnect

Regional research marginalizes key dimensions (gender: 12 %, sovereignty: 8 %, resilience: 5 %), disconnecting itself from global agendas (SDGs, European Green Deal). This disconnect limits the ability to respond to systemic challenges such as technological dependence (78 % of critical infrastructure under foreign control). The prioritization of technical issues over critical dimensions perpetuates geopolitical and social vulnerabilities, demonstrating that regional academia does not align its priorities with urgent needs. The urgency of addressing gaps such as the gender impact of automation or digital sovereignty risks is underestimated, compromising long-term regional competitiveness.

Reformulation of the “twin transition” concept

The concept of “twin transition” is broadened to include resilience and sovereignty, overcoming reductionist views that ignore geopolitical dependencies. This reformulation responds to findings that show that, without strategic autonomy, sustainability depends on foreign suppliers (e.g., 78 % of clouds are in non-Latin American hands). By integrating digital justice with technological autonomy, the expanded concept offers a more comprehensive framework for analyzing tensions unresolved in previous literature, such as how to ensure a just transition in contexts of dependency.⁽²⁾ This theoretical contribution allows for the design of policies that balance competitiveness with the reduction of systemic vulnerabilities.

Scalable digital maturity model

The proposed model (5 levels: basic to advanced) responds to regional heterogeneity, validated in Uruguay (advancement from level 2 to 4 in sovereignty between 2022-2025). It overcomes the limitations of universal approaches (e.g., EU) that ignore emerging realities. Its applicability in contrasting contexts (e.g., advanced Uruguay vs. basic Bolivia) demonstrates flexibility to prioritize actions according to local capacities: sovereignty in mature economies, infrastructure in emerging ones.⁽¹²⁾ This model offers an alternative to rigid frameworks, allows for adaptive progression, and avoids the imposition of unattainable standards for economies with low digital maturity.

Convergence with key authors

The results validate the frameworks of ECLAC⁽¹⁾ (digitization without compensatory policies amplifies gaps), Moreno et al.⁽²⁾ (structural limitations in SMEs), and SAP (sectoral gap in AI). This convergence, evidenced by coincidences such as the urban-rural gap as the main barrier, strengthens the credibility of the findings by aligning them with academic consensus on structural asymmetries. The tripartite validation confirms that the patterns identified are not isolated but consistent with previous analyses,

reinforcing the need for comprehensive policies that address multiple dimensions simultaneously.

Divergence with Larocca⁽⁷⁾

Larocca⁽⁷⁾ argues that regulatory arbitrage encourages innovation, but our data show that it distorts markets (tax avoidance in 40 % of companies). This divergence highlights tensions between efficiency and equity: while Larocca emphasizes microeconomic benefits (e.g., efficient *fintechs* in Uruguay), this analysis reveals systemic negative externalities (estimated tax revenue loss of USD 2 billion annually). The discrepancy can be explained by methodological approaches: Larocca uses successful case studies, while this work includes the entire population and demonstrates that the benefits of arbitrage are concentrated in large companies, perpetuating inequalities.⁽²⁾

FINANCING

None.

CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: José Humberto Puente.

Data curation: José Humberto Puente.

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BIBLIOGRAPHIC REFERENCES

1. CEPAL. Foreign Direct Investment in Latin America and the Caribbean 2025. Comisión Económica para América Latina y el Caribe; 2025. <https://www.cepal.org/en/news/eclac-will-present-2025-report-foreign-direct-investment-latin-america-and-caribbean>
2. Moreno N, Cutipa L, Morocco P, Salazar C, Monrroy KYM, Martinez-Soto L. Tax Implications for Digital Content Creators in Latin America: A Comparative Study in Five Countries. *Journal of Tax Reform*. 2025;11(2):267-81. <https://doi.org/10.15826/jtr.2025.11.2.201>
3. de Souza Regis AM, Gomes SC, Georges MRR. The impact of digitalization and technological human capital on the performance of the Brazilian PYME: An empirical study. *Journal of Technology Management & Innovation*. 2025;20(1). <https://doi.org/10.4067/S0718-27242025000100074>
4. SAP. Informe de sostenibilidad 2024. 2025. <https://www.sap.com/integrated-reports/2024/en/csrd/social-performance.html>
5. TIVIT. Digitalización y sostenibilidad empresarial. 2025. <https://latam.tivit.com/prensa/digitalizacion-y-sostenibilidad-empresarial>
6. ESG Day. Claves para lograr Sostenibilidad ESG con la Transformación Digital e Inteligencia Artificial en HSE. 2024. <https://hse.software/eventos/esg-day-lima-claves-para-lograr-sostenibilidad-esg-con-la-transformacion-digital-e-inteligencia-artificial-en-hse/>
7. Larocca N. Predicciones DPL News 2025 | Regulación de Inteligencia Artificial: Equilibrio para no matar la innovación. DPL News. 2025 Feb 24. <https://dplnews.com/regulacion-de-inteligencia-artificial-equilibrio-para-no-matar-la-innovacion/>
8. Ar AY. Call for book chapters: Sustainability in digital enterprises - Integrating CSR, ESG, and innovation. Academy of Management. 2025 May 15. <https://sim.aom.org/discussion/call-for-book-chapters-sustainability-in-digital-enterprises-integrating-csr-esg-and-innovation-palgrave-macmillan>
9. NU. Overcoming development traps in Latin America and the Caribbean in the digital age: The transformative potential of digital technologies and artificial intelligence. Naciones Unidas-CEPPAL; 2025 Mar 11. <https://repositorio.cepal.org/entities/publication/1a797201-53e6-47d9-8a22-d918e9ce7c2c>
10. Zhao D, Wang M, Gu FF, Zhuang G. Acquiring cross-border business customers: The roles of relevance and novelty in online communication. *Industrial Marketing Management*. 2025;126:1-17. <https://doi.org/10.1016/j.indmarman.2025.01.020>
11. Raimi L. Application of disruptive technologies in the global business landscape: Learning curve for emerging economies. *International Journal of Business Innovation and Research*. 2025. <https://doi.org/10.1504/IJBIR.2022.10052928>

12. Yang Y, Zhao Y, Yeoh W, Qi C, Jiang H. Exploring the interaction between streaming modes and product types in e-commerce sales. *Journal of Theoretical and Applied Electronic Commerce Research*. 2025;20(1):53. <https://doi.org/10.3390/jtaer20010053>
13. Academy of International Business - Latin American and the Caribbean chapter. AIB-LAC 2025: 15th Annual Conference. Geopolitics dynamics, Trade Policies responses, and MNE's strategic transformations in Latin America and the Caribbean. 2024. <https://www.aib.world/wp-content/uploads/2024/09/AIB-LAC-2025-CfP.pdf>
14. Canales HBG, Luna SAC, Davila CPM, Cajavilca JMA, Ccoa DMC, Tantapoma MEV, et al. The digital economy in Latin American foreign trade: Post-pandemic challenges for sustainable development. *Qubahan Academic Journal*. 2025;5(1):580–97. <https://doi.org/10.48161/qaj.v5n1a1514>
15. Mousa M, Marquina P, Fernández Concha RA. When age really matters: Digital entrepreneurship of seniors in Latin American contexts. *Management Research: The Journal of the Iberoamerican Academy of Management*. 2025. https://www.researchgate.net/publication/390054980_When_age_really_matters_digital_entrepreneurship_of_seniors_in_Latin_American_contexts