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Edited by Dr. Jaime Humberto Beltrán Godoy

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Journal

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Letter from the Editor

This mid-year issue, *The Anáhuac Journal* features six articles that contribute to the academic discussion on various challenges faced by companies. These studies and case studies are regional in nature; thus, their findings enrich scientific and practical knowledge both in Mexico and in other Latin American countries.

The publication of these works, given their significance and the methodological rigor with which they were conducted, reaffirms our commitment to advancing scientific knowledge and disseminating high-quality research.

The articles address situations and challenges faced by small and medium-sized enterprises in their day-to-day operations, as well as in key areas such as outreach and communication. Their originality also lies in the timeliness of the topics they explore, which reflect the concerns and challenges characteristic of our time.

The first article in this volume examines the relationship between hardware and human capital in entrepreneurship in Latin America. In addition, two texts in this issue explore the importance of outreach and communication in organizations. One of them investigates financial reporting and corporate transparency in Colombia; the other focuses on the role of executives in public communication regarding carbon emissions and corporate mitigation policies in Mexico. From another perspective, the environmental issue is also addressed in the study of eco-innovation among mid-sized hotels in Tijuana. Like communication, innovation depends largely on the human factor.

Finally, we present two cases where development is closely linked to public policy. The first concerns the state-owned Mexican company Exportadora de Sal (ESSA), which could become a model of sustainability for Latin America with the right strategies in place. The second examines the barriers that micro, small, and medium-sized enterprises (MSMEs) in Morelos face in accessing financing options.

All these studies provide evidence on key aspects of the region's development: technological innovation, strengthening human capital, communication and outreach strategies, and the implementation of public policies to promote competitiveness, transparency, and the sustainable development of Latin American companies.

We would like to thank Dr. Ana Luz Zorrilla del Castillo and Dr. Arturo Briseño García, faculty members at the Autonomous University of Tamaulipas and guest editors of this issue. Their extensive research experience, as well as their dedication and hard work, have contributed significantly to the success of this first 2026 issue of *The Anáhuac Journal*.

As with every edition of the journal, I would like to thank you for reading our content and acknowledge the commitment to sharing knowledge and academic excellence that sets our contributors and readers apart.

Jaime Humberto Beltrán Godoy, PhD
Editor
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Hardware Over Human Capital? Smartphone Access, Generative AI and Early-Stage Entrepreneurship in Latin America

¿El hardware por encima del capital humano? Acceso mediante teléfonos inteligentes, IA generativa y emprendimiento inicial en América Latina

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Abstract

The public release of ChatGPT in late 2022 put advanced AI (Artificial Intelligence) in the hands of anyone with internet access. Using Latinobarómetro survey data from 2020 and 2023 (N = 38,106 across 17 countries), how this generative AI shock affected nascent entrepreneurship is examined, measured via Total Entrepreneurial Activity (TEA). A country-year difference-in-differences analysis shows that higher education in 2023 had no significant effect relative to less-educated peers, indicating little measurable impact beyond 2020 expectations. In contrast, adults with smartphones had a 6.1 percentage-point increase in TEA compared to non-owners (p = 0.001). These findings are robust to clustered wild-bootstrap tests. Results suggest that immediate entrepreneurial gains from generative AI favor those with physical access to technology.

Resumen

El lanzamiento público de ChatGPT a finales de 2022 puso capacidades avanzadas de inteligencia artificial al alcance de cualquier persona. Utilizando datos de Latinobarómetro 2020 y 2023 (N = 38,106 para 17 países), analizamos cómo este avance impactó el emprendimiento en ciernes, medido a través de la Actividad Emprendedora Total (TEA). Los resultados muestran que la educación superior no tuvo un efecto significativo sobre la TEA en 2023 respecto a 2020, mientras que los adultos con teléfono inteligente aumentaron su actividad emprendedora en 6.1 puntos porcentuales (p = 0.001). Estas estimaciones son robustas frente a pruebas de inferencia agrupadas, lo cual sugiere que el acceso a la tecnología potencia el emprendimiento basado en IA, permitiendo que la innovación se desarrolle con rapidez y ampliando las capacidades aportadas por el capital humano formal.

KEYWORDS / PALABRAS CLAVE

Artificial Intelligence, digital divide, total entrepreneurial activity, Latin America; smartphone access / Inteligencia artificial, actividad empresarial total; brecha digital; América Latina, acceso mediante teléfonos inteligentes.

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1. Introduction

In December 2022, OpenAI released ChatGPT, placing frontier-level artificial-intelligence capabilities in the hands of anyone with an internet connection. Within two months, the tool surpassed 100 million users—faster uptake than any previous consumer technology—allowing individuals to automate copywriting, market research, coding snippets, and customer support without specialized skills or capital. Such a sudden, zero-price shock to cognitive production tools could, in principle, lower the barriers to starting a business, especially in middle-income regions where formal support for entrepreneurship is patchy (Farrell et al., 2024). Yet access to these benefits is conditional: a would-be founder must possess an internet-enabled device and sufficient digital literacy to exploit the tool. Whether the new technology amplifies existing human capital advantages or instead redistributes opportunities toward those with simple hardware access is therefore an empirical question; one that Latin America's heterogeneous landscape of education attainment and smartphone penetration is uniquely suited to answer.

Classic theories of entrepreneurship posit that formal education and managerial skills increase the likelihood of venture creation (Lazear, 2005; Parker, 2018) and enhance entrepreneurial survival and performance (Van Der Sluis et al., 2008; Bates, 1990; Unger et al., 2011). Digital-divide scholarship, however, stresses physical access to technology as one of the binding constraints on ameliorating deployment costs for new and established businesses (OECD, 2021). Which channel dominates in the wake of a radically accessible AI (artificial intelligence) tool: the human-capital ladder or the hardware step?

Smartphone ownership in Latin America is increasingly the most important channel for accessing AI, as mobile devices are the primary gateway to the internet for much of the population. With limited access to desktop computers and inconsistent broadband infrastructure in many areas, smartphones offer an affordable and accessible way to connect to AI-powered tools. Despite substantial socioeconomic inequalities, Latinobarómetro survey data (Corporación Latinobarómetro, 2020, 2023) with 1200 observations per country show a significant overall increase in smartphone penetration in Latin America in 2023 compared to 2020 (see Table 1).

Table 1. Smartphone Penetration Rates. Percentage (%) of Smartphone Owners

	2020	2023	Change
Argentina	69.5	95.1	25.6
Bolivia	25.1	92.1	67.0
Brazil	53.6	90.9	37.3
Chile	67.5	98.3	30.8
Colombia	47.8	89.8	42.0
Costa Rica	48.1	79.6	31.5
Dominican Republic	37.4	76.2	38.8
Ecuador	35.8	92.4	56.6
El Salvador	39.8	70.1	30.3
Guatemala	32.3	70.2	37.9
Honduras	40.8	69.8	29.0
Mexico	54.2	88.3	34.1
Panama	39.1	75.5	36.4
Paraguay	45.0	95.7	50.7
Peru	40.2	85.5	45.3
Uruguay	51.8	96.0	44.3
Venezuela	57.3	80.1	22.8
Average	46.2	85.0	38.8
Median	45.0	88.3	37.3

Source: Corporación Latinobarómetro 2020, 2023.

From 2020 to 2023, high-income countries (Chile, Panama, and Uruguay) show an average increase of 37 pp (percentage points); low-income countries (Bolivia and Honduras) show an average increase of 48 pp; and the remaining middle-income countries show an average increase of 37 pp.* The overall sample average penetration rate of 85% for 2023 is consistent with the data for the smartphone penetration rate for Latin America provided by Slotta (2024), based on information from the Statista database, which claims that there were 600 million smartphone subscriptions in 2023 forecasted to grow to 700 million in 2029, jumping from a penetration rate

* Based on the World Bank Country Classification by Income Level (Metreau et al., 2024).

of 80% in 2023, to over 90% in 2030. This paper seeks to address three central questions: first, did the emergence of ChatGPT in 2023 have a differential impact on early-stage entrepreneurship among adults with varying levels of education? Second, does direct smartphone access moderate this effect? Third, is any observed education gap further influenced by national AI-readiness capacities?

The structure of the paper is as follows. Section two introduces the theoretical framework underpinning our analysis. Section three reviews existing literature on AI adoption and digital divides, highlighting key insights and gaps. Section four describes the data sources and the construction of key variables. Section five outlines the identification strategy employed to establish statistical associations among variables. Section six presents the empirical results and discusses its implications for entrepreneurship and education policy. Section seven provides descriptive statistics that contextualize our findings. Building on these insights, section eight offers policy recommendations to enhance equitable access to AI-driven opportunities. Section nine concludes the paper, and Section ten discusses its limitations and suggests directions for future research.

2. Theoretical Framework

The relationship between emerging technologies and entrepreneurial intentions builds on long-standing cognitive and behavioral theories. Still, recent scholarship highlights the accelerating role of AI in shaping entrepreneurial cognition. The Theory of Planned Behavior (Ajzen, 1991) remains foundational for explaining entrepreneurial intentions. Yet, contemporary research shows that digital tools significantly expand perceived behavioral control and reduce informational uncertainty. Recent work by Dwivedi et al. (2023) on the implications of generative AI demonstrates how tools such as ChatGPT can enhance individuals' capacity to perceive by providing instant access to knowledge and decision support. Similarly, studies on AI-driven human capital (e.g., Xu et al., 2018) argue that algorithmic assistance functions as a complement, or partial substitute, for formal training. In this sense, smartphone-enabled AI access can strengthen the cognitive antecedents of entrepreneurial intention by supplying real-time expertise typically acquired through structured entrepreneurial education.

Recent developments in digital entrepreneurship theory further emphasize how mobile and AI technologies reshape opportunity development and early-stage

venture formation. Nambisan et al. (2019) and Von Briel et al. (2018) argue that digital technologies lower experimentation costs and increase the accessibility of entrepreneurial resources, especially for nascent entrepreneurs with limited formal training.

AI-integrated entrepreneurial cognition also aligns closely with contemporary extensions of classical theories of decision-making under uncertainty. Effectuation theory (Sarasvathy, 2001) explains how entrepreneurs leverage the means at hand, their skills, networks, and available resources, and take action without needing a predetermined goal. Entrepreneurs create value by iterative experimentation rather than from fixed planning. Under this framework, recent scholarship has begun to extend Sarasvathy's effectuation theory by arguing that AI tools significantly enrich entrepreneurs' "means", the foundational resources in effectual logic, through the provision of synthesized insights, scenario simulations, and decision guidance. For instance, in a conceptual paper, Sathiswaran et al. (2023) propose a framework combining AI (e.g., machine learning and natural language processing) with effectuation, showing how AI enables entrepreneurs to analyze large datasets, detect trends, and iteratively test market strategies under uncertainty.

Meanwhile, Saura and Bužinskienė (2025) show that positive correlations between innovation, market dynamics, and risk management emphasize AI's potential to enhance entrepreneurial decision-making and market adaptability.

Furthermore, the AI-Enabled Individual Entrepreneurship Theory (AIET), recently articulated by Ganuthula (2025), argues that artificial intelligence fundamentally transforms solo entrepreneurship by amplifying individual capabilities, lowering capital barriers, and mitigating risks through three interconnected mechanisms: skill augmentation, capital structure transformation, and risk profile modification. By integrating knowledge-based and resource-based perspectives, the AIET suggests that individual entrepreneurs can now scale and sustain ventures in ways previously reserved for larger organizations. The theory also emphasizes sustainability, aligning with global development goals, such as economic inclusion and resource efficiency, while noting ethical challenges (e.g., algorithmic bias) and the need for equitable access to AI across regions. Together, these modern analyses suggest that AI tools serve as augmentative tools, enabling entrepreneurs to follow effectual principles more effectively by providing synthetic knowledge, simulated pathways, and real-time decision heuristics.

3. Literature Review

3.1 Productivity and Firm Dynamics

Early empirical work on artificial intelligence focused on frontier firms in advanced economies and consistently linked AI adoption to productivity gains. Using data from 5179 customer support agents working for a Fortune 500 software firm, Brynjolfsson et al. (2023) show that a large language model tool for customer service scripting increased call center productivity by 14 percentage points and narrowed the performance gap between novice and experienced workers. Agrawal et al. (2023) predict a broad reconfiguration of business models, framing AI as a contributor to the sharp decline in the cost of future business prediction. Czarnitzki et al. (2023) use firm-level panel data from a sample of German manufacturers and find that the adoption of AI technologies has a positive and significant impact on firm productivity. It shows that both the use of AI and the intensity with which firms exploit its potential significantly increase sales and value-added. At the macro-country level, Zhai and Liu (2023) show a positive correlation between national AI-related R&D investment, patent intensity, and multi-factor productivity growth.

3.2 The Digital Divide: Hardware versus Skills

At a first level, "digital divide" refers to the gap between demographics and regions with access to modern digital ICT (information and communication technology) and backbone infrastructure and those without it, or with limited access (Hynes, 2021). Gomes and Lopes (2022) examine the direct influence of ICTs on entrepreneurial activity across 37 OECD (Organisation for Economic Co-operation and Development) countries within the context of open innovation networks. They find that access to mobile cellular telephones has the strongest influence on the rate of new firm creation, followed by fixed broadband and internet access. A review of G20 members concludes that hardware subsidies remain a prerequisite for inclusive digital transformation (OECD, 2021). On the second and third levels, the digital divide emphasizes that access to hardware may not automatically lead to the use of such technology, unless the gaps in digital skills and meaningful gaps are narrowed (Van Dijk, 2006). Herrera et al. (2025) highlight that, beyond physical access, significant gaps persist in the competencies needed to leverage digital tools; they urge investment in education from early childhood onward to support inclusive development.

3.3 ICT and Entrepreneurship in Emerging Markets.

ICT access generally encourages new firm formation by lowering entry costs and expanding market reach. A comparative study of 59 developing, emerging, and developed economies finds that higher ICT penetration is consistently associated with larger entrepreneurial populations, underscoring the universal role of digital infrastructure in fostering new-firm creation (Afawubo & Noglo, 2022). The adoption of QR-code–based mobile money platforms significantly improves sales growth and overall performance among small and medium enterprises (SMEs) in developing countries, underscoring the pivotal role of digital payments in entrepreneurial outcomes (Ledi et al., 2023). Complementary evidence from 14 African economies shows that access to traditional financial services, particularly bank capital, combined with the availability of mobile money, leads to productivity improvements for SMEs (Konte & Tetteh, 2023). Soluk et al. (2021) present survey data from 1000 entrepreneurs in rural India that confirm that the adoption of digital technologies, such as smartphone applications, strengthens family and community support and thus fosters entrepreneurship in an ecosystem with weak formal institutions.

3.4 AI Readiness

The term AI readiness refers to a government's capacity across strategy, regulation, capacity, infrastructure, data, and human capital to safely and effectively adopt AI in public services (Oxford Insights, 2024). Several alternative indexes are found in the literature: *1)* The 2024 Oxford Insights Government AI Readiness Index (Oxford Insights, 2024), which aggregates 40 indicators for 188 countries covering vision, governance, digital infrastructure, and human resources. At its core, the index answers the question of how ready governments are to implement AI in the delivery of public services. *2)* The 2024 Stanford University Institute for Human-Centered AI Index Report (Maslej et al., 2023) is designed to track, analyze, and illustrate the global development and impact of AI in both public and private sectors. Similarly, the index tracks policymakers' interest in AI, as measured by the legislative records of 127 countries, showing that the number of bills containing "artificial intelligence" that were passed into law grew from just 1 in 2016 to 37 in 2022. Finally, 3) Cazzaniga et al. (2024) present a description and methodology of the International Monetary Fund (IMF) AI Preparedness Index, which assesses the level of AI preparedness across 174 countries, based on a set of macro-structural indicators that cover the countries' digital infrastructure, human capital and labor market policies, innovation and economic integration, and regulation and ethics.

3.5 Smartphone Ownership, Connectivity, and the Use of Digital Technologies

Empirical evidence indicates that smartphone ownership is consistently linked with greater engagement in digital technologies and services, supporting its use as a proxy for potential GenAI access. Smartphone owners tend to exhibit higher rates of internet use, digital information seeking, and markers of digital literacy than non-owners, demonstrating that ownership correlates with broader digital engagement rather than mere device possession (Oshima et al., 2021). Widespread mobile internet access and social media engagement, used by over two-thirds of the global population, facilitate rapid information acquisition, networking, and opportunity recognition, positioning mobile-connected individuals to participate more readily in early-stage entrepreneurial activity (Kemp, 2025). Complementing this evidence, the 2025 U.S. adult broadband and smartphone usage survey conducted by the Pew Research Center reports that 91% of surveyed adults own a smartphone, with 84% of them indicating no broadband use at home, implying that their connectivity to the internet and its applications occurs primarily through smartphone use (Pew Research Center, 2025).

Additionally, research in clinical and behavioral settings shows that smartphone ownership is associated with greater use and interest in mobile applications, indicating that owners are more likely to engage with software tools on their devices (Hsu et al., 2022).

A survey of 203 medical students in Nigeria found that all respondents owned a smartphone and that a large majority reported active use of generative AI tools such as ChatGPT and Gemini on those devices, supporting the notion that smartphone ownership correlates with generative AI engagement (Odelami et al., 2025). Though further academic evidence of the direct link between smartphone ownership and generative AI use is difficult to find, what does exists is evidence from consumer surveys indicating that a substantial proportion of individuals who are aware of generative AI access it directly via their smartphones, with around 70–73% of generative AI aware users reporting GenAI (generative artificial intelligence) use on their phone (Counterpoint Research, 2024), and up to 90% of U.S. adults reporting some form of AI usage on their phones (Talker Research, 2026)

Collectively, these studies support the position that smartphone ownership reflects not just hardware possession but meaningful digital connectivity and usage patterns that increase the likelihood of encountering and using advanced digital tools such as GenAI applications.

3.6 Technology and Higher Education as Determinants of Total Entrepreneurial Activity (TEA)

TEA measures the share of individuals who are actively starting or running a venture that is less than 42 months old (GEM, 2025). The Global Entrepreneurship Monitor (GEM) 2024 Adult Population Survey asks the question: "How important do you anticipate artificial intelligence tools will be for implementing your business model and strategy in the next three years?" (GEM, 2025, p. 76) The respondents' answers are presented in Table 2 (see Table 2).

Table 2. Percentage (%) of Surveyed Early-Stage Entrepreneurs Who Consider AI Important for Business Implementation

Country	Argentina	Brazil	Costa Rica	Chile	Ecuador	Mexico	Venezuela
%	38	21	42	53	33	29	45

Source: GEM (2025, p. 77).

Note: Only these Latin American countries are included in the survey.

Low response rates (below 50%) may be attributable to entrepreneurs not considering tools they don't know about.** Raising awareness and then training to develop digital marketing skills could be crucial to the success of the new business (GEM, 2025).

Other studies highlight the greater importance of AI tools for the creation of new businesses. Giuggioli and Pellegrini (2023) systematically reviewed 60 studies on the link between AI and entrepreneurship. Their main finding is that AI has profound implications for entrepreneurship, affecting entrepreneurs in four ways: through opportunity recognition, decision-making, performance, and education and research. Moreover, in a study of 100 startups, Weber et al. (2021) observe the rapid emergence of startups that incorporate AI into their products or services, with AI fostering novel business models. Using a sample of 58 countries from the GEM database, including both developed and developing countries, Alderete (2017) shows that greater mobile-broadband penetration is strongly associated with higher TEA rates. Overall, the surveyed studies provide favorable evidence that technology, using AI and greater mobile broadband, has a positive effect on new business creation.

** The GEM Report stresses that the emerging nature of AI means that a significant number of respondents chose to reply "Don't know" rather than an importance level (GEM, 2025).

Regarding higher education as an entrepreneurial enabler, empirical evidence is mixed. On the one hand, Jiménez et al. (2015) show that tertiary education increases formal entrepreneurship by fostering higher self-confidence, lower perceived risk, and enhanced human capital. Lechuga et al. (2022) present a study based on data from 212 universities participating in the 2016 edition of the Global University Entrepreneurial Spirit Students' Survey (GUESSS), highlighting that university entrepreneurship education positively impacts entrepreneurial behavior and enhances future entrepreneurs' ability to identify opportunities. The Global Entrepreneurship Monitor (GEM) literature typically reports a positive education premium in opportunity-driven Total Entrepreneurial Activity (TEA) for Ibero-America (González-Ramos et al*.,* 2025; GEM, 2020).

Alternatively, Maharama and Chaudhury (2022) provide evidence that higher education is not necessarily positively correlated with entrepreneurship intentions. In their study, based on a sample of 485 students from private and public universities in India, they find that Business Management and Commerce students have a greater inclination toward entrepreneurship than students in professional streams such as law, pharmacy, engineering, etc. Moreover, Habivov et al. (2016), using a cross-sectional sample of 29 transitional economies, find that university education reduces the likelihood of being self-employed.***

In summary, both higher education and technology play important roles in shaping total early-stage entrepreneurial activity (TEA), but they operate at different temporal speeds. Tertiary education builds entrepreneurial capacity gradually through structured learning, skill development, and experience accumulation. In contrast, AI-driven tools such as ChatGPT provide immediate access to synthesized knowledge, real-time data interpretation, and decision support. This difference in speed offers distinct advantages: higher education supports deep cognitive development over time, while AI enables rapid access to and processing of information, reducing uncertainty and lowering entry barriers in fast-moving markets. As a result, the immediacy, adaptability, and data-driven nature of AI may exert a stronger influence on short-term entrepreneurial decisions, particularly those concerning whether to initiate or delay a new business venture.

*** A transition economy refers to countries transitioning from a centrally planned economic system to a free market economy.

3.7 Hypotheses to Be Tested

Based on the theoretical framework and literature review presented above, two hypotheses are derived for empirical testing:

- H1: (No higher-education advantage). The 2023 GenAI shock tempered the TEA advantage traditionally enjoyed by highly educated adults, as connectivity and applications, including AI tools, increasingly exert greater influence.
- H2: (Hardware and connectivity premium emergence). The same shock disproportionately increased TEA among smartphone owners, because on-device access is a binding constraint on connectivity and GenAI use.

4. Data Sources

We use the Latinobarómetro individual surveys for 2020 and 2023, the most recent pre- and post-ChatGPT surveys that include the Entrepreneurship & New Technologies battery (Corporación Latinobarómetro, 2020, 2023).

Latinobarómetro is an annual cross-national survey that tracks public opinion, social conditions, and economic behavior across Latin America. Since 1995, the Chile-based Latinobarómetro Corporation has commissioned local polling firms in each participating country to interview a nationally representative sample of about 1000 adults (18+) using a common questionnaire. Stratified multistage sampling and post-stratification weights ensure results mirror each country's census profile for region, urban–rural status, gender, and age.

The instrument covers more than 100 items, including politics, trust, well-being, employment, and digital technology, allowing researchers to observe regional trends and make country-to-country comparisons over time. Fieldwork is usually conducted between September and December, with response rates that exceed 65%. Microdata and documentation are released each year in SPSS/CSV formats, making Latinobarómetro one of the few open, harmonized data sources suitable for repeated cross-sectional analyses of Latin-American societies using the quasi-experimental method of difference-in-differences regression.

The sample used in this study comprises 17 Latin American economies: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador,

Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, El Salvador, Uruguay, and Venezuela. The pooled dataset contains 38,106 respondents. All analyses apply Latinobarómetro's post-stratification WT (weight) to project micro-observations to national adult populations. The key variables are presented in Table 3 (see Table 3).

Table 3. Key Variables in the Model

Construct	Latinobarómetro Item (S)	Coding
Early-Stage Entrepreneurship (TEA)	S24.A Self-employed OR S25 Business owner / Informal self-employed	TEA_i = 1 if either; else 0.
Post-ChatGPT indicator (post-2023)	Survey year	1 for 2023, 0 for 2020.
Education treatment (HighEduc)	1 7-point ladder	1 = post-secondary or higher (Codes 5–7).
Digital-access proxy (smartphone)	S26.L / S20.D Owns smartphone with internet	1 = Yes, 0 = No.
Controls	AGE, SEX	Mitigate demographic heterogeneity. 2= female.

Source: Corporación Latinobarómetro, 2020, 2023.

5. Identification Strategy

The empirical testing of the previously mentioned hypotheses is carried out by estimating the following two difference-in-differences (DID) equations, which use repeated cross-sectional data to compare the change in outcomes over time between a treatment group and a control group.

Higher education as the treatment variable (1)

Smartphone penetration as the treatment variable (2)

Where age, gender, higher education, and smartphone ownership are included, and country and year are fixed effects. In equation (1), the coefficient measures the extra 2023 change for highly educated adults relative to less-educated peers within the same country, and for equation (2), the coefficient measures the extra 2023 change for smartphone owners relative to non-owners.

Given that in equations (1) and (2) the dependent variable is binary, the regressions become linear probability models. The conditional expectation of Y_{ict} given X_{ict}, $E(Y_{ict}|X_{ict})$, can be interpreted as the conditional probability that the event will occur given X_{ict}, that is $P_r(Y_{ict}=1|X_{ict})$. Thus, the regressions $E(Y_{ict}|X_{ict})$ represent the probability that an individual engages in early-stage entrepreneurship, conditional on possessing higher education in equation (1) and smartphone ownership in equation (2).****

The functional equation to be estimated for higher education:

The functional equation to be estimated for smartphone ownership:

5.1 Estimation Details

- Estimator: Linear-probability models. Fixed-Effects Ordinary Least Squares (FEOLS).*****
- Fixed effects: Country dummies and year capture unobserved heterogeneity and common shocks.
- Age and sex, which act as cofounders, are included as control variables in both regression equations.
- Standard errors: Clustered by country (17 clusters); inference via wild-cluster bootstrap (R fwildclusterboot, 9999, Rademacher draws).
- Missing data: Complete-case estimation retains all 38,106 observations.
- Weights: All regressions use WT; unweighted results are qualitatively identical.

6. Empirical Results

**** In equation (2), $(Y_{ict}|X_{ict})$ represents the probability of an individual engaging in early-stage entrepreneurship conditional on owning a smartphone compared with the control group with individuals not owning a smartphone.

***** When including fixed effects on the righthand side of a FEOLS model, the R package applies a within transformation: it demeans every variable by its country average and, in a second step, by its year average. After this double demeaning, the grand mean of the dependent variable is zero, so an explicit intercept would be perfectly collinear with the fixed-effect dummies. Therefore, a FEOLS model drops the constant automatically.

The empirical results of this study suggest that immediate entrepreneurial gains from generative AI favor those with physical access to technology. These results can be seen in Tables 4 and 5, prepared by the authors (see Table 4 and Table 5).

Table 4. Higher Education as the Treatment Variable

Predictor	**Coefficient**	**Std. Error**	**T value**	**Pr(>t)**
Higher Education	-0.009097	0.010919	-0.833147	4.1703e-01
Post-2023*Higher Education	-0.026469	0.012910	-2.050324	5.7088e-02
Control variables				
Age	0.000117	0.000468	0.249788	8.0593e-01
Sex	-0.171933	0.015245	-11.277991	5.0283e-09 ***
Smartphone	0.014763	0.014171	1.041752	3.1301e-01
Significance codes: *** = 0; ** = 0.01; * = 0.05				
R^2 = 0.073752; observations: 38,106; bootstrapping samples = 9,999; confidence interval for Post2023*smartphone coefficient: (-0.0548 , 0), with value = 0.0511 and t statistic = -2.054				

Source: Prepared by the authors using model estimates.

Table 5. Smartphone Ownership as Treatment Variable

Predictor	**Estimate**	**Std. Error**	**T value**	**Pr(>t)**
Smartphone	0.000123	0.015323	0.008008	9.9371e-01
Post2023*smartphone	0.061887	.015633	3.958754	1.1256e-03 **
Control variables				
Age	0.000131	0.000465	0.281893	7.8164e-01
Sex	-0.172265	0.015144	-11.374862	4.4486e-09 ***
Higher Education	-0.22917	0.009286	-2.468008	2.5245e-01
Significance codes: *** = 0; ** = 0.01; * = 0.05				
R^2 = 0.074127; observations: 38,106; bootstrapping samples = 9,999; confidence interval for Post2023*smartphone coefficient: 0.0279 - 0.0959 with value = 0.0016 and t statistic = 3.9589				

Source: Prepared by the authors using model estimates.

Table 4 reports the specification in which the 2023 dummy interacts with the highly educated flag, with controls for age, gender, and smartphone ownership, plus country and fixed effects (see Table 4). Estimated parameters associated with the higher- education variables proved non-significant. In Table 5, we replace higher education with smartphone ownership (see Table 5). Our difference-in-differences estimates show that the 2023 rise in AI had a positive, statistically significant effect on nascent entrepreneurship in Latin America, mainly because people gained greater access to AI tools. Specifically, in the 2020 wave,****** smartphone owners and non-owners were almost equally likely to be early-stage entrepreneurs. That is, before ChatGPT, merely owning a smartphone did not make someone more (or less) likely to start a business. The coefficient labelled smartphone equals +0.0001 ≈ 0 pp and is not statistically different from zero ($p = 0.99$).

In the 2023 wave, individuals who own a smartphone are about 6.2 percentage points more likely to be in early-stage entrepreneurship in 2023 than non-owners (interaction = 0.0619, wild-cluster = 0.0016). These patterns are consistent with a mechanism in which AI's early, widely adopted uses: idea testing, marketing content, translation, customer messaging, and low-code prototyping are mobile-first and therefore mediated by device access rather than formal schooling, thus eroding the traditional education premium. In other words, when AI lowers the fixed costs of entry tasks, everyday capability and connectivity dominate as the immediate bottlenecks at the startup margin, while the comparative advantage of formal education may shift toward later growth or wage employment within firms.

Policy follows naturally: expanding affordable access to smartphones and data plans, and providing hands-on training in AI-enabled mobile workflows are likely to raise TEA in the near term. Fostering access to smartphones as an end-user device to connect with the communications network is consistent with the following OECD (2021) recommendations:

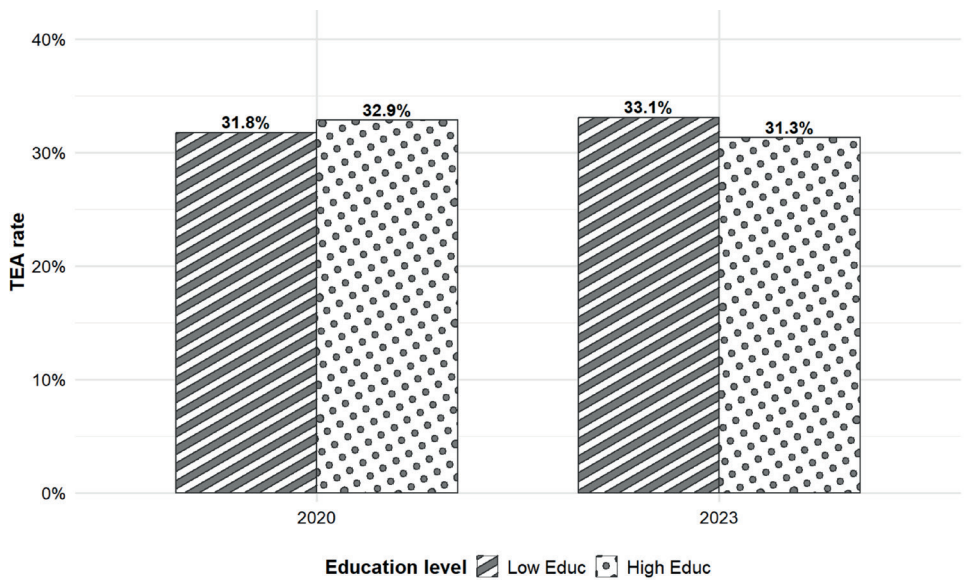
> To help close digital divides, people need access to *high-quality* communication networks and services at competitive prices, regardless of where they live [...] Policies and regulations that foster competition, promote investment in fixed and mobile networks, and reduce barriers to infrastructure deployment have been extremely effective in boosting connectivity in G20 countries... (OECD, 2021, p. 27)

****** A wave is one iteration of a survey conducted at a particular time. Many large datasets are collected repeatedly (every year, every few years, etc.), and each round is called a wave.

7. Descriptive Patterns of Survey Data

The sign and relative importance of the estimated interaction parameters can be assessed on a one-to-one basis against the descriptive behavior of higher education and smartphone ownership among early-stage entrepreneurs. Survey data show that the raw gap between education groups flipped sign from 2020 to 2023: Figure 1 shows that among low-educated adults, TEA rose from 31.8 % to 33.1 %, whereas among highly educated adults it fell from 32.9 % to 31.3 % (see Figure 1).

Figure 1. Early-Stage Entrepreneurship by Education, 2020 vs. 2023

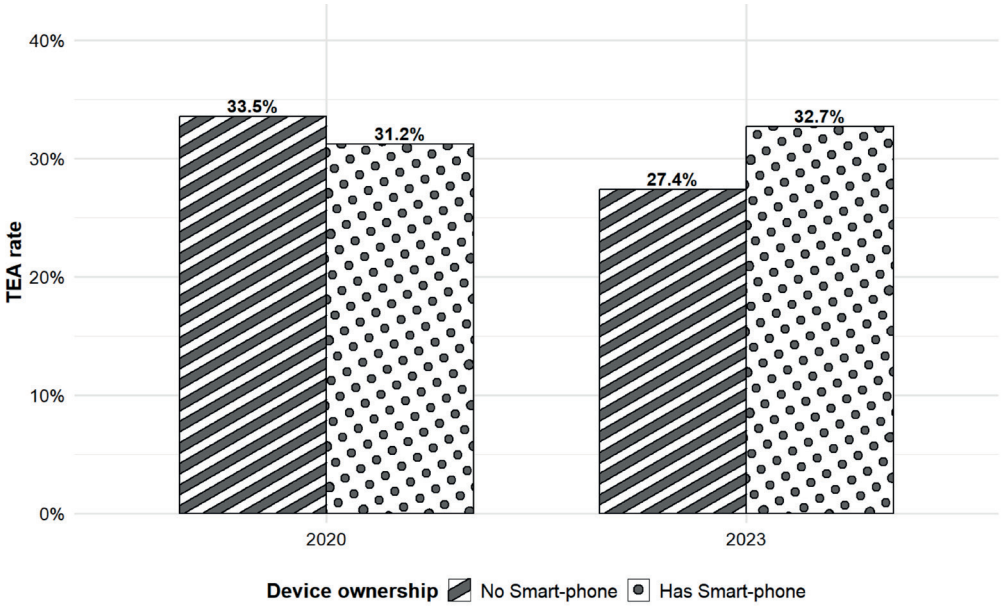


Source: Corporación Latinobarómetro 2020, 2023.

The negative, non-significant education interaction coefficient is consistent with early diffusion of GenAI, which lowers entry barriers, thereby pulling marginally qualified individuals into nascent entrepreneurship and illustrating the post-ChatGPT shift in the traditional education premium.

In contrast, Figure 2 shows that among the TEA group, smartphone owners climbed from 31.2 % to 32.7 %, while non-owners dropped sharply (33.5 % → 27.4 %) (see Figure 2).

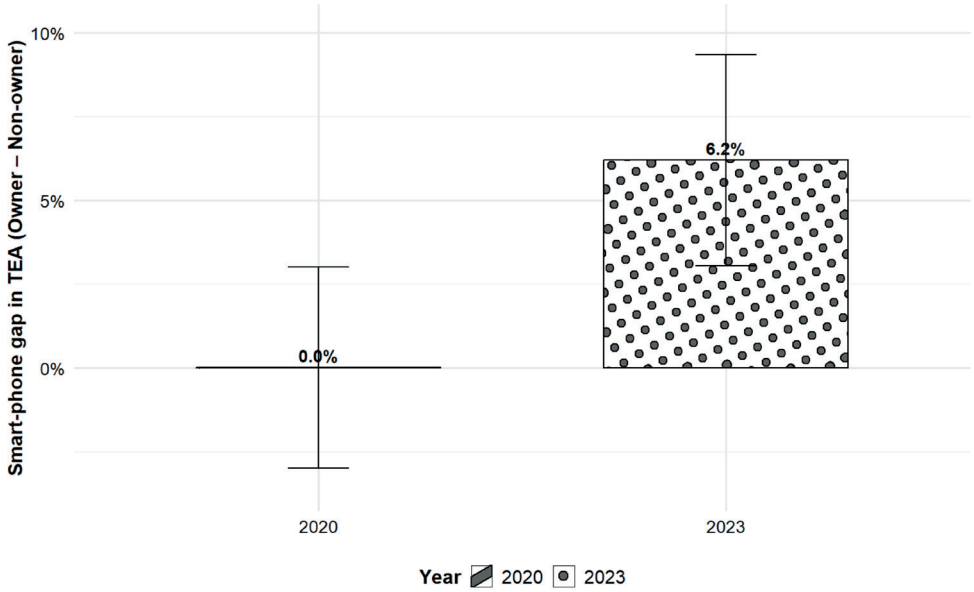
Figure 2. Early-Stage Entrepreneurship by Smartphone Access



Source: Corporación Latinobarómetro 2020, 2023.

Conversely, the strong positive smartphone interaction underscores a new "hardware divide": only those with on-device access to generative AI tools appear able to capitalize quickly on the new technology. Thus, the data highlights the lower importance of higher education as a TEA enabler, while smartphone ownership is more important, demonstrating consistency between model estimates and raw data behavior. These contrasts motivate the formal difference-in-differences test that follows (see Figure 3).

Figure 3. Smartphone Ownership Gap in Early-Stage Entrepreneurship, 2020 vs. 2023



Source: Prepared by the authors using model estimates.

Error bars show the difference in predicted TEA rates between smartphone owners and non-owners. In 2020, the gap is negligible (0 pp); by 2023, it widens to +6.2 pp. Whiskers denote 95 % clustered confidence intervals, highlighting a significant post-ChatGPT "hardware premium."*******

8. Discussion and Policy Recommendations

Our baseline difference-in-differences results support H1 (no higher-education advantage). The estimates suggest no detectable higher-education advantage as an entrepreneurial enabler across the 17 Latin American countries comprising the

******* Non-overlapping error bars suggest a statistically significant difference between the control and treatment groups at $p < 0.05$. This suggests that the impact of AI via mobile smartphone connectivity is unlikely to be due solely to random chance.

sample database. In both datasets (2020 and 2023), the higher-education variables and the 2023 interactive variable were not significant at the $p < 0.05$ threshold. This finding is consistent with the hypothesis that the 2023 GenAI shock tempered the TEA advantage traditionally enjoyed by highly educated adults, as connectivity and applications, including AI tools, increasingly exert a stronger influence on entrepreneurial activity.

Three plausible explanations might tentatively explain this result. First, in Latin America, dropout rates are high, and completion rates are low in secondary education. In 2023, on average, 35% of young people aged 21–23 had not completed secondary school (Arias Ortiz et al., 2024). On the other hand, the region's youth have low levels of foundational learning: in reading and science, more than half of the region's 15-year-olds do not meet the minimum competency level, while in mathematics, the percentage rises to 75% (Arias Ortiz et al., 2023). Second, generative AI automates cognitively intensive but generic startup tasks, drafting copy, writing code snippets, and conducting market scans, thereby compressing the advantage previously enjoyed by the well-schooled. Third, in the AI Era, highly educated workers often have attractive salaried alternatives in formal labor markets while robots are increasingly replacing middle-skilled workers, many of whom must turn to entrepreneurship for survival (Fierro et al., 2022). Together, these factors help explain why the traditional human-capital advantage associated with tertiary education appears attenuated in the presence of rapidly diffusing AI-enabled tools, in line with H1.

In contrast, our results provide strong support for H2 (the emergence of a hardware and connectivity premium). Regarding smartphone ownership, the estimates for equation (2) presented in Table 5 reveal the flip side of the education result: smartphone owners experienced a 6.1-percentage-point increase in TEA relative to non-owners (see Table 5). This finding is consistent with the hypothesis that the GenAI shock disproportionately increased TEA among smartphone owners, because on-device access represents a binding constraint on connectivity and the effective use of generative AI tools.

This result suggests that physical access to AI-capable devices is becoming an increasingly salient determinant of new business creation. Cao and Bhatia (2025) show that generative AI significantly reduces the time and cost of launching digital ventures, leading to a disproportionate rise in entrepreneurship among founders without formal education or managerial experience. By automating many startup tasks that once required specialized expertise, AI lowers entry barriers and

compresses the advantage traditionally held by highly educated founders, even as technical skill still matters for outcomes like funding.

According to World Bank data, mobile broadband through smartphones is the primary way households access the internet in Latin America and the Caribbean, with fixed connections still far less prevalent (Ibarra et al., 2022). Our finding, therefore, updates classic digital-divide theory: a novel "GenAI hardware divide" has emerged in which device ownership determines who can translate the use of communications technology, including AI tools, into entrepreneurial action. In this sense, the results for H2 complement those for H1: while higher education no longer appears to confer a measurable advantage for entry into entrepreneurship, connectivity and device access increasingly shape who can exploit new AI-enabled opportunities.

The above discussion suggests that subsidized AI-capable handsets and zero-rate data plans can create fast and more inclusive pathways to entrepreneurial opportunity. At the same time, policymakers should avoid framing formal tertiary education and digital technologies as substitutes. While higher education remains a critical foundation for human-capital development, the rapid diffusion of AI-enabled technologies is increasingly shaping entrepreneurial activity. Maximizing entrepreneurial outcomes, therefore, requires an integrated strategy that combines traditional schooling with targeted entrepreneurial education and the effective use of digital technologies.

For scholars, these patterns motivate a refinement of existing theories of entrepreneurial propensity, emphasizing the joint and complementary roles of human capital, entrepreneurial training, and digital infrastructure in enabling the realization of opportunities.

9. Conclusions

This paper exploits the near-simultaneous diffusion of generative artificial intelligence (GenAI) across Latin America to identify its short-run impact on nascent entrepreneurship. Using individual-level microdata for 38,106 adults across 17 countries, we find that smartphone ownership—which, in our review of the literature, was consistently linked to greater engagement with digital technologies, including GenAI—, is becoming an increasingly salient determinant of new business creation in the region. By contrast, higher education shows no detectable advantage as an entrepreneurial enabler in this context. These results highlight a "hardware divide," with a tangible premium associated with smartphone ownership.

The post-2023 decline in early-stage entrepreneurship among highly educated adults, as indicated by descriptive trends in the survey data and the non-significance of the high-education regression coefficients, stands in sharp contrast to the rise in new entrepreneurs who own a smartphone as a mediating device for accessing digital technologies. Regression results show that smartphone owners enjoy a substantial 6 percentage point advantage ($p = 0.001$) in starting new businesses, highlighting the growing importance of physical access to connected hardware. While generative AI (GenAI) promises to democratize knowledge work, our evidence suggests that this potential is contingent on access to devices and connectivity. Policymakers aiming to foster inclusive, AI-driven growth in Latin America should therefore treat smartphone and connectivity expansion not as auxiliary infrastructure programs but as core entrepreneurship policy. Bridging this "Hardware Divide" could unlock a generation of micro-entrepreneurs ready to leverage GenAI's capabilities, thus enhancing the value of general cognitive skills and formal education.

The main contributions of this study are the following:

1. *Empirical novelty*. We deliver data-supported statistical estimates of smartphone ownership as a proxy for GenAI's use and its effect on startup entry in emerging markets.
2. *Conceptual shift*. Results suggest a hardware divide superseding the traditional skills divide during disruptive technological shocks.
3. *Policy relevance*. Device-access interventions (subsidized handsets, data plans) may yield faster, more inclusive entrepreneurial gains than education-only strategies in the GenAI era.

10. Limitations and Future Research

A key limitation of this study is that the difference-in-differences design includes only two time periods, preventing a formal test of the parallel trends assumption necessary for causal inference. As a result, while the public release of ChatGPT is treated as a quasi-exogenous shock, the findings should be interpreted as indicative of associations rather than definitive causal effects. Nevertheless, the analysis provides useful insights into potential impacts of ChatGPT's release and highlights patterns that future research with longer pre- and post-treatment data could examine more rigorously. Despite this limitation, the observed patterns offer meaningful insights and underscore areas for further investigation in future studies.

In addition, two periods constrain pre-trend tests; smartphone ownership is not randomized; and LPM (Linear Probability Model) estimates are linear approximations, but clustered inference, country and year fixed effects, and robustness checks support the core conclusion that, post-2023, hardware access beats formal schooling for getting new ventures off the ground. Future research should test whether this hardware divide also shapes post-entry outcomes such as venture growth, innovation, and survival.

- Short observation window. The study captures entry decisions within the first year of ChatGPT's diffusion; medium-term venture survival remains unknown.
- Self-reported variables. TEA and smartphone ownership rely on survey responses; misclassification is possible, although robustness checks show stable coefficients.
- Unobserved confounders. Other 2023 shocks (inflation, labor-market tightening) could interact with education; future work should test synthetic control or triple-difference designs using additional pre-periods.

Regarding the direction of future research, we believe the following are relevant:

1. Longitudinal survival. Link forthcoming Latinobarómetro or GEM waves to track whether GenAI–induced entrants persist, innovate, and create jobs.
2. Quality of entrepreneurship. Distinguish opportunity- vs. necessity-driven ventures; assess whether GenAI lowers entry barriers mainly for one type.
3. Device heterogeneity. Measure hardware quality (processing power, data limits) and shared device use to refine the narrative on the hardware divide.
4. Global replication. Apply the same DiD design to GEM or Gallup data from Africa and Asia to test external validity.
5. Mechanism tests. Combine survey data with platform analytics (e.g., OpenAI API usage) to directly observe patterns of entrepreneurial GenAI adoption.

References

Afawubo, K., & Noglo, Y. A. (2022). ICT and Entrepreneurship: A Comparative Analysis of Developing, Emerging and Developed Countries. *Technological Forecasting & Social Change, 175*, 121312. https://doi.org/10.1016/j.techfore.2021.121312

Agrawal, A., Gans, J., & Goldfarb, A. (2023). *Prediction Machines: The Simple Economics of Artificial Intelligence* (Updated & expanded ed.). Harvard Business Review Press.

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Alderete, M.V. (2017). Mobile Broadband. A Key Enabling Technology for Entrepreneurship? *Journal of Small Business Management*, 55(2), 254-269. https://doi.org/10.1111/jsbm.12314

Arias Ortiz, E., Bos, M. S., Giambruno, C., & Zoido, P. (2023). *Latin America and the Caribbean in PISA 2022: How Many Students are Low Performers?* Inter-American Development Bank (IDB). https://doi.org/10.18235/0005316

Arias Ortiz, E., Giambruno, C., Morduchowicz, A., & Pineda, B. (2024). *The State of Education in Latin America and the Caribbean 2023*. Inter-American Development Bank (IDB). https://doi.org/10.18235/0005515

Bates, T. (1990). Entrepreneur Human Capital Inputs and Small Business Longevity. *The Review of Economics and Statistics, 72*(4), 551–559. https://doi.org/10.2307/2109594

Brynjolfsson, E., Li, D., & Raymond, L. R. (2023). *Generative AI at Work,* National Bureau of Economic Research (NBER) Working Paper 31161. https://doi.org/10.3386/w31161

Cao, R., & Bhatia, A. (2025). How Founder Expertise Shapes the Impact of Generative Artificial Intelligence on Digital Ventures. *ArXiv*. http://dx.doi.org/10.2139/ssrn.5727802

Cazzaniga,M., Jaumotte, F., Longji, L., Melina, G., Panton, A. J., Pizzinelli, C., Rockall, E.J., & Mendes Tavares, M. (2024). GenAI: Artificial Intelligence and the Future of Work, IMF Staff Discussion Note SDN2024/001, International Monetary Fund (IMF). https://doi.org/10.5089/9798400262548.006

Counterpoint Research. (2024). GenAI Consumer Awareness Survey 2024. Counterpoint Research. https://www.counterpointresearch.com/report/genai-consumer-awareness-survey-2024

Corporación Latinobarómetro. (2020). Latinobarómetro 2020: Dataset (aggregated version) [Data set]. https://www.latinobarometro.org/latinobarometro-2020

Corporación Latinobarómetro. (2023). Latinobarómetro 2023: Dataset (aggregated version) [Data set]. https://www.latinobarometro.org/latinobarometro-2023

Czarnitzki, D., Fernández, G. P., & Rammer, C. (2023). Artificial Intelligence and Firm-Level Productivity. *Journal of Economic Behavior & Organization, 211*, 188–205. https://doi.org/10.1016/j.jebo.2023.05.008

Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koohang, A., Raghavan, V., Ahuja, M., Albanna, H., Albashrawi, … (2023). Opinion Paper: "So What if ChatGPT Wrote it?" Multidisciplinary Perspectives on Opportunities, Challenges and Implications of Generative Conversational AI for Research, Practice and Policy. *Journal of Business Research, 153*, 113584. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Farrell, A.A., Ashton, J., Mapanga, W., Joffe, M., Chitha, N., Beksinska, M., Chitha, W., Coovadia, A., Cutland, C. L., Drennan, R. L., Kahn, K., Koekemoer, L., … (2024). Consensus Study on Factors Influencing the Academic Entrepreneur in a Middle-Income Country's University Enterprise. *Journal of Entrepreneurship in Emerging Economies 16*(5), 1409–1430. https://doi.org/10.1108/JEEE-08-2022-0241

Ganuthula, V. R. R. (2025). AI-Enabled Individual Entrepreneurship Theory: Redefining Scale, Capability, and Sustainability in the Digital Age. *Journal of Innovative Entrepreneurship, 14*(1). https://doi.org/10.1186/s13731-025-00521-9

Global Entrepreneurship Monitor (GEM). (2025). *Global Entrepreneurship Monitor: 2024/2025 Global Report: Entrepreneurship Reality Check.* GEM. https://www.gemconsortium.org/report/gem-20242025-global-report-entrepreneurship-reality-check-4

GEM (Global Entrepreneurship Monitor). (2020). *Global Entrepreneurship Monitor: 2019/2020 Global Report, GEM.* https://www.gemconsortium.org/report/gem-2019-2020-global-report

Gomes, S., & Lopes, J. M. (2022). ICT Access and Entrepreneurship in the Open-Innovation Dynamic Context: Evidence from OECD Countries. *Journal of Open Innovation: Technology, Market, and Complexity, 8*(2), 102. https://doi.org/10.3390/joitmc8020102

González-Ramos, M. I., Guadamillas, F., Ortiz, B., & Donate, M. J. (2025). Contextual Factors and Psychological Determinants for the Development of Entrepreneurship Intention: An International Study. *International Entrepreneurship and Management Journal*, *21*(1). https://doi.org/10.1007/s11365-025-01114-4

Giuggioli G., & Pellegrini M.M., (2023). Artificial Intelligence as an Enabler for Entrepreneurs: A Systematic Literature Review and an Agenda for Future Research. *International Journal of Entrepreneurial Behavior & Research; 29*(4), 816–837. https://doi.org/10.1108/IJEBR-05-2021-0426

Habivov, N., Afandi, E. & Cheung, A. (2016). What is the Effect of University Education on Chances to Be Self-Employed in Transitional Countries?: Instrumental Variable

Analysis of Cross-Sectional Sample of 29 Nations. *International Entrepreneurship & Management Journal*, *13,* 487–500. https://doi.org/10.1007/s11365-016-0409-4

Herrera, P., Huepe, M., & Trucco, D. (2025). *Education and the Development of Digital Competences in Latin America and the Caribbean.* Project Documents (LC/TS.2025/3), Economic Commission for Latin America and the Caribbean (ECLAC). https://www.cepal.org/en/publications/81378-education-and-development-digital-competences-latin-america-and-caribbean

Hynes, M. (2021). Digital Divides. In *The Social, Cultural and Environmental Costs of Hyper-Connectivity: Sleeping Through the Revolution* (pp. 103–20). Emerald Publishing Limited. https://doi.org/10.1108/978-1-83909-976-220211007

Hsu, M., Martin, B., Ahmed, S., Torous, J., & Suzuki, J. (2022). Smartphone Ownership, Smartphone Utilization, and Interest in Using Mental Health Apps to Address Substance Use Disorders: Literature Review and CrossSectional Survey Study Across Two Sites. *JMIR Formative Research***,** *6*(7), e38684. https://doi.org/10.2196/38684

Jiménez, A., PalmeroCámara, C., GonzálezSantos, M. J., GonzálezBernal, J., & JiménezEguizábal, J. A. (2015). The Impact of Educational Levels on Formal and Informal Entrepreneurship**.** *BRQ Business Research Quarterly. 18*(3), 204–212. https://doi.org/10.1016/j.brq.2015.02.002

Kemp, S. (2025). *Digital 2025 April Global Statshot Report.* Datareportal, Meltwater, & We Are Social. https://datareportal.com/reports/digital-2025-april-global-statshot

Konte, M., & Tetteh, G. K. (2023). Mobile Money, Traditional Financial Services and Firm Productivity in Africa. *Small Business Economics, 60*(3), 745–769. https://doi.org/10.1007/s11187-022-00613-w

Lazear, Edward P. (2005). Entrepreneurship. *Journal of Labor Economics, 23*(4), 649-680. https://doi.org/10.1086/491605

Lechuga Sancho, M.P., Ramos-Rodríguez, A. R., & Frende Vega, M.A. (2022). The Influence of University Entrepreneurship-Oriented Training in the Transformation of Intentions into New Businesses, *The International Journal of Management Education*. *20*(2), 100631. https://doi.org/10.1016/j.ijme.2022.100631

Ledi, K. K., Ameza-Xemalordzo, E., Amoako, G. K., & Asamoah, B. (2023). Effect of QR Code and Mobile Money on Performance of SMEs in Developing Countries: The Role of Dynamic Capabilities. *Cogent Business & Management*, *10*(2). https://doi.org/10.1080/23311975.2023.2238977

Fierro, L. E., Caiani, A., & Russo, A. (2022). Automation, Job Polarisation, and Structural Change. *Journal of Economic Behavior & Organization*, *200*, 499–535. https://doi.org/10.1016/j.jebo.2022.05.025

Ibarra, G. L., Comini, N., & Gelvanovska-Garcia, N. (2022, December 21). *Universal, Affordable, and Reliable Internet Connectivity is a Key Ingredient for Inclusive Recovery*.

World Bank Blogs. https://blogs.worldbank.org/en/latinamerica/universal-affordable-and-reliable-internet-connectivity-key-ingredient-inclusive

Maharama N., & Chaudhury , S. K. (2022). Entrepreneurship Education and Entrepreneurial Intent: A Comparative Study of the Private and Government University Students. *IIM Ranchi Journal of Management Studies*, *1*(2), 191-208. https://doi.org/10.1108/IRJMS-09-2021-0118

Maslej, N., Fattorini, L., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Ngo, H., Niebles, J. C., Parli, V., Shoham, Y., Wald, R., Clark, J., & Perrault, R. (2023). *Artificial Intelligence Index Report 2023.* Stanford University, AI Index Steering Committee, Institute for Human-Centered AI. https://hai.stanford.edu/assets/files/hai_ai-index-report_2023.pdf

Metreau, E., Young, K. E., & Eapen, S. G. (2024, July 1). World Bank Country Classifications by Income Level for 2024-2025. *World Bank Blogs.* https://blogs.worldbank.org/en/opendata/world-bank-country-classifications-by-income-level-for-2024-2025

Nambisan, S., Wright, M., & Feldman, M. (2019). The Digital Transformation of Innovation and Entrepreneurship: Progress, Challenges and Key Themes, *Research Policy, 48*(8), 103773. https://doi.org10.1016/j.respol.2019.03.018

Odelami, B. J., Shehu, N., Odeyemi, S. I., & Adeyemi, A. J. (2025). Survey of Smartphones, Medical Mobile Apps, and Generative AI Use Among Medical Students in Nigeria: A Case Study. *Research Square*. https://doi.org/10.21203/rs.3.rs-7576725/v1

Organization for Economic Co-operation and Development (OECD). (2021). *Bridging Digital Divides in G20 Countries*. OECD Publishing. https://doi.org/10.1787/35c1d850-en

Oshima, S. M., Tait, S. D., Thomas, S. M., Fayanju, O. M., Ingraham, K., Barrett, N. J., & Hwang, E. S. (2021). Association of Smartphone Ownership and Internet Use with Markers of Health Literacy and Access: Cross-Sectional Survey Study of Perspectives from Project PLACE. *Journal of Medical Internet Research*, *23*(6), e24947. https://doi.org/10.2196/24947

Oxford Insights. (2024). *Government AI Readiness Index 2024*. Oxford Insights. https://oxfordinsights.com/wp-content/uploads/2024/12/2024-Government-AI-Readiness-Index-2.pdf

Parker, S. C. (2018). The Economics of Entrepreneurship (2nd ed.). Cambridge University Press. https://doi.org/10.1017/9781316756706

Pew Research Center. (2025). *Mobile Fact Sheet* [Fact sheet]. https://www.pewresearch.org/internet/fact-sheet/mobile

Sarasvathy, S. D. (2001). Causation and Effectuation: Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency. *Academy of Management Review, 26*(2), 243–263. https://doi.org/10.5465/amr.2001.4378020

Sathiswaran Uthamaputhran, Kiran Kumar Thoti, Yusrinadini Zahirah Yusuff, Wan Nur Fazni Wan Mohamad Nazarie, Wahidah Shari. (2023). Artificial Intelligent (AI), Effectuation Theory, and International Opportunity: A Powerful Approach to Global Entrepreneurship. *Journal of Harbin Engineering University, 44*(5), 182-188. https://harbinengineeringjournal.com/index.php/journal/article/view/204/193

Saura, J.R. & Bužinskienė, R. (2025). Behavioral Economics, Artificial Intelligence and Entrepreneurship: An Updated Framework for Management. *International Entrepreneurship and Management Journal 21*, 67. https://doi.org/10.1007/s11365-025-01076-7

Slotta, D. (2024). Smartphone Market in Latin America: Statistics & Facts. Statista. Retrieved September 15, 2025, from https://www.statista.com/topics/7195/smartphone-market-in-latin-america/?utm_source.

Soluk, J., Kammerlander, N., & Darwin, S. (2021). Digital Entrepreneurship in Developing Countries: The Role of Institutional Voids. *Technological Forecasting and Social Change, 170*, 120876. https://doi.org/10.1016/j.techfore.2021.120876

Talker Research. (2026, January 12). Half of Americans Unaware they're Using AI on their Phone. https://talkerresearch.com/half-of-americans-unaware-theyre-using-ai-on-their-phone/

Unger, J. M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human Capital and Entrepreneurial Success: A Meta-Analytical Review. *Journal of Business Venturing, 26*(3), 341–358. https://doi.org/10.1016/j.jbusvent.2009.09.004

Van Der Sluis, J., Van Praag, M., & Vijverberg, W. (2008). Education And Entrepreneurship Selection and Performance: A Review of the Empirical Literature. *Journal of Economic Surveys, 22*(5), 795–841. https://doi.org/10.1111/j.1467-6419.2008.00550.x

Van Dijk, J. A. G. M. (2006). Digital Divide Research, Achievements and Shortcomings. *Poetics*, *34*(4–5), 221–235. https://doi.org/10.1016/j.poetic.2006.05.004

Von Briel, F., Davidsson, P., & Recker, J. (2018). Digital Technologies as External Enablers of New Venture Creation in the IT Hardware Sector. *Entrepreneurship Theory and Practice*. *42*(1), 47–69. https://doi.org/10.1177/1042258717732779

Weber, M., Beutter, M., Weking, J., Bojm, M., & Krcmar, H. (2022). AI Startup Business Models. *Business & Information Systems Engineering, 64*(1), 91–109. https://doi.org/10.1007/s12599-021-00732-w

Xu, M., David, J.M., & Kim, S. (2018). The Fourth Industrial Revolution: Opportunities *and* Challenges. *International Journal of Financial Research, 9*(2), 90-95. https://doi.org/10.5430/IJFR.V9N2P90

Zhai, S., Z., & Liu, Z. (2023). Artificial Intelligence Technology Innovation and Firm Productivity: Evidence from China. *Finance Research Letters, 58, Part B,* 104437. https://doi.org/10.1016/j.frl.2023.104437

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Online Financial Disclosure and Corporate Transparency: Explanatory Variables Based on an Index for Companies Issuing Shares on the Colombian Stock Exchange

Divulgación financiera en línea y transparencia corporativa: variables explicativas a partir de un índice para empresas emisoras de la Bolsa de Valores de Colombia

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Abstract

The study analyzed the relationship between online financial disclosure and performance factors, business strategy, and transparency in companies listed on the Colombian Stock Exchange (BVC). A quantitative approach with a cross-sectional design was used for the systematic examination of corporate websites. An index was constructed to assess the level of disclosure, comprising various dimensions: accountability, corporate and strategic information, financial analysis, transparency, and website functionality. Regression models were used to explore the associations between this index and financial and corporate governance variables. Findings suggest that online financial disclosure by Colombian companies is not yet determined by structural or performance characteristics, posing challenges for strengthening corporate transparency and accountability practices in the local market.

Resumen

El estudio analizó la relación entre la divulgación financiera en línea y factores de rendimiento, la estrategia empresarial y la transparencia en las empresas que cotizan en la Bolsa de Valores de Colombia (BVC). Se empleó un enfoque cuantitativo con diseño transversal para el examen sistemático de los sitios web corporativos. Para evaluar el nivel de divulgación, se construyó un índice compuesto por diversas dimensiones: rendición de cuentas, información corporativa y estratégica, análisis financiero, transparencia y funcionalidad del sitio web. Con modelos de regresión, se exploraron las asociaciones entre este índice y variables financieras y de gobierno corporativo. Los hallazgos sugieren que la divulgación financiera en línea de las empresas colombianas aún no está determinada por características estructurales o de desempeño, lo que plantea desafíos para fortalecer la transparencia y las prácticas de rendición de cuentas en el mercado local.

KEYWORDS / PALABRAS CLAVE

Colombia, Internet, disclosure, information transparency, financial reporting / Colombia, internet, divulgación, transparencia de la información, informes financieros.

JEL Classification / Clasificación JEL: *G14, I22, M29, M49.*

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1. Introducción

En el mercado de capitales colombiano, los índices bursátiles son instrumentos que miden y comparan el desempeño de los principales activos financieros; estos indicadores se construyen a partir del comportamiento de las cotizaciones de los títulos más representativos y reflejan la evolución del mercado en distintos horizontes de tiempo. Su función principal es evaluar portafolios de inversión, diseñar estrategias financieras, medir rendimientos y estructurar productos de fondos bursátiles (Exchange-Traded Funds, ETFs) o derivados sobre índices (BVC, 2025). Asimismo, los índices contribuyen a la gestión del riesgo, a la evaluación del entorno económico y a la formación de expectativas sobre el comportamiento de las empresas y la economía nacional, constituyéndose en una herramienta para la toma de decisiones de inversionistas e instituciones financieras (BVC, 2025).

La Bolsa de Valores de Colombia (BVC) organiza sus índices en tres grandes grupos: renta variable, renta fija y mercado monetario, cada uno con metodologías específicas que capturan las particularidades de los instrumentos que representan (BVC, 2025). En el mercado accionario se destacan el COLEQTY, que agrupa las 40 acciones más líquidas; el COLSC, que reúne las 15 empresas de menor capitalización bursátil dentro del COLEQTY; el MSCI COLCAP, considerado el índice más representativo del mercado colombiano, y el COLIR, que incluye las empresas con reconocimiento IR por sus buenas prácticas de relación con inversionistas (BVC, 2025). Al 1 de octubre de 2025, estos índices mostraron leves variaciones negativas: el MSCI NUAM USD registró 1376.27 puntos (-0.12%), el MSCI COLCAP 1862.92 (-0.50%), el COLSC 1099.32 (-0.86%), el COLIR 1212.79 (-0.53%) y el COLEQTY 1294.48 (-0.47%), lo que refleja un escenario de ajuste moderado en el mercado accionario nacional (BVC, 2025).

En cuanto a la renta fija, los índices COLTES comparan el comportamiento de los títulos de deuda pública (TES) denominados en pesos y en Unidades de Valor Real (UVR) según su plazo de vencimiento (BVC, 2025). En la misma fecha, los principales indicadores presentaron variaciones positivas: el COLTES UVR LP aumentó a 135.50 puntos (0.37%), el COLTES LP a 413.40 (0.42%) y el COLTES general a 382.89 (0.34%), evidenciando una tendencia al alza en el mercado de deuda pública (BVC, 2025). Por último, el índice del mercado monetario, COLIBR, que refleja la variación del Indicador Bancario de Referencia (IBR) y la liquidez del sistema, se situó en 274.65 puntos con una leve variación de 0.02%, mostrando estabilidad en el corto plazo (BVC, 2025).

La asimetría de la información y los problemas de agencia se intensifican cuando los directivos actúan de forma oportunista, promoviendo la sobreinversión y la expansión subóptima de las operaciones a fin de maximizar sus beneficios privados (Jensen y Meckling, 1976). Ese exceso puede derivar en decisiones subóptimas de asignación de recursos, afectando la inversión en el capital físico y el empleo (Fong *et al*., 2021; Ten Eikelder y Van Amerongen, 2023). Por ello, la calidad de la información financiera (IF) es de vital importancia para mitigar estos problemas, al ofrecer a los inversores y otros *stakeholders* la información oportuna y precisa que necesitan para supervisar y evaluar las actividades empresariales (Liu *et al*., 2022; Monteiro *et al*., 2024).

A partir de las abundantes evidencias empíricas se establece una relación equilibrada entre la transparencia financiera, el rendimiento de las decisiones en términos de inversión y menores costes de capital, ya que existe mayor confianza de los inversores y menor percepción del riesgo (Honjo *et al*., 2024). Niveles adecuados de divulgación de la IF resuelven el problema de la selección adversa y también el de los costos de agencia que tienden a limitar la eficiencia de las inversiones (Alves y Meneses, 2024; Ho *et al*., 2023; Pereira da Silva, 2024). Del mismo modo, también se ha encontrado que la calidad de la IF interfiere de manera directa en las decisiones de inversión, ya que esta les permite evaluar de manera adecuada las oportunidades y los riesgos inherentes del proceso de toma de decisiones de las oportunidades de inversión (Argüello-Avalos y Jaramillo-Calle, 2024; Landu *et al*., 2025).

Los diferentes *stakeholders* tienden a considerar la divulgación de la IF como aquella de la información no financiera (INF) en línea con la apertura de la empresa, en la medida que lo permitan sus características. Sin embargo, su adopción ha sido desigual entre los sectores, las industrias o las regiones (Landu *et al*., 2025; Lu *et al*., 2023). Hu *et al*. (2024) y Wang *et al*. (2024) han dedicado esfuerzos a determinar de qué manera se puede explicar el uso creciente de la IF, aunque todavía se carece de una serie de condiciones que tiendan a explicar la divulgación de información distinta y su efecto sobre la transparencia (Singhania y Gupta, 2024).

López-Santamaría *et al*. (2021) y Pereira da Silva (2024) analizan la forma en que los atributos distintivos de las empresas que cotizan en la BVC influyen en el grado de divulgación de IF y INF en sus sitios web. Entre los factores se destaca el tamaño de la empresa, ya que aquellas con mayores ingresos, activos y personal suelen disponer de más recursos para elaborar y presentar información detallada. Esta capacidad está asociada con la presión de los *stakeholders* y las expectativas del mercado respecto a la transparencia y el cumplimiento (Cardona, 2024; Gil *et al*., 2024; Liu *et al*., 2023).

El grado de internacionalización influye positivamente en gran medida. La adecuación y la divulgación de información por las empresas que operan fuera de su propia frontera están condicionadas por múltiples límites impuestos por las distintas normas legales y contables que la regulan, lo que evidencia una influencia de este tipo de normas o arreglos institucionales en la forma de hacerlo (Landu *et al*., 2025; López *et al*., 2024). Así, la estructura de propiedad es otro aspecto importante. Las empresas familiares tienden a priorizar el control de la reputación y la confianza de sus grupos de interés a corto plazo, mientras que las más difusas están más ocupadas en satisfacer las expectativas de los inversores institucionales y los analistas financieros a largo plazo (Landu *et al.,* 2025; López *et al*., 2024).

El sector industrial es otro de los aspectos relevantes, dado que actualmente está sometido a una regulación estricta (financiera, de telecomunicaciones y de energía principalmente), por lo que sus integrantes han de cumplir obligaciones de revelación más específicas que las derivadas de la normativa accesoria del mercado de valores (Linares-Rodríguez *et al*., 2023; Y. Zhang *et al*., 2024). En lo que respecta a la normativa de cumplimiento en Colombia, la Superintendencia Financiera de Colombia (SFC) y otras autoridades reguladoras la definen, aunque no van mucho más allá de lo exigido para la divulgación de la IF y la INF. Esto abarca la aplicación de las normas contables por el Consejo Técnico de la Contaduría Pública (CTCP) y las normas particulares sobre la transparencia y el gobierno corporativo. Con el tiempo, la discusión sobre los métodos para comunicar la IF y la INF se ha intensificado, provocando pronunciamientos del Consejo de Información Financiera (FRC), el Consejo de Normas Internacionales de Contabilidad (IASB), la Federación Internacional de Contadores (IFAC) y la Organización Internacional de Comisiones de Valores (IOSCO).

La literatura indica que un mayor cumplimiento se asocia con elevados niveles de divulgación (Butori y Lancelot Miltgen, 2023; Sun y Xiao, 2024). Por tanto, el gobierno colombiano ha puesto en marcha medidas para promover el uso de las TIC para facilitar el acceso a los servicios gubernamentales a través de la Ley 2195 de 2022 y la Ley 1712 de 2014 que crea la Ley de Transparencia y el Derecho de Acceso a la Información Pública Nacional. Sobre esto, hay estudios que analizan la importancia de que la entidad gubernamental establezca sistemas que garanticen el acceso permanente de los ciudadanos a la información (Y. Liu *et al*., 2024; Zhen Li *et al*., 2023).

En este sentido, el estudio aborda el problema de la eventual información asimétrica disponible en sitios web de empresas cotizadas en el mercado continuo colombiano, evidenciando diferencias y similitudes, y buscando variables explicativas que

puedan ofrecer respuestas a los grupos de interés acerca del devenir del reporte continuo *on-line* frente a la ausencia de evidencia en este mercado y, en general, en contextos latinoamericanos. Además, la diferenciación específica de los tipos de información divulgada no ha sido explicada con gran profundidad, cuestión que aborda este trabajo a partir de cinco subíndices de medición.

Se aplicó la metodología usada previamente (Jarne y Morales, 2023; Morales y Jarne, 2022a; Morales y Jarne, 2022b) para la revisión de la difusión de la contabilidad financiera en sitios web de 68 organizaciones colombianas que cotizan en la BVC. Se optó por el enfoque cuantitativo, con una evaluación, en total, de 71 variables agrupadas en cinco categorías. El panorama general de los índices de la BVC ofrece un contexto para examinar el nivel de transparencia y divulgación de la IF en línea con las empresas emisoras que los forman. La evolución de los mercados y la disponibilidad de información digital influyen directamente en la confianza de los inversionistas y en la percepción de la solidez corporativa.

En este marco, el presente estudio propone y aplica un índice de divulgación financiera en línea orientado a evaluar la calidad, la accesibilidad y el alcance de la información que las compañías publican en sus sitios web. El instrumento analiza dimensiones de rendición de cuentas, análisis financiero, información estratégica y transparencia, con el propósito de identificar patrones de comportamiento entre las empresas listadas en la BVC y contribuir a la comprensión del vínculo entre desempeño financiero, gobierno corporativo y comunicación digital. Con el propósito de evaluar la consistencia interna y la coherencia del índice, se estimó la matriz de correlaciones de Pearson entre las dimensiones parciales (IDI_RC, IDI_CE, IDI_AF, IDI_TRAN, IDI_FUNC) y el índice total (IDI_TOTAL). Las correlaciones resultaron estadísticamente significativas, lo que respalda la estructura propuesta y aporta evidencia de validez convergente del índice.

Los resultados obtenidos mostraron que una mayor difusión total se relaciona positivamente con los demás índices considerados. A continuación, se valora la homogeneidad de las muestras a partir de la prueba de Mann-Whitney, que permite comparar ambos grupos independientes y detectar si las diferencias entre estos son significativas (Cantillo *et al*., 2022; Vergara Arrieta *et al*., 2023). En segundo lugar, se aplicó un modelo de regresión de índices múltiples con una variable explicativa para predecir la variable dependiente a partir de varios factores (Antonio-Anderson *et al*., 2020; Calahorrano *et al*., 2021). El enfoque metodológico garantiza la precisión y validez de los resultados obtenidos, sentando así las bases para la comprensión del tema objeto de estudio.

El estudio contribuye a comprender las prácticas de divulgación de información empresarial en Colombia, subrayando la importancia de contar con normas sólidas para mejorar la transparencia y facilitar la toma de decisiones informadas por los inversores y los reguladores. En conclusión, el campo de la IF en línea sigue desarrollándose, a pesar de que la producción académica sobre el tema suele emplear enfoques descriptivos y explicativos, utilizando índices para cotejar datos sobre prácticas de divulgación de IF e INF (Kim *et al*., 2024; Xiao *et al*., 2023). La investigación se esfuerza en avanzar en la transparencia corporativa mediante la elucidación y sistematización de las dimensiones contextuales, sociales y culturales del uso de internet (Argüello-Avalos y Jaramillo-Calle, 2024; Gil *et al*., 2024).

2. Contexto teórico

La fundamentación teórica del estudio se apoya en tres teorías: la de agencia, la institucional y la de las señales, las cuales explican los distintos mecanismos que impulsan las prácticas de divulgación financiera en línea.

Desde la teoría de agencia, la divulgación es un instrumento para reducir la asimetría de información entre los directivos (agentes) y los inversionistas o propietarios (principales), fortaleciendo la confianza y disminuyendo los costos de supervisión y control (Jensen y Meckling, 1976). Bajo este enfoque, las empresas con una estructura de gobierno corporativo más sólida o con auditorías externas de mejor calidad tienden a ofrecer mayor transparencia, justificando la relación esperada entre la rendición de cuentas, la estructura del consejo y el nivel de divulgación financiera.

Por su parte, la teoría institucional plantea que las organizaciones actúan por motivaciones económicas y en respuesta a presiones normativas, miméticas y coercitivas provenientes de su entorno (DiMaggio y Powell, 1983). En este sentido, las empresas listadas en la BVC enfrentan expectativas institucionales de cumplimiento, legitimidad y alineación con los estándares internacionales de IF. Dichas presiones fomentan la adopción de prácticas de transparencia y comunicación digital, en especial en entornos donde la confianza del inversionista depende del acceso oportuno a información fiable y verificable. Así, las dinámicas institucionales ayudan a explicar la homogeneidad o divergencia en los niveles de divulgación entre los diferentes sectores económicos.

Adicionalmente, la teoría de las señales de Spence (1973) complementa las anteriores al considerar la divulgación financiera en línea como una estrategia de diferenciación

competitiva. Las empresas pueden enviar señales positivas al mercado mediante la publicación voluntaria de información que refleje eficiencia, solidez financiera o compromiso con la transparencia; un comportamiento que busca fortalecer la reputación corporativa y atraer inversionistas al demostrar credibilidad y responsabilidad frente a los grupos de interés. Por ello, los tres enfoques teóricos proporcionan un vínculo entre los niveles de divulgación observados y factores de desempeño, presiones institucionales y estrategias de comunicación corporativa, garantizando coherencia conceptual y empírica en el modelo analítico propuesto.

En Colombia, el marco normativo contable y financiero se estructura sobre la Ley 1314 de 2009, la cual estableció los principios y normas de contabilidad, IF y aseguramiento de la información, con el propósito de converger hacia estándares internacionales emitidos por el IASB y la IFAC (Botero *et al*., 2018). Esta ley busca garantizar la calidad, transparencia y comparabilidad de la IF, promover la confianza de los inversionistas y mejorar la eficiencia de los mercados. En su desarrollo, el Decreto Único Reglamentario 2420 de 2015 junto con sus modificaciones posteriores consolidó el marco técnico normativo aplicable a las entidades que preparan información financiera bajo las Normas Internacionales de Información Financiera (NIIF); dicho decreto clasificó a las entidades en tres grupos según su tamaño y naturaleza (NIIF plenas, NIIF para pymes y Normas de Información Financiera para microempresas), estandarizando las pautas de reconocimiento, medición, presentación y revelación de información contable (MINCIT, 2015). Así, el marco técnico se constituye en un referente clave para la transparencia corporativa, al exigir que la información divulgada sea pertinente, verificable y comparable, fortaleciendo la rendición de cuentas de las empresas ante los distintos grupos de interés.

De forma complementaria, otras normas refuerzan el régimen de divulgación y transparencia en el mercado de valores colombiano. El Decreto 2555 de 2010 regula la estructura y funcionamiento del mercado de valores, define las obligaciones de los emisores y establece los requisitos de información para el Registro Nacional de Valores y Emisores (RNVE) (Presidente de la República de Colombia, 2010). Posteriormente, el Decreto 151 de 2021 actualizó el régimen de revelación de información, precisando los plazos, el contenido y los hechos relevantes que deben reportarse al mercado (Presidente de la República de Colombia, 2021), mientras que la Ley 1328 de 2009 introdujo disposiciones para la protección al inversionista y la claridad informativa (Congreso de la República de Colombia, 2009).

En materia de supervisión, la SFC ha emitido diversas circulares externas, entre ellas la Circular Externa 12 de 2022, la Circular Básica Contable y Financiera, la Circular

Externa 038 de 2015 y la 016 de 2020, las cuales establecen lineamientos sobre la presentación, divulgación y publicación digital de IF y INF, así como sobre gobierno corporativo, sostenibilidad y gestión de riesgos; aquellas disposiciones, junto con la Guía para los Emisores de Valores emitida por la SFC, consolidan un entorno regulatorio que promueve la transparencia, la comparabilidad y la divulgación responsable (SFC, 2025).

Con el aumento de la multinacionalización y la globalización de las economías, los *stakeholders* ahora tienen un mayor interés en el proceso de transmisión de IF e INF, de modo que el proceso de reportar a los diversos *stakeholders* es más complejo y desafiante (Bathla *et al.,* 2024). Afortunadamente, la tecnología moderna y las herramientas de análisis han permitido a las empresas superar los desafíos a medida que surgen nuevas demandas en el entorno global. De hecho, Soledispa-Lucas y Murillo-Delgado (2020) afirman que la globalización ha incrementado las condiciones de la competencia y modificado sus formas, en gran medida por el impacto singular del desarrollo de las TIC, que han provocado la llamada sociedad en red.

Las políticas financieras de las empresas desempeñan una función en la inversión en el marco estructural de los mercados de capitales imperfectos, es decir, donde tienen lugar las fricciones de asimetría de información o de riesgo moral. Un entorno de capitales imperfecto explica, en mayor medida, el papel relevante de la divulgación precisa y rápida para hacer frente a los efectos adversos, derivado de las imperfecciones del mercado (Bernard *et al*., 2021; Wang *et al*., 2024; Zhang y Zhou, 2024). También es importante tener en cuenta la posibilidad de que los conflictos de agencia entre directivos y accionistas den lugar a decisiones de inversión subóptimas que prioricen los beneficios privados sobre el valor a largo plazo de la empresa (Jensen y Meckling, 1976).

La relación entre la asimetría de la información, la divulgación y las decisiones de inversión se ha investigado ampliamente en la literatura económica y financiera. Los estudios de Rincón *et al.* (2021) y Reymundo-Soto y Navarrete-Zambrano (2024) afirman que la calidad y transparencia de la información afectan de manera significativa el comportamiento inversor y financiero de las compañías. La asimetría de la información es la heterogeneidad en el acceso y en la comprensión de la información de aquellos que representan los intereses de las compañías; un desafío importante en el que puede llegar a verse perjudicado el proceso de toma de decisiones de inversión y, por tanto, la eficiencia económica. Reymundo-Soto y Navarrete-Zambrano (2024) plantean que una divulgación eficaz mitiga la selección adversa y los costos de agencia, facilitando así una asignación más eficiente de los recursos.

La calidad de la IF influye en el costo de capital de una empresa (Clark y Kundu, 2021; Ji *et al*., 2023 y Remo-Diez *et al*., 2023); la percepción de un mayor riesgo debido a la asimetría de la información puede elevarlo, limitando así su capacidad para financiar oportunidades de inversión lucrativas. La literatura muestra que la divulgación de IF de alta calidad incrementa la eficiencia en la toma de decisiones de inversión y fomenta una asignación más eficiente de los recursos financieros, reduciendo la exposición al riesgo de tomar decisiones subóptimas (Altendorfer, 2024; Gil *et al*., 2024).

Por ello, la divulgación de IF reviste gran importancia en la gestión de contratos y compensación de los directivos, ya que asegura la alineación de sus intereses con los de los accionistas y otros *stakeholders*. Dichos contratos inciden en los lineamientos de políticas de inversión y de gasto de la empresa, y afectan la interpretación del mercado sobre la credibilidad y la responsabilidad de la dirección (W. Liu *et al*., 2024; Majeed *et al*., 2023; Masulis y Mobbs, 2023; Tseng, 2024).

Otra cuestión pertinente es la forma en que los datos comparativos entre empresas pueden informar las decisiones de inversión. La utilización de informes de pares por los directivos, con fines de evaluación comparativa, sirve para mejorar la competitividad y, a la vez, evita la sobreinversión y fomenta una asignación más eficiente de los recursos financieros disponibles (Pereira da Silva, 2024; Yi, 2023).

Gil *et al.* (2024) y Landu *et al*. (2025) hacen hincapié en proporcionar información cualitativa en forma prospectiva con un mayor nivel de interactividad, avanzando hacia el concepto de información continua. Las mejoras en la transparencia de la información digital deben entenderse en términos cuantitativos y cualitativos, cantidad de datos disponibles y su interactividad; ello facilita una comprensión más profunda de la situación financiera de la empresa por los interesados, lo que puede mejorar la calidad de las decisiones de inversión.

El concepto de la rendición de cuentas (*accountability*, de origen anglosajón), constituye la IF y es el que da pie a la investigación de los tipos de rendición de cuentas de las empresas a través de sus páginas web. Este concepto une la rendición de cuentas y la responsabilidad social (RSC). La llegada de la información de manera unilateral a las partes interesadas se considera un fenómeno orientado a una mayor transparencia en la información y un fácil acceso a esta, por ser un camino que lleva a una mayor comunicación en la relación con los clientes y los accionistas de la empresa, y también a una forma de consolidar las relaciones con clientes y accionistas (Dobija *et al*., 2023; Scharnigg, 2024).

Por su parte, Wild y Wild (2023) examinan la RSC y la transparencia en la rendición de cuentas de la IF. Los autores concluyen que cuanto más reflexivas de la RSC son las empresas mayor es la cantidad de transparencia que arbitran en sus reportes financieros; en dicho trabajo de investigación se muestra que el mayor grado de transparencia se observa, en su mayor parte, en función de un tamaño proporcionalmente más pequeño de la empresa y, en aumento, en función de una mejor gobernanza, ya presente en el trabajo de Mustafa Khan y Mohd Ali (2023), quienes enfatizan que la expectativa de la información sobre las empresas es muy alta en el ámbito público y, por lo tanto, también en el privado, y añaden que la transparencia en las presentaciones de informes empresariales es una tendencia en aumento, sobre todo en el contexto de la presentación de la información según las NIIF.

Por lo tanto, se considera un mecanismo por el cual las empresas pueden hacer una entrega a la RSC y la globalización de los Objetivos de Desarrollo Sostenible (ODS) 2030. Por su parte, Langella *et al*. (2023) examinan el impacto de la transparencia de la IF en la comprensión y participación pública de los ciudadanos. Los resultados indican que ofrecer explicaciones claras y representaciones visuales mejora la comprensión, de modo que la participación pública es mayor entre quienes creen comprender la información, aun cuando su comprensión real es baja.

A partir de la literatura consultada, este trabajo se sitúa en la hipótesis teórica acerca de la existencia de asimetría de información en el mercado y, por lo tanto, quiere aportar evidencias al respecto, confirmando una eventual relación significativa con variables como rentabilidad a partir de ROA y ROE, que ha sido evaluada en trabajos previos (Briano y Rodríguez, 2012) y respecto a divulgación empresarial *on-line* sobre responsabilidad social tiene un poder explicativo muy importante (Tubay y De León, 2020).

Sin embargo, en Alali y Romero (2012) y Diniz *et al*. (2019) la rentabilidad no tiene un efecto significativo respecto de la divulgación de información en internet; el endeudamiento, que ha sido estadísticamente significativo muestra una relación positiva respecto a la divulgación en internet (Ahmed *et al*. 2017; Gómez y Católico, 2009); en cuanto al tamaño de la empresa medido en capital y los activos relativizados sobre patrimonio neto, se espera una relación positiva respecto a la divulgación (Abdullah *et al*., 2017; Dolinšek *et al*., 2018) y específicamente en un contexto latino (Mendes-Da-Silva *et al*., 2014; Alali y Romero, 2012); respecto al gobierno corporativo medido en número de integrantes y de mujeres en el directorio, en estudios locales, los autores confirman una relación significativa y positiva entre el tamaño de la junta y los niveles de divulgación en internet (Briano y Rodríguez,

2013; Sandhu y Singh, 2019), sin embargo, en mercados latinos no se ha descubierto que esta variable sea significativa (Briano y Rodríguez, 2012). También se ha evaluado el tamaño de la junta y la diversidad de género (Orazalín, 2019; Morales y Sáez, 2022) encontrando los autores relaciones entre dichas variables. Finalmente, la variable tipo de empresa de auditoría externa, medida en pertinencia o no respecto al grupo reconocido como *big four,* posee una conformidad en relación con la divulgación *on-line* en diversos mercados locales (Ahmed *et al*., 2017; Boubaker *et al*., 2012; Bozcuk, 2012; Abdullah *et al*., 2017).

3. Diseño, muestra y métodos

En la investigación se utilizó la metodología propuesta por (Jarne y Morales, 2023; Morales y Jarne, 2022a; Morales y Jarne, 2002b). El estudio fue cuantitativo y analizó el contenido de los sitios web de empresas colombianas; asimismo, fue empírico y no experimental, basado en un criterio selectivo y pertinente. Se trabajó con empresas listadas en la bolsa, incluyendo todos los emisores con capitalización bursátil pertenecientes a la BVC el 31 de diciembre de 2022, número que ascendió a 178 empresas. La muestra de estudio se redujo a 68 empresas activas con capitalización bursátil a la fecha de su realización. En total, se trabajó con 71 variables de información que corresponden a la evaluación del *reporting* en internet de las empresas que se han estructurado en cinco categorías, como se muestra en la tabla 1 (ver tabla 1).

Esta investigación se centró en el estudio de los niveles de revelación de IF de empresas colombianas, considerando una variedad de factores, entre ellos, rendición de cuentas (RC), compañía y estrategia (CE), análisis financiero (AF), transparencia (TRAN) y funcionalidad (FUNC). Para llevar a cabo la recopilación de datos, se requirió, en primer lugar, localizar la dirección URL de cada una de las empresas elegidas. En virtud de que todas las seleccionadas cotizan en la BVC, se utilizó la URL que estas presentan en los sitios web de las bolsas o de los reguladores locales del mercado de valores. Ello permitió acceder de manera certera y clara al sitio web corporativo de cada una de las empresas que forman parte de la muestra. El análisis de estos sitios web se realizó de forma independiente. Las diferencias encontradas en las evaluaciones se discutieron colectivamente para alcanzar un consenso sobre el índice de divulgación de cada institución.

Tabla 1. Dimensiones evaluadas y variables consideradas

Dimensiones	Variables
Rendición de cuentas (RC): 32 variables	Presenta el juego completo de los estados contables, notas explicativas a los estados financieros, memoria anual (informe de gestión), información histórica anual, información intermedia; presenta estado de resultados integral de forma segmentada y otras informaciones sobre el segmento de negocios.
Compañía y estrategia (CE): 9 variables	Posee carta del presidente de la compañía, Divulga el equipo de gobierno organigrama, información sobre juntas directivas, composición accionaria, información sobre asambleas de accionistas, información sobre pagos de dividendos, explicación y figura de la estructura empresarial, y presenta alguna información sobre estrategias de negocios o empresarial.
Análisis financiero (AF): 7 variables	Divulga tablas resúmenes de estados contables del ejercicio actual, tablas resúmenes de estados contables de ejercicios anteriores; proporciona ratios financieras; divulga gráficos y/o cuadros explicativos de la situación financiera, información sobre el *ranking* de la empresa en clasificaciones, información *on-line* de la bolsa o precio de la acción en tiempo real, información cuantitativa de los impactos de implementar las NIIF (IFRS).
Transparencia (TRAN): 12 variables	Posee código de buen gobierno (o prácticas corporativas), código de ética, informe de auditor externo, informes sobre riesgos, informe medioambiental, informe sobre capital intelectual, informe de costes, informe de gestión, previsiones o informes proyectados, información sobre conferencias y presentaciones en PowerPoint, video o audio y el informe social.
Funcionalidad (FUNC): 21 variables	Posee buscador interno del sitio, buzón de sugerencias, *e-mail* para consultas, un espacio de preguntas frecuentes, un espacio de novedades o noticias actualizado, vínculos a otros sitios (reguladores, auditores, filiales, etcétera). Ofrece la posibilidad de recibir alertas de noticias o *newsletters* al e-mail; el sitio web cuenta con IF en inglés, información empresarial (cualitativa) en inglés o se presenta en más de un idioma (idioma del país y otro).

Fuente: Morales y Jarne, 2022a.

La construcción del índice de divulgación (IDI-T o IDITOTAL), utilizado como variable dependiente, constituye el núcleo metodológico de la investigación, al cuantificar el grado de divulgación financiera en línea de las empresas analizadas. Este índice facilita un estudio comparativo a nivel nacional, al analizar la IF y INF disponible

en los sitios web corporativos, identificando similitudes, diferencias y patrones de divulgación entre las firmas emisoras. La recolección de la información se efectuó mediante un análisis de contenido estructurado, asignando valores dicotómicos (1: revela; 0: no revela), siguiendo la metodología propuesta por Cooke (1989), ampliamente utilizada en estudios sobre transparencia y rendición de cuentas. A partir de esta codificación, se obtuvieron índices parciales por las dimensiones RC, CE, AF, TRAN y FUNC, que se agregan para conformar el índice total (IDITOTAL).

$$IDI_{RC} = \frac{\sum_{i=1}^{n} RC_i}{32} x100 \qquad IDI_{TRAN} = \frac{\sum_{i=1}^{n} TRAN_i}{12} x100$$

$$IDI_{CE} = \frac{\sum_{i=1}^{n} CE_i}{9} x100$$

$$IDI_{AF} = \frac{\sum_{i=1}^{n} AF_i}{7} x100 \qquad IDI_{FUNC} = \frac{\sum_{i=1}^{n} FUNC_i}{12} x100$$

A partir de obtener los índices parciales se genera el índice total, evitando así el efecto de las diferencias de variables de cada dimensión y equilibrando los pesos de las dimensiones sobre el total, de modo que sea un índice lineal no ponderado. La representación del índice total (IDITOTAL) matemáticamente se expresa de la siguiente forma:

$$IDI_{TOTAL(i)} = \frac{IDI_{RC(i)} + IDI_{CE(i)} + IDI_{AF(i)} + IDI_{TRAN(i)} + IDI_{FUNC(i)}}{5}$$

La formulación matemática adoptada se basa en un modelo lineal no ponderado, en el que todas las dimensiones tienen el mismo peso en el cálculo del índice total, una decisión metodológica que responde al objetivo de garantizar la comparabilidad entre empresas y dimensiones, evitando que el número desigual de ítems en cada categoría distorsione los resultados globales. Así, se optó por una ponderación uniforme, asumiendo que cada dimensión contribuye de manera equivalente al constructo general de divulgación. Aquella aproximación ha sido empleada previamente por Chow y Wong-Boren (1987), quienes argumentan que la aplicación de

ponderaciones diferenciadas puede introducir sesgos subjetivos si no existe evidencia empírica sólida que justifique la relevancia relativa de cada componente.

No obstante, se reconoce que la metodología utilizada podría fortalecerse mediante procedimientos de validación estadística formal (análisis factorial exploratorio) para confirmar la estructura subyacente del índice o una evaluación de confiabilidad interevaluador para medir la consistencia de la codificación. La ausencia de dichas pruebas no invalida la utilidad del IDI como herramienta descriptiva, pues constituye una oportunidad para futuras investigaciones orientadas a perfeccionar su robustez y aplicabilidad en distintos contextos empresariales y regionales. De este modo, el índice propuesto aporta una base empírica clara y replicable para el análisis de la divulgación financiera en línea, al tiempo que abre el camino a futuras mejoras metodológicas en su validación estadística.

Correlacionaremos el índice IDI con diversas variables de interés, que han sido utilizadas en estudios previos en economías emergentes y con interés empresarial o para los reguladores. Entre estas variables está la rentabilidad, medida por el ROA (resultados sobre activos), para la que diversos autores han evidenciado una relación positiva con la divulgación en internet en Egipto y en Turquía (Ahmed *et al*., 2017; Bozcuk, 2012). El ROE (resultados sobre patrimonio) no tiene un impacto significativo en la divulgación de información en internet en Brasil (Alali y Romero, 2012; Diniz *et al*., 2019). Sobre el endeudamiento (pasivo sobre activo) no se encontraron evidencias en diversos trabajos que relacionen la divulgación en internet con endeudamiento en empresas (Pelayo *et al*., 2013). Y, por último, la rentabilidad y el apalancamiento no tienen un efecto significativo en la divulgación de la información en internet (Alali y Romero, 2012).

El tamaño será medido en dos determinaciones, el tamaño 1 (capital sobre patrimonio) y tamaño 2 (activo sobre patrimonio); se ha encontrado que sí hay relación significativa y directa entre el tamaño y las divulgaciones empresariales en la web, para Argentina, de acuerdo con Alali y Romero (2012) y en Brasil (Mendes-Da-Silva *et al*., 2014).

Respecto al gobierno corporativo, medimos el número de integrantes del consejo de administración, donde la relación es significativa y positiva entre el tamaño del consejo o directorio y los niveles de divulgación en internet (véase Briano y Rodríguez, 2013; Sandhu y Singh, 2019, y Parlakkaya *et al*., 2015). Para el número de mujeres en el consejo o directorio de la empresa, es posible proyectar que los directorios con alta participación femenina tienen a una mayor calidad comunicativa, lo que a su vez genera una acertada entrega de información a los inversionistas (Huse y Solberg,

2006) lo que puede estar igualmente asociado con la legitimidad empresarial o la teoría institucional. También ha sido considerada en estudios de divulgación sobre la responsabilidad social empresarial (Orazalín, 2019) y se ha confirmado una correlación entre el número de mujeres en el directorio y el nivel de revelación sobre RSE (Frias-Aceituno *et al*., 2013).

El tipo de empresa auditora es una variable medida previamente según la diferencia de grandes firmas, *big four* (B4) y *no big four* (NBG), confirmando su relevancia con la divulgación en web y las grandes firmas en diversos trabajos previos en Nigeria, Egipto y Turquía (Agboola y Salawu, 2012; Ahmed *et al*., 2017; Bozcuk, 2012).

4. Resultados

Tras la aplicación del índice propuesto, puede observarse que la dimensión compañía y estrategia es, en promedio, la mejor valorada, con 98.20% en la escala de 1 a 100. Se trata de un indicador que representa un amplio cumplimiento de revelación en aspectos relacionados con la información de la propia compañía. Su historia, misión, visión, al igual que en su *website* tienen la disponibilidad de información que da cuenta de la expansión del negocio, aspectos de innovación, socios estratégicos, entre otros. El comportamiento de la divulgación en las empresas cotizadas colombianas de la muestra en los diferentes subíndices se observa en la tabla 2 (ver tabla 2).

Tabla 2. Estadísticos de los índices de medición de la divulgación por dimensión

	Media	Mediana	Máximo	Mínimo	Desv. estándar
IDF_RC	39.96	37.95	64.73	32.59	5.62
IDF_RCeajustado	53.09	50.55	83.52	43.96	6.96
IDF_CE	98.20	100.00	100.00	66.67	5.63
IDF_AF	61.34	57.14	85.71	28.57	10.78
IDF_TRAN	93.14	100.00	100.00	50.00	12.63
IDF_FUNC	72.06	66.67	91.67	50.00	12.28
IDFT	72.94	72.35	88.42	55.68	5.08

Fuente: elaboración propia.

Aquellos aspectos contenidos en el índice de transparencia resultaron altamente valorados, con 93.14%, lo que sitúa a esta dimensión en segunda posición, logrando

un porcentaje de cumplimiento por encima del 90%. Esta dimensión es el resultado de una serie de contenidos, ética, gobernanza, medio ambiente y social, y los resultados son auspiciosos para el mercado colombiano en el contexto de la discusión mundial sobre criterios basados en medio ambiente, social y gobernanza (ESG). La dimensión de funcionalidad, que no evaluó el contenido sino la calidad del sitio, por su disposición, organización, posibilidades de descarga, idioma del sitio, interconectividad a través de medios, hipervínculos, entre otras.

Entre los aspectos menos valorados, ha de destacarse la existencia de una similitud cualitativa entre las dimensiones correspondientes al análisis financiero (61.34%) y rendición contable (39.96%). El primero corresponde a la relación con la disponibilidad de información y datos procesados para la mejor comprensión financiera del negocio, cualitativo y cuantitativo, mientras que la otra dimensión mide la disponibilidad de información contable a través de estados financieros del año corriente, años anteriores (histórico) e intermedia, y el reporte de información segmentada geográficamente o por líneas de negocios.

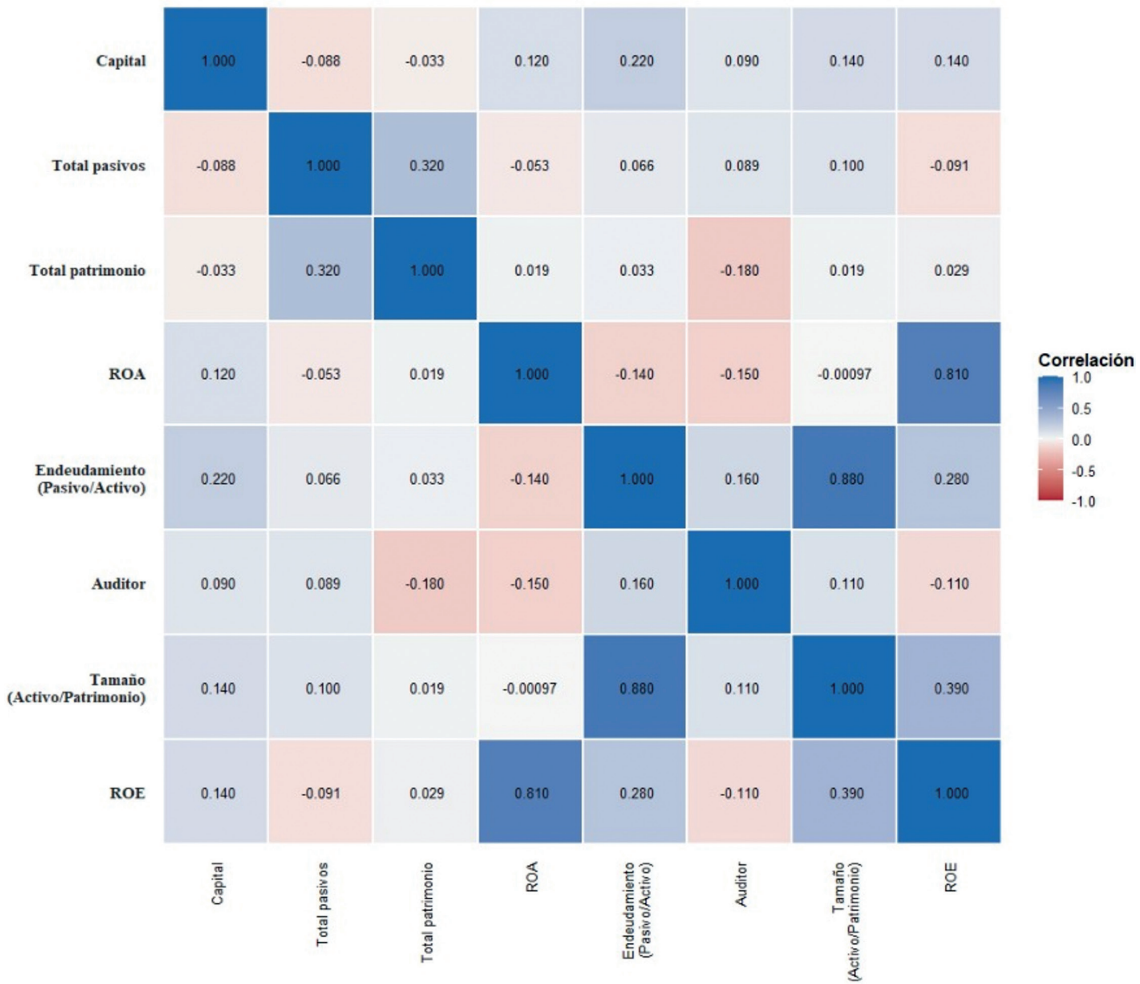
Las correlaciones entre las variables financieras revelan patrones significativos en la estructura y los resultados de las empresas. La correlación inversa entre el ROE y la presencia de auditor con -0.11 indica que la relación entre el ROE y la presencia de auditor es débil. Asimismo, se observa una relación -0.091 débil, pues a medida que aumenta el total del pasivo, el ROE tiende a disminuir ligeramente. El endeudamiento y tamaño de la empresa presentan una correlación positiva de 0.88, lo cual está asociado a la estrategia corporativa. Ello indica una preferencia por una financiación más agresiva en las empresas más grandes. Estas correlaciones tienen implicaciones significativas para el análisis financiero, al proporcionar información sobre la rentabilidad, salud financiera de la empresa y la transparencia en la divulgación de IF.

Asimismo, las empresas con mayores fondos propios tienen una mayor funcionalidad en cuanto al control interno y la gestión financiera, ya que la correlación positiva de 0.88 entre ROE y ROA sugiere que la rentabilidad de las empresas seleccionadas en relación con su capital y la rentabilidad en relación con sus activos están altamente alineadas.

La matriz de correlaciones es una herramienta crucial en el análisis financiero y empresarial, que permite examinar las relaciones entre variables clave dentro de una organización; asimismo, ofrece una visión sistemática de cómo interactúan los distintos factores financieros y estructurales, revelando tendencias que pueden influir

en los resultados y la estrategia de empresa. Esta matriz puede apreciarse en la figura 1 (ver figura 1).

Figura 1. Matriz de correlación. Niveles de revelación de IF



Fuente: elaboración propia.

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e3049 (pp. 29-63)

Continuando con lo anterior, parece ser una tónica en las empresas colombianas de la muestra la menor disponibilidad de IF y contable. Sin embargo, cabe mencionar que el índice de rendición de cuentas-contable se ha visto afectado a la baja por una triple revisión de un mismo ítem, relacionado con la divulgación de estados contables bajo las NIIF, principios de contabilidad generalmente aceptados en Estados Unidos (USGAAP) y norma local. Respecto de este último criterio de reconocimiento, ninguna empresa cotizada de la muestra lo ha reportado (a partir de la Ley 1314 de 2009, las entidades que captan recursos deben aplicar las NIIF Grupo 1), por lo que todas las empresas se han registrado con cero en esa variable, lo cual ocasiona una disminución en la determinación de este subíndice, que al ajustarse mediante la eliminación de la variable (por estar todos en igual condición) mejora el índice ajustado con un 53.09%, bastante superior que el indicado anteriormente.

Al evaluar la correlación entre los índices determinados por dimensión, se observa que el índice de revelación de rendición de cuentas (IDI_{RC}) está correlacionado negativamente con el índice de revelación de compañía y estratégica (IDI_{CE}) y con el índice de revelación de transparencia (IDI_{TRAN}). Por su parte, el índice de revelación de compañía y estratégica (IDI_{CE}) está correlacionado negativamente con el índice de revelación de análisis financiero (IDI_{AF}). Cuanto mayor sea el índice de revelación de compañía y estrategia, menor será el nivel de análisis financiero. Mientras que el índice de revelación de transparencia (IDI_{TRAN}) está correlacionado negativamente con el índice de revelación de funcionalidad (IDI_{FUNC}). El índice de revelación total (IDI_{TOTAL}) está correlacionado positivamente con todos los otros índices.

Los resultados del análisis de correlación de las variables se presentan en tabla 3 (ver tabla 3).

Tabla 3. Análisis de correlaciones de Pearson

	IDI_{RC}	IDI_{CE}	IDI_{AF}	IDI_{TRAN}	IDI_{FUNC}	IDI_{TOTAL}
IDI_{RC}	1	-0.045	0.509**	-0.335**	0.423**	0.511**
IDI_{CE}	-.045	1	-0.108	0.154	0.182	0.312**
IDI_{AF}	0.509**	-0.108	1	0.071	0.310*	0.700**
IDI_{TRAN}	-0.335**	0.154	0.071	1	-0.099	0.397**
IDI_{FUNC}	0.423**	0.182	0.310*	-0.099	1	0.696**
IDI_{TOTAL}	0.511**	0.312**	0.700**	0.397**	0.696**	1

*** 1% > ** 5% < *10%

Fuente: elaboración propia.

Se ha comprobado que existe una correlación negativa entre el índice de revelación de rendición de cuentas y los otros índices de revelación de compañía y estratégica, y el de transparencia. También observamos una correlación negativa entre el índice de revelación de compañía y estratégica y el índice de revelación de análisis financiero. Además, hay una correlación negativa entre el índice de revelación de transparencia y el de revelación de funcionalidad, de modo que, a mayor nivel de transparencia de la empresa, menor es el nivel de revelación de funcionalidad. El índice de revelación total arrojó una correlación positiva respecto al resto de los índices, ya que en la medida en que el nivel de revelación total es mayor se refleja en incrementos en todos los índices. Esto es una muestra de la importancia que reviste el dar la mayor cantidad de información a los inversores y al mercado.

Con el objetivo de asegurar la validez de tipo estadístico de la prueba, se hace uso de pruebas no paramétricas de Mann-Whitney U, teniendo en cuenta el aparente diseño del índice de divulgación y la existencia de distribuciones no normales. Ello da lugar a una prueba que aumenta la solidez de la misma, disminuyendo la probabilidad de errores tipo I como consecuencia de supuestos paramétricos no cumplidos.

Al hacer un análisis univariado para toda la muestra, utilizando estadísticos de prueba de Mann-Whitney, para este caso en particular se presentarán las diferencias en los índices de revelación IDI_{RC}, IDI_{CE}, IDI_{AF}, IDI_{TRAN}, IDI_{FUNC}, IDI_{TOTAL} de empresas colombianas y se determinará si hay diferencias significativas. La variable de agrupación que se utilizará es la siguiente:

ROA: ROA (resultados sobre activos)

ROE: ROE (resultados sobre patrimonio)

END: endeudamiento (pasivo sobre activo)

TA1: tamaño 1 (capital sobre patrimonio)

TA2: tamaño 2 (activo sobre patrimonio)

NID: número de integrantes del consejo de administración o directorio de la empresa

NMD: número de mujeres en el consejo o directorio de la empresa

TEA: tipo de empresa auditora

En cada uno de los casos se plantea que la hipótesis nula corresponde a la igualdad del indicador en las empresas analizadas. Al evaluar los resultados de diferentes

variables de agrupación, no hay diferencias significativas en los índices de revelación de las empresas colombianas y solamente se rechaza la hipótesis nula de igualdad de las muestras, utilizando un nivel de significancia del 5% en tres casos.

Tabla 4. Prueba de U Mann-Whitney

Variable de agrupación	Descripción	IDI_{RC}	IDI_{CE}	IDI_{AF}	IDI_{TRAN}	IDI_{FUNC}	IDI_{TOTAL}
ROA	ROA (resultados sobre activos)	0.525	0.305	0.837	0.781	0.801	1.000
ROE	ROE (resultados sobre patrimonio)	0.445	0.147	0.987	0.784	0.179	0.286
END	Endeudamiento (pasivo sobre activo)	0.106	0.368	0.555	0.131	0.350	0.946
TA1	Tamaño 1 (capital sobre patrimonio)	0.925	0.201	0.346	0.710	0.026	0.334
TA2	Tamaño 2 (activo sobre patrimonio)	0.106	0.368	0.555	0.131	0.350	0.946
NID	Número de integrantes del consejo de administración	0.513	0.044	0.554	0.325	0.657	0.797
NMD	Número de mujeres en el consejo o directorio de la empresa	0.608	0.410	0.423	0.071	0.412	0.758
TEA	Tipo de empresa auditora	0.112	0.961	0.811	0.001	0.953	0.942

Fuente: elaboración propia.

A partir de los datos aportados en la Tabla 4, destacamos lo siguiente:

a) En el indicador índice de funcionalidad (IDI_{FUNC}), variable de agrupación el tamaño de las empresas tamaño 1 (capital sobre patrimonio), hay evidencia para rechazar la hipótesis nula de igualdad del indicador entre las empresas colombianas.

b) En el indicador compañía y estrategia (IDI_{CE}), variable de agrupación del número de integrantes del consejo de administración o directorio de la empresa, hay evidencia para rechazar la hipótesis nula de igualdad del indicador entre las empresas colombianas.

c) En el indicador transparencia (IDI_{TRAN}), variable de agrupación el tipo de empresa auditora, hay evidencia para rechazar la hipótesis nula de igualdad del indicador entre las empresas colombianas.

Por lo tanto, la ausencia sistemática de diferencias significativas en la mayoría de las variables de agrupación (ROA, ROE, endeudamiento y tamaño) constituye un patrón estadísticamente robusto. A partir de esto, es posible concluir que hay diversidad en la revelación de información entre las empresas colombianas en el indicador de funcionalidad, dependiendo del tamaño de la empresa medido por el capital sobre el patrimonio. Si se considera un modelo de regresión lineal múltiple, estimando los parámetros con máxima verosimilitud bajo los supuestos clásicos de linealidad, independencia de los errores y homocedasticidad, se presentan en este trabajo cuatro modelos en los cuales se estiman los parámetros, se realiza un análisis de significancia de cada uno de los parámetros obtenidos y se finaliza con la prueba F y su nivel de significancia en los ANOVA para cada modelo. Esto se presenta de la siguiente forma:

$$\text{Modelo 1: } \boldsymbol{IDI_{TOTAL}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\text{ROA} + \boldsymbol{\beta_2 ROE} + \boldsymbol{\beta_3 END} + \boldsymbol{\beta_4 TA1} + \boldsymbol{\beta_5 TA2} + \boldsymbol{\beta_6 NID} + \boldsymbol{\beta_6 NMD}\ \boldsymbol{\beta_6 TEA} + \boldsymbol{e_i}$$

$$\text{Modelo 2: } \boldsymbol{IDI_{TOTAL}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\text{ROA} + \boldsymbol{\beta_2 ROE} + \boldsymbol{\beta_3 END} + \boldsymbol{\beta_4 TA1} + \boldsymbol{\beta_6 NID} + \boldsymbol{\beta_6 NMD}\ \boldsymbol{\beta_6 TEA} + \boldsymbol{e_i}$$

Los resultados de la aplicación de estos modelos pueden apreciarse en la tabla 5 (ver tabla 5).

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e3049 (pp. 29-63)

Tabla 5. Análisis multivariante a partir de modelos de regresiones 1 y 2

Coeficientes para Modelo 1					Coeficientes Modelo 2				
	B	Desv. Error	t	Sig.		B	Desv. Error	t	Sig.
Constante	66.792	2.798	23.875	0.000	Constante	66.903	2.747	24.358	0.000
ROA	10.982	9.802	1.120	0.267	ROA	10.989	9.727	1.130	0.263
ROE	-9.209	8.941	-1.030	0.307	ROE	-9.211	8.872	-1.038	0.303
END	2.626	3.527	0.745	0.459	END	1.930	2.426	0.796	0.429
TA1	0.644	0.992	0.649	0.519	TA1	0.643	0.984	0.653	0.516
TA2	-0.102	0.372	-0.274	0.785	NID	0.738	0.273	2.703	0.009
NID	0.748	0.278	2.695	0.009	NMD	-0.562	0.457	-1.229	0.224
NMD	-0.546	0.464	-1.175	0.245	TEA	2.956	2.081	1.420	0.161
TEA	2.887	2.112	1.367	0.177					
ANOVA F 1.487 Sig. 0.181					ANOVA F 1.715 Sig. 0.123				

Fuente: elaboración propia.

El modelo 1 queda expresado IDI_{TOTAL}= 66.792+10.982*ROA* – 9.209*ROE* + 2.626*END* + 0.644*TA1* – 0.102*TA2* + 0.748*NID* – 0.54*NMD* + 62.887*TEA* + *ε* con un nivel de significancia de la prueba F de 0.181 con lo cual se acepta la hipótesis nula. Esta prueba de significación global indica que el modelo de regresión lineal no se ajusta adecuadamente a los datos.

En el modelo 2, que se expresa IDI_{TOTAL}= 66.903 + 10.989*ROA* – 9.211*ROE* + 1.930*END* + 0.643*TA*1 + 0.738*NID* – 0.562*NMD* + 2.956*TEA* + *ε* se tiene un nivel de significancia de la prueba F de 0.123, concluyendo que se acepta la hipótesis nula. Esta prueba de significación global indica que el modelo de regresión lineal no se ajusta adecuadamente a los datos.

Los siguientes modelos por explorar quedan expresados de la siguiente forma:

$$\text{Modelo 3: } \boldsymbol{IDI - TOTAL = \beta_0 + \beta_1}\text{ROA} + \boldsymbol{\beta_2 ROE} + \boldsymbol{\beta_3 END} + + \boldsymbol{\beta_6 NID} + \boldsymbol{\beta_6 NMD\ \beta_6 TEA} + \boldsymbol{e_i}$$

$$\text{Modelo 4: } \boldsymbol{IDI - TOTAL = \beta_0 + \beta_1}\text{ROA} + \boldsymbol{\beta_2 ROE} + \boldsymbol{\beta_6 NID} + \boldsymbol{\beta_6 NMD\ \beta_6 TEA} + \boldsymbol{e_i}$$

Los resultados de la aplicación de los modelos presentados anteriormente se presentan en la tabla 6 (ver tabla 6)

Tabla 6. Análisis multivariante a partir de modelos de regresiones 3 y 4

Coeficientes para Modelo 3					**Coeficientes Modelo 4**				
	B	Desv. Error	t	Sig.		B	Desv. Error	t	Sig.
Constante	66.531	2.674	24.877	.000	Constante	67.141	2.514	26.709	.000
ROA	5.616	5.163	1.088	.281	ROA	4.649	4.949	.939	.351
ROE	-4.009	3.888	-1.031	.307	ROE	-3.298	3.734	-.883	.380
END	1.640	2.373	.691	.492	NID	.760	.268	2.843	.006
NID	.733	.272	2.698	.009	NMD	-.642	.442	-1.450	.152
NMD	-.576	.454	-1.268	.210	TEA	3.561	1.946	1.830	.072
TEA	3.367	1.974	1.706	.093					
ANOVA F 1.948 Sig. 0.087					ANOVA F 2.262 Sig. 0.059				

Fuente: elaboración propia.

El modelo 3, expresado con la ecuación IDI_{TOTAL}= 66.531 + 5.616*ROA* – 4.009*ROE* + 1.640*END* + 0.733*NID* – 0.576*NMD* + 3.367*TEA* + *ε*, tiene un nivel de significancia de la prueba F de 0.087, con lo cual se rechaza la hipótesis nula. Con esta prueba de significación global se indica que el modelo de regresión lineal se ajusta adecuadamente a los datos, considerando un nivel de significancia del 10%.

Mucho mejor es el modelo 4, expresado con la ecuación IDI_{TOTAL}= 67.141 + 4.649*ROA* – 3.298*ROE* + 0.76*NID* – 0.642*NMD* + 3.561*TEA* + *ε*, con un nivel de significancia de la prueba F de 0.059, con lo cual se rechaza la hipótesis nula. Esta prueba de significación global indica que el modelo de regresión lineal se ajusta adecuadamente a los datos, considerando un nivel de significancia del 10% la cual se justifica bajo criterios estadísticos y econométricos aplicables a muestras pequeñas o moderadas, en especial cuando se evalúan efectos estructurales en transparencia corporativa.

Con lo anterior, se observa que el índice de revelación total de las empresas colombianas se ve influido por el ROA, ROE, END, NID, NMD, TEA y se concluye que el ROA, END, NID y TEA tienen un efecto positivo en los niveles de revelación total y mientras que el NMD y el ROE tienen un impacto negativo.

5. Discusión

La comunicación efectiva de la información contable es crucial para la transparencia y el éxito financiero. Los resultados obtenidos con las empresas colombianas respaldan esta premisa con empresas proclives a la comunicación en la web, financiera y de otros aspectos corporativos en web (Hernández *et al*., 2025), destacando que el índice de revelación total (IDI_{TOTAL}) presenta una correlación positiva con todos los demás índices, lo que va en línea con trabajos previos de países comparables de la región (Jarne y Morales, 2023; Morales y Jarne, 2022) impulsado fuertemente por la buena valoración de los subíndices de Transparencia y Compañía y Estrategia, siguiendo las tendencias de reporte no financiero y sostenible actual, fenómeno ya observado en Perú, por ejemplo (Hernández-Pajares y Biel, 2021). No obstante, es interesante observar que el índice de revelación de compañía y estrategia (IDI_{CE}) muestra una correlación negativa con el índice de revelación de análisis financiero (IDI_{AF}), lo que podría deberse a la existencia de mecanismos internos de control que sustituyen la necesidad de una amplia divulgación pública de esta información.

Destaca en el estudio la correlación negativa entre ROE y auditor del -0.11, auditor y total patrimonio -0.18, total pasivo y capital del -0.088, que son débiles estadísticamente. Por otra parte, sobresalen las correlaciones positivas de ROE y ROA de 0.81, endeudamiento y tamaño 2 (activo/endeudamiento), lo cual tiene mucho sentido ya que en su cálculo ambas tienen un mismo componente en común. Adicionalmente, el índice de revelación de transparencia (IDI_{TRAN}) presenta una correlación negativa con el índice de revelación de funcionalidad (IDI_{FUNC}). Esto sugiere que a medida que aumenta la revelación de transparencia, disminuye el nivel de funcionalidad de los sitios web, lo que estaría siendo un indicador de falta de mejoras en la usabilidad de los sitios para favorecer la transparencia digital, mejoras que debieran incluir herramientas de inteligencia artificial, para lo cual ya existen buenas experiencias a seguir en Uruguay, Brasil y Chile (Acosta *et al*., 2025).

Respecto a las variables que afectan la revelación de información de las compañías colombianas, los resultados estadísticos prueban de manera constante la importancia del número de integrantes del directorio (NID), en consonancia con los resultados previos (Briano y Rodríguez, 2013; Sandhu y Singh, 2019; Parlakkaya *et al*., 2015) y la variable del tipo de auditor (TEA) (Agboola y Salawu, 2012; Ahmed *et al*., 2017; Bozcuk, 2012). Las variables financieras (ROA, ROE, END) y el número de mujeres en el consejo (NMD) muestran signos acordes con la literatura, a pesar de que no consiguen niveles de significatividad estadística suficientes como para ser consideradas

determinantes robustos en esta muestra. Adicionalmente, el índice de revelación total (está correlacionado positivamente con todos los otros índices (IDI_{RC}, IDI_{CE}, IDI_{AF}, IDI_{TRAN}, IDI_{FUNC}), resultados que subrayan la complejidad de los factores que influyen en la divulgación empresarial y la importancia de considerar múltiples dimensiones para mejorar la transparencia y la toma de decisiones en el ámbito financiero.

La teoría de la agencia (Jensen y Meckling, 1976) y la divulgación empresarial en la web observada en el mercado colombiano son fundamentales para entender cómo se comunican las empresas latinoamericanas con sus inversores, en una región donde muchas empresas son familiares o de grupos económicos con alta concentración de mercados, con conflictos entre gerentes y propietarios, y entre accionistas mayoritarios y minoritarios. Ello ha sido la causa de hacer a un lado la valiosa oportunidad de usar adecuadamente la *web* de las empresas para establecer una comunicación basada en la transparencia, en especial en materias que tradicionalmente no se divulgaban (como la ética, la sostenibilidad y la gobernanza corporativa, además de la financiera y contable).

Desde la perspectiva de la teoría de las señales (Spence, 1973), las empresas colombianas que arrojan buenos resultados en la divulgación están enviando una señal de que operan con visión globalizante, distanciándose de la posible inestabilidad local; es decir, hacen una contribución desde la perspectiva del riesgo-país que afecta al país y a la región.

Por último, desde la perspectiva de la teoría institucional (DiMaggio y Powell, 1983) es claro que los sitios webs corporativos sí tienden a parecerse entre sí, en especial en los espacios dedicados a las relaciones con inversionistas). La tendencia marcada es no solo divulgar información económica, sino también aquella relacionada con la confianza debida en materias propias del entorno empresarial, donde menos empresas de la muestra dejan vacíos y quieren distanciarse de las mejores divulgadoras.

6. Conclusiones

Desde una perspectiva teórica, los resultados se alinean con los postulados de la teoría de agencia, al evidenciar que la divulgación en línea es un mecanismo para reducir la asimetría de información y fortalecer la rendición de cuentas hacia los inversionistas y grupos de interés. Asimismo, los hallazgos pueden interpretarse bajo la teoría institucional, en la medida en que las empresas listadas en la BVC enfrentan

presiones normativas y de legitimidad derivadas del marco regulatorio contable y financiero colombiano, que incentiva la transparencia y la adopción de estándares internacionales de información. Por otro lado, la teoría de las señales explica que la divulgación voluntaria en entornos digitales constituye una estrategia para proyectar solvencia, reputación y compromiso ético frente al mercado. Estas teorías abarcan la diversidad de comportamientos observados en la muestra y la heterogeneidad de las estrategias de comunicación adoptadas por las empresas.

Este estudio aporta evidencia empírica sobre las prácticas de divulgación en el mercado continuo colombiano y las variables que explican los niveles de información publicada en la web, un canal clave de comunicación empresarial y social. Los resultados son relevantes para los gestores y agentes reguladores, que se proponen mejorar la normativa vigente.

No obstante, se reconocen limitaciones derivadas del diseño transversal y de la naturaleza observacional del análisis que, aunque se sometió a doble revisión independiente, podría contener sesgos en la recolección o interpretación de los datos. Asimismo, la ausencia de una validación estadística formal del índice (por ejemplo, análisis factorial o confiabilidad interevaluador) representa una oportunidad de mejora metodológica para futuras investigaciones. Se recomienda ampliar el alcance del estudio hacia otras dimensiones de divulgación (ESG), e incorporar enfoques longitudinales y comparativos con otros mercados latinoamericanos, lo que contribuiría a una comprensión más robusta del papel de la transparencia financiera en la creación de valor corporativo.

Referencias

Abdullah, M. D. F., Ardiansah, M. N. y Hamidah, N. (2017). "The Effect of Company Size, Company Age, Public Ownership and Audit Quality on Internet Financial Reporting". https://doi.org/10.29259/sijdeb.v1i2.153-166

Acosta-Vargas, P., B. Salvador-Acosta, M. Loachamín-Valencia, M. Chacón-Castro, J. Jadán-Guerrero and L. Salvador-Ullauri (2025). "Evaluating Web Accessibility in Countries Included in the Latin American Artificial Intelligence Index". *IEEE Access*, 13, pp. 104872-104887. https://doi.org/10.1109/ACCESS.2025.3579751

Agboola, A. y Salawu, M. (2012). "The Determinants of Internet Financial Reporting: Empirical Evidence from Nigeria". *Research Journal of Finance and Accounting* 3(11), 95-105. https://doi.org/10.1016/S0278-4254(02)00067-4

Ahmed, A. Burton, B. y Dunne, T. (2017). "The Determinants of Corporate Internet Reporting in Egypt: An Exploratory Analysis". *Journal of Accounting in Emerging Economies* 7(1), 35-60. https://doi.org/10.1108/JAEE-04-2015-0024

Alali, F. y Romero, S. (2012). "The Use of the Internet for Corporate Reporting in the Mercosur (Southern Common Market): The Argentina Case". *Advances in Accounting, Incorporating Advances in International Accounting,* 28, 157-167. https://doi.org/10.1016/j.adiac.2012.03.009

Altendorfer, A. (2024). "Evidence on the Incremental Information Content of Concurrent Financial and Non-Financial Corporate Disclosures". *Finance Research Letters*, 60, 104940. https://doi.org/10.1016/j.frl.2023.104940

Alves, C. F. y Meneses, L. L. (2024). "ESG Scores and Debt Costs: Exploring Indebtedness, Agency Costs, and Financial System Impact". *International Review of Financial Analysis*, 94, 103240. https://doi.org/10.1016/j.irfa.2024.103240

Antonio-Anderson, C., Peña Cárdenas, M. C. y López Saldaña, C. del P. (2020). "Determinantes de la alfabetización financiera". *Investigación Administrativa*, 49–1, 1–16. https://doi.org/10.35426/IAv49n125.05

Argüello-Avalos, S. C. y Jaramillo-Calle, C. Y. (2024). "Perspectivas éticas en la aplicación de las NIIF: un análisis crítico en el sector minero". *Revista Metropolitana de Ciencias Aplicadas*, 7(S2), 65–75. https://doi.org/10.62452/f5vcpg71

Bathla, S., Sharma, A. K. y Kandpal, V. (2024). "Stakeholders' Response to IFRS Adoption/Convergence on Accounting Quality and Disclosures: A Bibliometric Review of Scopus Database". *Heliyon*, 10(1), e23912. https://doi.org/10.1016/j.heliyon.2023.e23912

Bernard, D., Kaya, D. y Wertz, J. (2021). "Entry and Capital Structure Mimicking in Concentrated Markets: The Role of Incumbents' Financial Disclosures". *Journal*

of Accounting and Economics, 71(2–3), 101379. https://doi.org/10.1016/j.jacceco.2020.101379

Botero, Á. S., Marulanda Camilo, Muñoz, L. M. y Álvarez, M. C. (2018). "Proceso de implementación de las NIIF en Colombia: un acercamiento a las autoridades de vigilancia definidas en la ley 1314 de 2009". *Contaduría Universidad de Antioquia*, 73, 131–162. https://doi.org/10.17533/udea.rc.n73a06

Boubaker, S., Lakhal, F., y Nekhili, M. (2012). "The determinants of web-based corporate reporting in France". Managerial Auditing Journal 27(2) pp.126-155.

Bozcuk, A. (2012). "Internet Financial Reporting: Turkish Companies Adapt to Change". *Managerial Finance,* 38(8), 787-800. https://doi.org/10.1108/03074351211239405

Briano, G. y Rodríguez, L. (2012). "Corporate Information Transparency on the Internet by Listed Companies in Spain (IBEX 35) and Mexico (IPYC)". *The International Journal of Digital Research*, 12, 1-37. http://hdl.handle.net/10481/29581

Briano, C. y Rodríguez, L. (2013). "Transparencia de la información corporativa en Internet de las empresas del IBEX 35". *Revista de Contabilidad y Dirección*, 16, 187-208.

Bolsa de Valores de Colombia (BVC). (2025). Mercado de valores BVC. https://www.bvc.com.co/mercado-local-en-linea?tab=indices_mercado-monetario

Butori, R. y Lancelot Miltgen, C. (2023). "A Construal Level Theory Approach to Privacy Protection: The Conjoint Impact of Benefits and Risks of Information Disclosure". *Journal of Business Research*, 168, 114205. https://doi.org/10.1016/j.jbusres.2023.114205

Calahorrano, G. A., Chacón, F. A. y Tulcanaza, A. B. (2021). "Indicadores financieros y rentabilidad en bancos grandes y medianos ecuatorianos, periodo: 2016-2019". *INNOVA Research Journal*, 6(2), 225–239. https://doi.org/10.33890/innova.v6.n2.2021.1700

Cantillo, A. S., Vergara, J. J., Puerta, F. A. y Makita, T. G. (2022). "Implementación de las normas internacionales de información financiera (NIIF) para las pequeñas y medianas empresas (PyMEs) en el sector palmicultor de Colombia". *Información Tecnológica*, 33(2), 269–278. https://doi.org/10.4067/S0718-07642022000200269

Cardona, J. C. (2024). "La integración del mercado bursátil latinoamericano: una revisión sistemática de la literatura". *Revista Finanzas y Política Económica*, 16(2), 317–354. https://doi.org/10.14718/revfinanzpolitecon.v16.n2.2024.1

Chow, C. y Wong-Boren, A. (1987). "Voluntary Financial Disclosure by Mexican Corporations". *Accounting Review*, 62(3), 533–541. https://www.jstor.org/stable/247575

Clark, D. J. y Kundu, T. (2021). "Competitive Balance: Information Disclosure and Discrimination in an Asymmetric Contest". *Journal of Economic Behavior & Organization*, 184, 178–198. https://doi.org/10.1016/j.jebo.2021.01.034

Congreso de la República de Colombia. (2009). Ley 1328 de 2009. Gobierno de Colombia, Función Pública. https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=36841

Cooke, T. E. (1989). "Disclosure in the Corporate Annual Reports of Swedish Companies". *Accounting and Business Research*, 19(74), 113–124. https://doi.org/10.1080/00014788.1989.9728841

DiMaggio, P. J. y Powell, W. W. (1983). "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields". *American Sociological Review*, 48(2), 147. https://doi.org/10.2307/2095101

Diniz, L., Barbosa, A., y De Freitas, M. (2019). "Fatores determinantes da divulgação voluntária web-based das companhias brasileiras de saneamento básico". *Revista Evidenciação Contábil & Finanças* 7(2), 118-141. https://doi.org/10.22478/ufpb.2318-1001.2019v7n2.39791

Dobija, D., Grossi, G., Mora, L., Staniszewska, Z., Kozłowski, Ł. y Kovbasiuk, A. (2023). "Adaptive Social Media Communication for Web-Based Accountability". *Government Information Quarterly*, 40(4), 101859. https://doi.org/10.1016/j.giq.2023.101859

Dolinšek, T. y Lutar-Skerbinjek, A. (2018). "Voluntary Disclosure of Financial Information on the Internet by Large Companies in Slovenia". *Kybernetes* 47(3) 458-473. https://doi.org/10.1108/K-08-2016-0220

Fong, J. H., Koh, B. S. K., Mitchell, O. S. y Rohwedder, S. (2021). "Financial Literacy and Financial Decision-Making at Older Ages". *Pacific-Basin Finance Journal*, 65, 101481. https://doi.org/10.1016/j.pacfin.2020.101481

Frias-Aceituno, J., Rodriguez-Ariza, L. y Garcia-Sanchez, I. (2013). "The Role of the Board in the Dissemination of Integrated Corporate Social Reporting". *Corporate Social Responsibililty and Environmental Management*, 20, 219-233. https://doi.org/10.1002/csr.1294

Gil, O. M., Guacaneme, Y. G. y Gallardo, N. (2024). "Componentes de un modelo de medición de transparencia del mercado de valores: una revisión de literatura". *Accounting and Management Research*, 3, 26. https://doi.org/10.22209/amr.v3a07.2024

Gómez, E. y Católico, D. (2009). "Revelación y divulgación de la información financiera y no financiera on-line de las 500 empresas más representativas en Colombia". *Cuadernos de Contabilidad* 10(27), 269-318.

Hernández Aros, L., Parada, F. M., Portela, F. G. y Sanhueza, R. H. (2025). "A informação empresarial divulgada no sítio Web das empresas cotadas na Bolsa de Valores da Colômbia como fator determinante". *Revista ENIAC Pesquisa*, 14(2), 270–290. https://doi.org/10.22567/rep.v14i2.1070

Hernández-Pajares, J. y Biel, C. G. (2021). "Análisis y factores de divulgación de información de sostenibilidad en páginas web de empresas cotizadas peruanas". *Correspondencias & Análisis*, (14), 125-146.

Ho, K.-C., Yan, C., Mao, Z. y An, J. (2023). "Corporate Sustainability Policies and Corporate Investment Efficiency: Evidence from the Quasi-Natural Experiment in China". *Energy Economics*, 127, 107050. https://doi.org/10.1016/j.eneco.2023.107050

Honjo, Y., Ikeuchi, K. y Nakamura, H. (2024). "Does Risk Aversion Affect Individuals' Interests and Actions in Angel Investing? Empirical Evidence from Japan". *Japan and the World Economy*, 70, 101253. https://doi.org/10.1016/j.japwor.2024.101253

Hu, Y., Ye, Y., Yu, X., Piao, X., Huang, L. y Li, B. (2024). "Managerial Overconfidence and Corporate Information Disclosure". *Borsa Istanbul Review*, 24(2), 263–279. https://doi.org/10.1016/j.bir.2023.12.011

Huse, M. y Solberg, A. (2006). "Gender-Related Boardroom Dynamics: How Scandinavian Women Make and Can Make Contributions on Corporate Boards". *Women in Management Review*, 21(2), 113-130. https://doi.org/10.1108/09649420610650693

Jarne, J. y Morales, F. (2023). "Evolución de la comunicación de información corporativa en páginas web de compañías cotizadas latinoamericanas". *Revista de Investigación Aplicada en Ciencias Empresariales*, 12(1). https://doi.org/10.22370/riace.2023.12.1.4039

Jensen, M. C. y Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Ji, Y., Xu, W., Zhao, Q. y Jia, Z. (2023). "ESG Disclosure and Investor Welfare under Asymmetric Information and Imperfect Competition". *Pacific-Basin Finance Journal*, 78, 101982. https://doi.org/10.1016/j.pacfin.2023.101982

Kim, Y., Lee, J., Lee, K. y Oh, F. D. (2024). "Corporate Disclosure Behavior During Financial Crises: Evidence from Korea". *Journal of Financial Stability*, 73, 101298. https://doi.org/10.1016/j.jfs.2024.101298

Landu, M., Mota, J. H., Moreira, A. C. y Bandeira, A. M. (2025). "Factors Influencing the Quality of Financial Information: A Systematic Literature Review". *South African Journal of Accounting Research*, 39(2), 149–176. https://doi.org/10.1080/10291954.2024.2366169

Langella, C., Anessi–Pessina, E., Botica Redmayne, N. y Sicilia, M. (2023). "Financial Reporting Transparency, Citizens' Understanding, and Public Participation: A Survey Experiment Study". *Public Administration*, 101(2), 584–603. https://doi.org/10.1111/padm.12804

Linares-Rodríguez, M. C., Gambetta, N. y García-Benau, M. A. (2023). "Climate Action Information Disclosure in Colombian Companies: A Regional and Sectorial Analysis". *Urban Climate*, 51, 101626. https://doi.org/10.1016/j.uclim.2023.101626

Liu, Y., Padgett, C. y Yin, C. (2022). "Internal Information Quality and Financial Policy Peer Effects". *International Review of Financial Analysis*, 84, 102357. https://doi.org/10.1016/j.irfa.2022.102357

Liu, J., Ye, K. y Liu, Y. (2023). "Mandatory Information Disclosure and Innovation: Evidence from the Disclosure of Operational Information". *China Journal of Accounting Research*, 16(2), 100294. https://doi.org/10.1016/j.cjar.2023.100294

Liu, W., Lin, G. y He, Q. (2024). "Enhanced Management Information Disclosure Responsibilities and Corporate Risk-Taking: Evidence from the Accountability System for Errors in China". *International Review of Economics & Finance*, 89, 511–531. https://doi.org/10.1016/j.iref.2023.10.028

Liu, Y., Cheng, Y., Li, T., Ni, J. y Norman, S. (2024). "Information Disclosure and Public Participation in Environmental Management: Evidence from the River Chief System in China". *China Economic Review*, 85, 102168. https://doi.org/10.1016/j.chieco.2024.102168

López, S., Granados-Gonzalez, P. y Moreno-Adalid, A. (2024). "La elaboración de informes financieros que aportan valor". *ESIC Market*, 55(1), e326. https://doi.org/10.7200/esicm.55.326

López-Santamaría, M., Amaya, N., Grueso Hinestroza, M. P. y Cuero, Y. A. (2021). "Sustainability Disclosure Practices as Seen Through the Lens of the Signaling Theory: A Study of Companies Listed on the Colombian Stock Exchange". *Journal of Cleaner Production*, 317, 128416. https://doi.org/10.1016/j.jclepro.2021.128416

Lu, H., Shin, J.-E. y Zhang, M. (2023). "Financial Reporting and Disclosure Practices in China". *Journal of Accounting and Economics*, 76(1), 101598. https://doi.org/10.1016/j.jacceco.2023.101598

Majeed, M. A., Xie, S., Ullah, I., Fu, J. y Wang, C. (2023). "Do Powerful CEOs Affect Qualitative Financial Disclosure? Evidence from Accounting Comparability". *Research in International Business and Finance*, 66, 102026. https://doi.org/10.1016/j.ribaf.2023.102026

Masulis, R. W. y Mobbs, S. (2023). "Influential Independent Directors' Reputation Incentives: Impacts on CEO Compensation Contracts and Financial Reporting". *Journal of Corporate Finance*, 82, 102449. https://doi.org/10.1016/j.jcorpfin.2023.102449

Mendes-Da-Silva, W., Onusic, L. M. y Bergmann, D. R. (2014). The Influence of E-disclosure on the *Ex-Ante* Cost of Capital of Listed Companies in Brazil. *Journal of Emerging Market Finance*, 13(3), 335-365. https://doi.org/10.1177/0972652714550928

Ministerio DE Comercio, Industria y Turismo (MINCIT). (2015, 14 de diciembre). Decreto 2420 de 2015. Por medio del cual se expide el Decreto Único Reglamentario de las Normas de Contabilidad, de Información Financiera y de Aseguramiento de la Información y se dictan otras disposiciones. Diario Oficial No. 49.726 de 14 de

diciembre de 2015. https://www.cancilleria.gov.co/sites/default/files/Normograma/docs/decreto_2420_2015.htm

Monteiro, A. P., Vale, J., Leite, E. y Lis, M. (2024). "Linking Quality of Accounting Information System and Financial Reporting to Non-Financial Performance: The Role Women Managers". *International Journal of Accounting Information Systems*, 54, 100692. https://doi.org/10.1016/j.accinf.2024.100692

Morales, F. A. y Jarne, J. I. (2022a). "Divulgación de informaciones corporativas en la website de empresas cotizadas mexicanas: estado de situación y evolución". *Trascender, contabilidad y gestión*, 7(21sept-dic), 69–89. https://doi.org/10.36791/tcg.v7i21sept-dic.182

Morales, F. A. y Jarne, J. I. (2022b). Corporate transparency on the webs of Chilean listed companies: status and evolution. People and technology management journal, (45), 98-122. http://dx.doi.org/10.35588/gpt.v14i45.5901

Morales F. y Sáez, J. (2022). "Transparencia corporativa sobre capital humano en empresas del retail del Mercado Integrado Latinoamericano". *Suma de Negocios*, 13(28), 19-27. https://doi.org/10.14349/sumneg/2022.v13.n28.a3

Mustafa Khan, N. J. y Mohd Ali, H. (2023). "Regulations on Non-Financial Disclosure in Corporate Reporting: A Thematic Review". *Sustainability*, 15(3), 2793. https://doi.org/10.3390/su15032793

Orazalín, N. (2019). "Corporate Governance and Corporate Social Resposibility (CRS) Disclosure in an Emerging Economy: Evidence from Commercial Banks of Kazakhstan". *Corporate Governance*, 19 (3), 490-507. https://doi.org/10.1108/CG-09-2018-0290

Parlakkaya, R., Kahraman, U. y Cetin, H. (2015). "The Effects of the Corporate Governance on the Level of Internet Financial Reporting: Evidence from Turkish Companies". *International Journal of Social, Behavioral, Educational, Economics, Business and Industrial Engineering*, 9(3), 920-924.

Pelayo, M., Fuertes, Y., Cuellar, B. y Arias, M. (2013) "Impacto de la divulgación de información financiera en Internet de las empresas en América Latina". *Global Conference on Business and Finance Proceedings,* 8(1), 772-781.

Pereira da Silva, P. (2024). "The Impact of Non-Financial Disclosure on Labor Investment: International Evidence". *Borsa Istanbul Review*, 24(1), 218–234. https://doi.org/10.1016/j.bir.2023.12.004

Presidente de la República de Colombia. (2010). Decreto 2555 de 2010. Gobienro de Colombia, Función Pública. https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=40032

Presidente de la República de Colombia. (2021). Decreto 151 de 2021. Gobienro de Colombia, Función Pública. https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=158332

Remo-Diez, N., Mendaña-Cuervo, C. y Arenas-Parra, M. (2023). "Exploring the Asymmetric Impact of Sustainability Reporting on Financial Performance in the Utilities Sector: A Longitudinal Comparative Analysis". *Utilities Policy*, 84, 101650. https://doi.org/10.1016/j.jup.2023.101650

Reymundo-Soto, E. y Navarrete-Zambrano, C. M. (2024). "Impacto de las normas internacionales de información financiera en la calidad contable según revisión sistemática". *Multidisciplinary Collaborative Journal*, 2(2), 57–70. https://doi.org/10.70881/mcj/v2/n2/36

Rincón, C. A., Gómez, M. y Rivera, Y. A. (2021). "Los diseños de índices de divulgación de información financiera en Internet. Una revisión sistemática de la literatura". *Cuadernos de Administración*, 34. https://doi.org/10.11144/Javeriana.cao34.didifi

Sandhu, A. y Singh, B. (2019). "Board Composition and Corporate Reporting on Internet: Indian Evidence". *Journal of Financial Reporting and Accounting* 17 (2), 292-319. https://doi.org/10.1108/JFRA-05-2017-0031

Scharnigg, R. (2024). "Implicit Negotiations in Niche-Regime Interactions: Relational Aspects of Agency, Accountability, and Anticipation in Transition Studies". *Environmental Innovation and Societal Transitions*, 51, 100834. https://doi.org/10.1016/j.eist.2024.100834

Singhania, M. y Gupta, D. (2024). "Impact of Environmental, Social and Governance ESG Disclosure on Firm Risk: A Meta□Analytical Review". *Corporate Social Responsibility and Environmental Management*, 31(4), 3573–3613. https://doi.org/10.1002/csr.2725

Soledispa-Lucas, F. F. y Murillo-Delgado, I. G. (2020). "La globalización y las tecnologías de la información y comunicación". *Reicomunicar*, 3(6), 105–118. https://reicomunicar.org/index.php/reicomunicar/article/view/21

Spence, M. (1973). "Job Market Signaling". *The Quarterly Journal of Economics*, 87(3), 355. https://doi.org/10.2307/1882010

Sun, S. y Xiao, X. (2024). "Delegation of Management Authority and the Level of Corporate Risk Disclosure". *Finance Research Letters*, 63, 105284. https://doi.org/10.1016/j.frl.2024.105284

Superintendencia Financiera de Colombia (SFC). (2025). Circulares Externas. Superintendencia Financiera de Colombia.

Ten Eikelder, S. C. M. y Van Amerongen, J. H. M. (2023). "Resource Allocation Problems with Expensive Function Evaluations". *European Journal of Operational Research*, 306(3), 1170–1185. https://doi.org/10.1016/j.ejor.2022.07.048

Tseng, J. (2024). "Effect of Information Disclosure on Firms' Direct Financing in Emerging Securities Markets". *International Review of Economics & Finance*, 91, 54–68. https://doi.org/10.1016/j.iref.2023.10.003

Tubay, JB y De Leon, M. v. (2020). "Website Sustainability Disclosure Analysis: A Case of Publicly-Listed Mining Companies in the Philippines". *International Journal of Energy Economics and Policy*, 10 (1), 23-30. https://doi.org/10.32479/ijeep.8347

Vergara Arrieta, J. J., Puerta Guardo, F. A. y Huertas Cardozo, N. C. (2023). "Implementation of International Financial Reporting Standards (IFRS) for Small and Medium-Sized Enterprises (SMEs) in Colombia". *Contaduría y Administración*, 68(2), 296–321. https://doi.org/10.22201/fca.24488410e.2023.2643

Wang, R., Chua, W. F., Simnett, R. y Zhou, S. (2024). "Is Greater Connectivity of Financial and Non-Financial Information in Annual Reports Valued by Market Participants?". *The British Accounting Review*, 101407. https://doi.org/10.1016/j.bar.2024.101407

Wild, J. J. y Wild, J. M. (2023). "Corporate Social Responsibility and Disclosure Transparency". *Journal of Financial Reporting and Accounting*. https://doi.org/10.1108/JFRA-08-2022-0309

Xiao, F., Chan, A. L.-C. y Chen, V. Y. S. (2023). "Board Political Connections and Tradeoff Between Market and Nonmarket Advantages: Evidence from Corporate Financial Information Disclosure". *Journal of Business Research*, 164, 113949. https://doi.org/10.1016/j.jbusres.2023.113949

Yi, E. (2023). "Corporate Governance, Information Disclosure and Investment - Cash Flow Sensitivity". *Finance Research Letters*, 55, 103942. https://doi.org/10.1016/j.frl.2023.103942

Zhang, L. y Zhou, J. (2024). "The Impact of Imperfect Financial Markets and Stock Holdings on Corporate Innovation: Evidence from China". *Finance Research Letters*, 61, 104957. https://doi.org/10.1016/j.frl.2023.104957

Zhang, Y., Wang, H., Ruan, S., Cheng, J. y Song, Y. (2024). "Effects of Environmental Information Disclosure on the Green Development of Mining Industry: Evidence from Chinese Provincial Mining Sub-Sectors". *Resources Policy*, 89, 104669. https://doi.org/10.1016/j.resourpol.2024.104669

Zhen Li, O., Wu, W., Xia, L. y Zhang, Q. (2023). "Fiscal-Audit Separation and Government Disclosure Quality". *Journal of Accounting and Public Policy*, 42(4), 107100. https://doi.org/10.1016/j.jaccpubpol.2023.107100

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Eco-Innovation and Circular Economy in Medium-Sized Hotels in Tijuana and Ciudad Juárez, Mexico

Ecoinnovación y economía circular en hoteles de tamaño medio de Tijuana y Ciudad Juárez, México

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Abstract

This study analyzes the low level of eco-innovation in medium-sized hotels in Tijuana, Baja California, and Ciudad Juárez, Chihuahua, in Mexico, and its relationship with the adoption of the circular economy strategies. Using a qualitative and phenomenological approach, 14 semi-structured interviews were conducted with hotel managers, and their narratives were examined using inductive coding in ATLAS.ti. Results indicated that although initial practices—such as recycling, efficient resource use, digital technologies, and some clean energy initiatives—are present, their implementation is uneven and constrained by economic, cultural, and knowledge barriers. Human capital, both managerial and operational, emerges as a key determinant for promoting eco-innovation, particularly through training, awareness-building, and the adoption of new technologies. The study explores the connection between human capital, eco-innovation, and the circular economy within a strategic yet understudied sector in northern Mexico, providing valuable evidence for designing public policies and business strategies aimed at sustainability.

Resumen

Este artículo analiza el bajo nivel de ecoinnovación en hoteles medianos de Tijuana, Baja California, y Ciudad Juárez, Chihuahua, en México, y su relación con la adopción de estrategias de economía circular. Con un enfoque cualitativo y fenomenológico, se realizaron 14 entrevistas semiestructuradas a gerentes, cuyos discursos fueron analizados mediante codificación inductiva y ATLAS.ti. Los resultados muestran que, aunque hay prácticas iniciales —como reciclaje, uso eficiente de recursos, tecnologías digitales y algunas energías limpias— su implementación es heterogénea y limitada por barreras económicas, culturales y de conocimiento. El capital humano, tanto gerencial como operativo, aparece como un determinante central para impulsar la ecoinnovación, en especial mediante la capacitación, la concientización y la adopción de nuevas tecnologías. El estudio explora la percepción directiva sobre la conexión entre capital humano, ecoinnovación y economía circular en un sector estratégico y poco estudiado en la frontera norte de México, proporcionando evidencia útil para el diseño de políticas públicas y estrategias empresariales orientadas a la sustentabilidad.

KEYWORDS / PALABRAS CLAVE

Circular economy, sustainability, eco-innovation, hotel managers, environmental management / Economía circular, sostenibilidad, ecoinnovación, gerentes de hotel, gestión ambiental.

JEL Classification / Clasificación JEL: *Q50, Q56, R19.*

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1. Introduction*

The circular economy proposes modifying the current linear process of production, distribution, and consumption towards a cyclical one of regeneration, reuse, restoration, and the return of materials to the production system to extend their life cycles, transform waste into useful raw materials for other industries, and avoid generating more waste. In short, it offers an alternative for companies seeking to positively impact the environment, economic prosperity, and social benefit.

Eco-innovation is conceived as the practical way to guide companies towards the circular economy. One of its most comprehensive definitions is presented by the Eco-Innovation Observatory (EIO): "The introduction of any new or significantly improved product (good or service), process, organizational change, or marketing solution that reduces the use of natural resources and decreases the release of harmful substances across the entire life cycle (EIO, 2012, p. 8)."

The hotel sector is a pillar of the Mexican economy due to its generation of direct and indirect employment, its contribution to the economy, and its foreign exchange earnings (Torres & Grossman, 2012). These companies play an important role in addressing the problems of pollution and excessive resource use, since their activities contribute to water scarcity, pollution, and the generation of solid waste, consequently leading to ecosystem imbalances.

Eco-innovation is the link that connects companies in the hotel sector with the circular economy. Velázquez and Vargas (2014) and Menezes and Da Cunha (2016) point out that these organizations face economic, technological, governmental, and cultural barriers to the introduction of eco-innovations, as well as a lack of technical knowledge and specialized personnel within their human capital. Consequently, this article establishes as its research problem the low level of eco-innovation among medium-sized hotel companies in Tijuana and Ciudad Juárez (two of the most important cities on Mexico's northern border) in the adoption of circular-economy-aligned strategies. It assumes that the human element is indispensable for adopting the circular economy strategies; therefore, it is proposed that a connection exists between human capital, eco-innovation, and the circular economy, given that each individual contributes knowledge, skills, creativity, experience, and attitudes to exploit opportunities and develop new ideas, which are the foundation of change.

* The work of the two anonymous reviewers is appreciated. The research was carried out at the Laboratorio de Problemas Estructurales de la Economía Mexicana, Universidad Autónoma de Ciudad Juárez.

The research questions are as follows: What circular-economy-aligned strategies are implemented by a sample of medium-sized hotel companies in Tijuana and Ciudad Juárez? What are the key connections between the categories identified in the narratives of managers from a sample of medium-sized hotel companies in Tijuana and Ciudad Juárez? What is the effect of human capital (managers and employees) on eco-innovation for the adoption of strategies aligned with the circular economy?

To answer these questions, we conducted field research based on in-situ, semi-structured interviews with general and operations managers of medium-sized hotels across the cities under study. By foregrounding managerial perceptions, decision heuristics, and implementation experiences rather than compliance checklists, this article contributes novel, sector-specific evidence to the growing literature on the circular economy in services and hospitality.

First, it bridges macro-level circular-economy principles (e.g., waste prevention, resource efficiency, product-service loops) with meso-level organizational routines by documenting how managers interpret these ideas and translate them into concrete practices (e.g., water reuse, energy retrofits, food-waste valorization, circular procurement, and housekeeping protocols). Second, it advances theory by mapping perceived drivers and barriers—regulatory uncertainty, capital constraints, supply-chain coordination failures, capability deficits, and demand-side signals from eco-conscious guests—onto established frameworks such as the resource-based view, institutional theory, and the theory of planned behavior, thereby refining these lenses in a service-intensive, asset-light context. Third, it offers a methodological contribution; working with a purposive, non-probability sample, it enables analytic generalization through a transparent coding scheme and a comparative cross-city matrix that future studies can replicate, extend to probabilistic designs, or test quantitatively.

Finally, the findings carry actionable implications for policy and management at a time when authorities are scaling circular economy initiatives. They specify where targeted incentives, information campaigns, green public procurement, and support for local circular ecosystems can reduce adoption frictions, while outlining capability-building supplier engagement and investment appraisal practices that hotel managers can deploy to accelerate circular economy transitions.

2. Data and Methodology

To achieve the research objectives, the qualitative method was used. This method offers multiple benefits: it is flexible, it stems from the researcher's perspective on a

problem or phenomenon, and it helps understand people within their own reality. It was assumed that managers' positive perceptions and knowledge of economic, social, and environmental problems, as well as the benefits that eco-innovation and the circular economy bring to addressing these problems, contribute to their implementation. Table 1 shows a series of stages that were followed to develop the research (Álvarez-Gayou, 2003) (see Table 1).

Table 1. Research Stages

1. Definition of the problem and research questions	Problem: The low level of eco-innovation among medium-sized companies in the hotel sector in Tijuana and Ciudad Juárez in adopting circular-economy-aligned strategies. 1. What types of eco-innovations are present in a sample of medium-sized companies in the hotel sector in Tijuana and Ciudad Juárez? 2. What are the strategies aligned with the circular economy implemented in a sample of medium-sized companies in the hotel sector in Tijuana and Ciudad Juárez? 3. What are the key connections between the categories identified in the narrative of managers from a sample of medium-sized companies in the hotel sector in Tijuana and Ciudad Juárez? 4. What is the effect of human capital (managers and employees) on eco-innovation for the adoption of strategies that align with the circular economy?
2. Definition of objectives	1. Describe the types of eco-innovations present in a sample of medium-sized companies in the hotel sector in Tijuana and Ciudad Juárez, according to the categories identified in the narrative provided by the managers of these companies. 2. Describe the strategies aligned with the circular economy implemented in a sample of medium-sized companies in the hotel sector in Tijuana and Ciudad Juárez, according to the categories identified in the narrative of the managers of these companies. 3. Identify key connections between categories present in the narrative of the managers of a sample of medium-sized companies in the hotel sector in Tijuana and Ciudad Juárez. 4. Describe the effect of human capital (managers and employees) on eco-innovation for the adoption of strategies that align with the circular economy.

3. Definition of the interpretive paradigm	Phenomenology: Focuses on understanding attitudes, opinions, and perceptions expressed through lived experiences.
4. Participant characteristics	Hotel managers in Tijuana and Ciudad Juárez.
5. Procedure for obtaining information	Semi-structured interviews with a sequence of topics to be discussed.
6. Data analysis	Content analysis, use of the ATLAS.ti program.
7. Preparation of the final report	Preparation of an article reporting on the results for a research journal.

Source: Prepared by the authors.

Regarding the sample, to obtain information from an adequate number of companies in each city, a quota sample was selected, based on the 25 identified medium-sized hotel companies. The proportion of hotels in each city was calculated, yielding a number for each subgroup (seven in Tijuana and seven in Ciudad Juárez). According to Izcara (2007), the researcher determines which individuals are part of the study and when it is feasible to conclude the information-gathering process. When the number of discourses obtained allows for a satisfactory interpretation, explanation, or description of all dimensions of the social phenomenon under analysis (Izcara, 2007, p. 28).

The 14 companies were visited between April and May 2022, when a semi-structured interview was conducted to gather managers' perceptions on topics related to eco-innovation and the circular economy. Medium-sized companies were chosen because they are more likely to implement eco-innovations and strategies aligned with the circular economy.

According to Álvarez-Gayou (2003, p. 109), an interview is a conversation in which the goal is to understand phenomena from the interviewee's perspective and interpret the meaning of their experiences. Based on the stated objectives and the assumption that the manager's role is vital to promoting eco-innovation programs and practices aligned with the circular economy, the analysis dimensions summarized in Table 2 were established and used to develop an interview guide (see Table 2).

Table 2. Qualitative Research Dimensions

OPINION ON THE ECONOMIC, SOCIAL, AND ENVIRONMENTAL PROBLEMS OF THE CITY
Q1. In terms of the economy, what do you consider to be the most significant economic problems facing the city?
Q2. What are the most distinct social problems?
Q3. What are the most distinct environmental problems?
SUGGESTIONS FOR ECONOMIC, SOCIAL, AND ENVIRONMENTAL PROBLEMS
Q4. What other factor could you consider, or suggestions could you make in relation to the economic and social problems you mention?
Q5. What other factor could you consider, or suggestions could you make in relation to environmental problems?
Q6. What responsibility does the hotel sector have in relation to environmental problems?
PARTICIPATION OF THE HOTEL SECTOR
Q7. How does it address social and economic issues?
PARTICIPATION OF THE GOVERNMENT
Q8. What is the government's involvement in solving problems, particularly environmental issues?
HUMAN CAPITAL
Questions were asked to assess managers' perceptions of their employees' human capital, and specific questions were used to assess the managers' own human capital. Both formal and informal education for the benefit of their work activities.
Next, the topic of the Circular Economy Law is introduced with a brief explanation, followed by the following questions: Q9. Are you aware of the Circular Economy Law? Q10. What is your opinion of the General Law on Circular Economy passed in Mexico?
CIRCULAR ECONOMY
Q11. In your opinion, do you think that companies in the hotel sector should move towards environmental, social, and economic practices simultaneously soon? Why? Q12. What changes need to be made in hotel companies to contribute to solving the environmental, social, and economic problems you mention?
ECO-INNOVATION
Q13. What investments do you think should be made so that companies in the hotel sector focus on caring for the environment? Q14. How would you involve your employees, customers, and suppliers (guests) in caring for the environment? (water conservation, energy conservation, green areas). Q15. What is your opinion on using new technologies to prevent pollution and conserve water, energy, and the environment?

Source: Prepared by the authors.

Once the manager interviews are conducted, several approaches can be used to analyze the qualitative data. This research followed the approach proposed by Álvarez-Gayou (2003) and used interpretive phenomenology. Following this approach, we examine the problem of low eco-innovation levels in adopting circular economy strategies, as well as the effect of human capital (managers and workers) on these variables.

The analysis is based on the managers' experiences, knowledge, and attitudes as heads of the organization, to identify significant themes or phrases. The data was then compiled as follows: 1) All the information was transcribed as quickly as possible to preserve its freshness, clarity, and the meaning of the interviewee's comments; 2) The text was carefully read several times until it was fully understood, and the important points in the discourse were highlighted; 3) The categories or codes were reviewed to classify and label them; 4) A description was carried out as the data was presented, with the support of ATLAS.ti version 22 software and inductive coding; and 5) A reflective process was conducted to arrive at the essence of the phenomenon, where human capital represents a key and indispensable element for increasing the level of eco-innovation and the adoption of circular economy strategies.

In summary, the results presented in the following section are based on 14 semi-structured, face-to-face interviews, seven from Tijuana and seven from Ciudad Juárez, all from medium-sized companies. The collected data allowed us to understand: 1) The presence or absence of eco-innovations and strategies aligned with the circular economy available to the sample of hotel companies; and 2) An approximation of the relationship between human capital, eco-innovation, and the circular economy. Furthermore, direct contact with managers yielded information on: 1) The profile of the human capital (managers and employees); 2) The types of eco-innovations and strategies that align with the circular economy identified in the narrative of the managers of these companies and 3) The key connections between the categories identified as part of this study and 4) The effect of human capital (of managers and employees) on eco-innovation for the adoption of strategies that align with the circular economy.

3. Results

3.1 Ciudad Juárez Managers

The purpose of this section is to examine managerial perceptions of the challenges that companies in the hotel sector face in orienting their strategies toward sustainable development, and to seek a balance among generating economic benefits, protecting the environment, and fostering social well-being. The manager's role is key to managing both physical and intangible resources in contributing to the path toward a circular economy. Therefore, it is assumed that managers' knowledge of economic, social, and environmental problems, and of the benefits that eco-innovation and the circular economy offer in addressing them, contributes to their implementation.

The economic problems perceived by managers in Ciudad Juárez include a lack of urban planning, roads in poor condition, and inefficient private and public transportation, which create a negative image of the city and harm tourism. They also express concern about the scarcity of local supplies for their operations; the unequal competition in wages and hiring bonuses offered by maquiladoras to attract and retain staff; employee turnover; and the lack of technically trained workers in the hotel sector. The withdrawal of some maquiladoras from the area due to electricity shortages, purchasing power constraints, and security concerns is another challenge.

Social problems include insecurity, theft, drug trafficking, and violence, all of which negatively impact the city's image. These issues, which must be addressed, include the lack of recreational spaces, domestic violence, and childcare for working mothers. They add that the lack of leadership in media communication leads to misinformation, divides Ciudad Juárez society, and hinders the unification of projects for the city's growth.

Environmental problems include the lack of green spaces and city cleanliness, the need for reforestation, and the presence of vehicles and public transportation that emit pollutants, contributing to poor air quality. Industrial, chemical, and toxic waste generated by maquiladora activity creates pollution and residue. They also note that the lack of a culture of water conservation and awareness contributes to water scarcity. They believe that environmental sanctions are merely a revenue-generating measure, and that government technical support, the promotion of environmental

stewardship, and stricter transportation regulations are needed. According to the managers, the involvement of the Ciudad Juárez hotel sector in addressing the problems is summarized below.

On the economic front, Ciudad Juárez hotels have implemented measures to attract and retain talent amid a highly competitive labor market driven by the maquiladora industry. These measures include offering hiring bonuses to compete with assembly plants and using incentives focused on "love for the company" and the ease of the job to reduce turnover. Complementarily, the sector promotes business tourism, positioning the city as a destination for corporate stays and professional events, which provides stability in demand and related economic spillovers.

In the social sphere, participation is expressed through direct assistance actions and initiatives to build social capital. Hotels make donations of blankets to shelters and nursing homes, promote community well-being, and run a basic education program for adults who are behind in their studies. They also promote cultural life by organizing events such as Aventuras de Samalayuca, Chupacabras, and Turibús, as well as their own activities, such as the "Bike Ride" at a local hotel. To strengthen these initiatives, they establish partnerships with companies to raise funds for social events and, through exchange programs, provide rooms for participants in charitable activities, including families with children with terminal cancer, as a form of support. Inside, some properties implement nutrition plans for their staff and promote social awareness by caring for stray animals, aiming to be "good neighbors" in their immediate surroundings.

In environmental matters, the sector develops a comprehensive strategy that combines saving, reuse, monitoring, and certification. Initiatives worth mentioning include cleanup drives in downtown Ciudad Juárez and parks, as well as strategies for saving and recycling supported by equipment monitoring. In water management, pool water is recirculated and reused; water dispensers are installed on each floor; refillable systems are available in bathrooms and showers; and bottled water is produced through reverse osmosis to reduce single-use plastics. In supplies and energy, cornstarch plates and cups, LED bulbs, and chemical-dosing dispensers are used, and substances are reviewed to minimize risks. At the same time, cardboard recycling, product reuse, pollution reduction, and solar panels to heat the pool are promoted, with the goal of moving toward an energy self-sufficient company. In guest relations, point loyalty programs are implemented to encourage water and energy conservation, and waste monitoring is conducted. Finally, the Electronic Collection Fair—with tree exchanges and private certification (Biosphere)—reinforces the

environmental commitment and promotes transparency. In Figure 1, we can see what a preliminary analysis identified as the most frequent words in the managers' narratives in Ciudad Juárez (see Figure 1).

Figure 1. Word Cloud from Managers in Ciudad Juárez

Source: Prepared by the authors based on results from ATLAS.ti 22.

Next, as is shown in Table 3, the connections among the main codes in the Ciudad Juárez managers' speeches were established through an analysis of co-occurrences, in which related codes within a quote or paragraph were identified (see Table 3).

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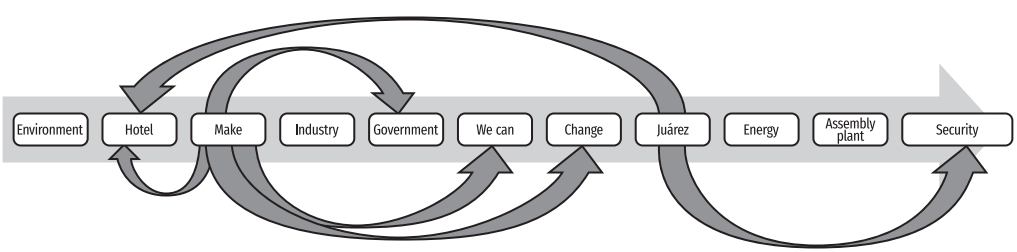
Table 3. Co-Occurrences Between Codes (Ciudad Juárez)

	Environment	Change	Energy	Government	Make	Hotel	Industry	Ciudad Juárez	Assembly plant	We can	Security
Environment	0	2	1	3	4	6	4	2	1	2	1
Change	2	0	0	4	6	0	0	0	1	3	0
Energy	1	0	0	1	0	3	0	1	2	0	2
Government	3	4	1	0	6	3	1	1	1	4	0
Make	4	6	0	6	0	6	3	3	2	6	1
Hotel	6	0	3	3	6	0	1	4	2	4	4
Industry	4	0	0	1	3	1	0	2	3	2	1
Ciudad Juárez	2	0	1	1	3	4	2	0	0	2	4
Assembly plant	1	1	2	1	2	2	3	0	0	2	1
We can	2	3	0	4	6	4	2	2	2	0	1
Security	1	0	2	0	1	4	1	4	1	1	0
Total	26	16	10	24	37	33	17	19	15	26	15

Source: Prepared by the authors based on results from ATLAS.ti 22.

Based on these co-occurrences, a framework was developed outlining the most frequently occurring concepts and key expressions used by managers to interpret their stance toward change or resistance to this circular economy proposal. The framework is presented graphically in Figure 2. It can be summarized as the idea that environmental change is possible. Managers consider involvement from the hotel sector and the government important; the latter must address the security problems affecting tourism in the city (see Figure 2).

Figure 2. Connection Between Codes in the Discourse of Ciudad Juárez Managers



Source: Prepared by the authors based on results from ATLAS.ti 22.

3.2 Tijuana Managers

Regarding Tijuana's hotel managers, they mention that the most prominent economic problems are business closures, low wages, rising product prices, and the unequal distribution of wealth, which creates an imbalance in the population's purchasing power. They also cite the purchase of supplies for the hotel sector, which are priced in dollars, and the increase in gasoline and gas prices, which affects their costs and consequently leads to price increases.

Among the social problems they highlight migration benefits them economically, on the one hand, but on the other, it increases the demand for water and energy and contributes to the wear and tear on hotel rooms. In their opinion, crime, insecurity, overpopulation, and a lack of green spaces and public areas are triggers of social problems.

Environmental problems result from a lack of education, culture, and awareness regarding the maintenance of a clean city. They emphasize water scarcity, the underutilization of waste potential for recycling and energy generation, and the presence of monopolies in the sector. They assert that pollution and noise from vehicle traffic led to poor air quality and driver stress. According to managers, the hotel sector in Tijuana is involved in addressing these problems, as summarized below.

The hotel sector in Tijuana has been integrating sustainability practices across its operations, with actions that combine economic efficiency, social responsibility, and environmental initiatives. In the economic dimension, establishments have promoted active staff collaboration to reduce costs and save energy, thereby reinforcing an internal culture of efficient resource use. This approach is complemented by ongoing staff training in proper equipment handling and correct linen washing, as well as by offering workplace courses and education. These measures increase productivity, standardize processes, and reduce operational losses.

In the social dimension, hotels have established links with specialized associations, highlighting their approach to promoting the inclusion of deaf people in the labor market and donating to an association dedicated to addiction care, as an expression of community co-responsibility. Offering training opportunities within the work environment also serves a dual purpose: strengthening human capital and expanding employees' professional development prospects, while reducing operational losses.

In the environmental dimension, there is a robust set of interventions aimed at responsible resource management and impact mitigation. These include monitoring

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energy consumption and incorporating efficient technologies—such as smart floors and air dryers—to optimize electricity use and reduce single-use inputs and operational waste. The separation of waste, the use of environmentally friendly products in laundry and room cleaning, as well as placing biodegradable toilet paper and eco-friendly amenities (for example, shampoo with a lower environmental impact), consolidate everyday practices of the circular economy and reduce pollution footprint. These actions are supported by a sustainability study (Scarpellini et al., 2020) and the adoption of private certification (Biosphere sustainability certification), suggesting a process of institutionalization and external verification of environmental goals. Finally, the adoption of green areas reinforces the provision of ecosystem services and improves the immediate urban environment, linking environmental benefits with social value.

Overall, these initiatives show that the involvement of Tijuana's hotel sector is not limited to isolated actions but rather forms an integrated strategy: it relies on staff participation and continuous training to sustain economic improvements, promotes inclusion and community support in the social sphere, and strengthens environmental management based on monitoring, certification, and responsible operational practices. The initial analysis identified the most frequent words in the narrative of Tijuana managers, as shown in Figure 3 (see Figure 3).

Figure 3. Word Cloud from Managers in Tijuana

Source: Prepared by the authors based on results from ATLAS.ti 22.

Table 4 presents the connections among the main codes in the speeches of Tijuana managers, based on co-occurrence analysis, which identifies those that occur together within a quote or paragraph (see Table 4).

Table 4. Co-Occurrences Between Codes (Tijuana)

	Environment	Culture	Energy	Government	Make	Hotel	Important	Cleaning	We can	Products	Recycling
Environment	0	1	1	4	5	7	3	3	3	3	1
Culture	1	0	1	5	1	0	3	0	2	0	2
Energy	1	1	0	2	2	4	1	1	0	2	0
Government	4	5	2	0	9	3	4	1	5	0	3
Make	5	1	2	9	0	7	3	3	6	0	2
Hotel	7	0	4	3	7	0	2	4	5	2	2
Important	3	3	1	4	3	2	0	0	2	1	2
Cleaning	3	0	1	1	3	4	0	0	2	1	1
We can	3	2	0	5	6	5	2	2	0	0	0
Products	3	0	2	0	0	2	1	1	0	0	1
Recycling	1	2	0	3	2	2	2	1	0	1	0
Total	31	15	14	36	38	36	21	16	25	10	14

Source: Prepared by the authors based on results from ATLAS.ti 22.

Based on these co-occurrences, a scheme is developed using the concepts with the highest frequency in the managers' narrative. In summary, they recognize that it is possible to make changes in favor of the environment, and they consider the participation of the hotel sector and the government, through regulations and incentives, important, mainly in the area of energy. The connection between codes in the discourse can be seen graphically in Figure 4 (see Figure 4).

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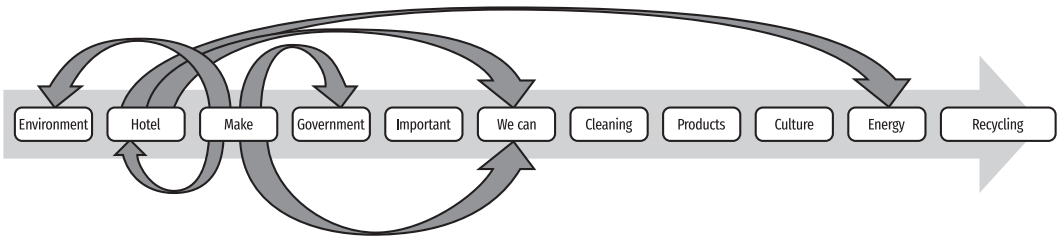
Figure 4. Connection Between Codes in the Discourse of Tijuana Managers



Source: Prepared by the authors based on results from ATLAS.ti 22.

3.3 Phenomenological Interpretation

The circular economy is seen as a complex model for companies in the hotel sector, as it proposes an economic system in which natural resources, energy, and water are used efficiently; new technologies are introduced to reduce emissions, waste, and pollution; and environmental management is implemented to protect the environment and resources. The circular economy fosters sustainable tourism, where human participation is vital to promoting change in thinking, attitudes, and consumption habits within organizations (senior management and employees), among consumers (guests), among third-party stakeholders (supply chain), and among residents of border cities.

Therefore, it is important to highlight the problems in the cities of Tijuana and Ciudad Juárez in three key areas, which will serve as a basis for promoting public policies that establish guidelines, laws, incentives, awareness programs, and education initiatives to address the needs and advance sustainable development in these towns. As can be seen, the problems perceived by management in its three areas are strongly linked, affecting the sustainable development of the border cities of Tijuana and Ciudad Juárez; consequently, a negative image of these cities is created, to the detriment of tourism and companies in the hotel sector.

> M1: "Without a doubt, our streets have deteriorated too much. It greatly affects both our visitors and ourselves." (quote 1:1). "More and more of us are walking around our city" (quote 1:3). "Well, insecurity, without a doubt" (quote 1:435). "...and so it's getting harder and harder for us to go out on our streets, to go out and socialize, and we definitely need more family-friendly spaces." (quote 1:6).

M3: "Maquilas are moving away because of electricity use" (quote 1:43). This affects us greatly here in the hotel sector because maquilas bring us many guests, so both maquilas and we are like an alliance, you could say, since we provide accommodation to many people who come from outside." (quote 1:44).

M4: "Ciudad Juárez continues to be stigmatized as a violent city. There are companies, for example, that we cannot work with, in the case of the hotel... because we are right behind a conflictive area, which for them is a red zone. Sometimes they don't want to stay in the surrounding hotels because there isn't much to do. Still, at the end of the day, they can't stay with me because once they gave us a chance, and a waiter was killed in a nearby establishment, so the next day it was no... I told you it's still a red-light district." (quote 1:506).

M5: "From my perspective in the tourism industry, these campaigns definitely need to clean up the city's image, and that's in terms of safety issues." (quote 1:153).

In this context, introducing the circular economy implies government participation through public policies that promote it in these cities, through regulations, education, training, and incentives, in accordance with the needs of each region and sector of the economy.

M2: "I think it's very good, but greater awareness and dissemination are needed. Training and implementation of laws are required." (quote 1:36).

M6: "Okay, it's our land. If they teach us how to train our workers, there will be a better quality of life. But it needs to be implemented. The authorities say how: regulation and training." (quote 1:408).

M8: "Waste should be valued, 'waste is gold' and can be used to generate energy and control companies that are monopolies in the city." (quote 1:236).

M9: "There should be consequences, and they should be enforced" (quote 1:251).

M11: "Positive opinion, as oil is running out, gasoline and electricity prices have risen. Government assistance is required." (quote 1:311).

M13: "I agree, positive if it is followed up, reaching the goal. It's good, as long as it is followed up and disseminated." (quote 1:368).

Another important aspect to consider is these companies' investment in eco-innovations for environmental protection. While managers acknowledge the benefits of acquiring new technologies, which allow them to reduce costs, they indicate, based on their experience, that a prior economic-environmental cost-benefit analysis is necessary to incentivize such investments.

a. Technological eco-innovations

M1: "Well, they are undoubtedly significant investments in some cases because you have to... replace things. You must replace pumps, systems, etc., etc., in order to actually carry it out. But I've always said... No, for me, I would refer to it as an investment rather than an expense. Because, in the long run, it supports and benefits me as a company in terms of energy savings, which is one of the most significant expenses for any company. And so, in another way, I am continuing with our philosophy of being a socially responsible company." (quote 1:21).

M2: "A monitoring system with sensors that track guests' arrivals and departures, replacing the use of cards and enabling the use of electricity when guests enter their rooms. This reduces electricity consumption. It is a costly investment that brings many benefits in terms of cost reduction and environmental protection." (quote 1:38).

M4: "We are coming for a significant investment in the next few months, and it is regarding the keys... There was an initiative in which, precisely to avoid touching things and spreading viruses, check-in is now done online, and your key is on your cell phone. The investment in this case is in the locks, which have a reader. Normally, you insert your key, it opens and closes, like a credit card." (quotes 1:137 and 1:139).

M5: "We have invested in renewable energy through solar panels, and we are always on the lookout for what causes us the most waste." (quotes 1:169 and 1:170).

M7: "They already have advanced technology in the rooms that cuts off power when no movement is detected." (quote 1:225).

b. Non-technological eco-innovations

M1: "Through the dynamics we have, month after month, of these community wellness activities, we raise awareness of this issue, not only through a document or an image, but by transferring it so that people can see... and experience the needs of the city, which may have a park, where none of us are neighbors, but we

see a need and we commit ourselves to caring for it, cleaning it, and so on. Doing our bit." (quote 1:22)." "We have a sustainability card in the rooms as part of a program, and if the guest leaves the card on the bed, it means they do not want their sheets changed during their stay." (quote 1:23).

M2: "Guests are made aware of the amount of water consumed based on the length of their shower through information provided in each room." (quote 1:40). "Recycling and the separation of organic and inorganic waste are encouraged." (quote 1:39).

M3: "Perhaps doing an activity with them on recycling, on the careful use of chemicals, implementing courses, will help us to better train our staff, so that they become more involved in caring for the environment." (quote 1:78).

M5: "Yes, we do have training on what products to use, which are non-chemical, biodegradable, and environmentally friendly, and we carry out supervision tasks such as turning off lights, processes, and procedures, and we always follow programs such as Green Teams for the hotel industry very closely." (quote 1:189).

M7: "Guests are offered the opportunity to join a loyalty program and the Green Dome program, which encourages customers not to request daily linen changes, thereby earning them redeemable points." (quote 1:223).

M10: "There are stickers inside the rooms that say 'Keep in mind' if you leave the water running, so many liters of water are wasted, to try to raise awareness that they should use the water that is obviously required when they are showering, or when they flush the toilet, or even for cleaning the room." (quote 1:296).

Finally, the managers stated that the shift towards a circular economy must begin with their own education, and that they should then share this knowledge with their employees, as they were not aware of the issue.

M5: "Having knowledge of what currently applies." (quote 1:177).

M6: "It's okay, it's our land, if they teach us how to teach our collaborators, there will be a better quality of life." (quote 1:408).

M11: "Train me first so that I can then teach them." (quote 1:312).

They point out that through formal and informal training and education of their employees (with awareness campaigns, efficient use of resources, recycling and waste separation activities, courses, proper handling of toxic waste, and mass advertising

campaigns) and guests (through informational brochures and posters inside the rooms) it is possible to generate awareness and change habits in favor of the environment.

3.4 Content Analysis

The content analysis identified 602 citations, and the 1165 codes took into account key expressions. To facilitate data interpretation, the codes were organized and classified into ten groups: 1) Human capital of employees; 2) Human capital of managers; 3) Eco-innovation; 4) Circular economy strategies; 5) Perception of the circular economy; 6) Education; 7) Economic problems; 8) Social problems; 9) Environmental problems; and 10) Participation of the hotel sector (social-environmental). The first five groups are of interest as they relate to the objectives of this article. Finally, these codes were classified into 21 categories. The five groups and the categories are shown in Table 5 (see Table 5).

Table 5. Groups/Categories of Human Capital, Eco-Innovation and the Circular Economy

Group 1	Group 2	Group 3	Group 4	Group 5
Human Capital (of Employees)	**Human Capital (of Managers)**	**Eco-Innovation**	**Strategies Aligned with the Circular Economy**	**Perception of the Circular Economy**
Employee training and education	Present and future actions	Employee training and education	Strategic alliances	Positive perception
Awareness	Anthropocentrism	Environmental certifications	Guest awareness	Negative perception
Environmental concern	Environmental concern	Digitalization	Digitalization	
Recycling and waste separation	Opinion in favor of environmental protection	Eco-innovative products and services	Recycling and waste separation	
Human resources management	Human resources management	Clean energy	Clean energy	
	Circular economy law	New technologies	New technologies	
	Responsibility	Efficient use of resources	Efficient use of resources	
			Framework of the R's	

Source: Prepared by the authors based on results from ATLAS.ti 22.

The managers' opinions highlight relevant points for promoting the circular economy in these companies and serve as a basis for identifying connections among the variables under study. (The citation number generated in ATLAS.ti 22 is attached.)

Group 1. Human capital (of employees)

1. Employee training and education: Ongoing training and education of workers.

   M3: "Implementing programs helps us to better train our staff, so that they become more involved in caring for the environment." (quote 1:78).

   M9: "Each department chief trains their team, raising awareness among workers." (quote 1:253).

2. Awareness: Raising awareness through activities such as recycling.

   M1: "Through the dynamics we have, month after month, of these community wellness activities, we raise awareness of this issue, not only through a document or an image, but by transferring them so that people can see..." (quote 1:22).

3. Environmental concern: Concern about environmental issues across generations of employees is driving changes in their behavior.

   M1: "We see it and suffer it every day, there are more and more of us traveling around our city." (quote 1:3).

   M4: "Fortunately, the fact that different generations are working together in this case reminds us of the importance of using more cardboard bags for breakfast. We also deal a lot with the fact that people are saying, 'Hey, we're throwing away too much plastic'... What can we do?... These are initiatives that stem from the concern of these different generations that come together to work..." (quote 1:143 and 1:144).

4. Recycling and waste separation.

   M7: "As for employees, we implemented a recycling and waste separation program (the proceeds from which are used to make purchases for employees at the end of the year). Supplies such as avocado peel straws." (quote 1:224).

   M10: "For example, at the hotel, we try to separate cans and plastics from the rest of the waste, such as paper or boxes, and what do we do? We collect the plastic and aluminum and take it to the recycler, and with that money... we use to buy

them shoes. It's a way to motivate them, because they know that something good comes out of it for them if they do it." (quote 1:295).

5. Human resources management: Human resources are a source of creativity and potential for making a change.

   M1: "It can be very difficult for them to adapt to certain things, in terms of procedure, this and that, but they are really very creative. So, I believe that we have a lot of potential to really make a change, I repeat, from our core." (quote 1:390).

Group 2. Human capital (of managers)

6. Actions: These are the actions that companies take to address environmental and social problems: 1) Waste separation and recycling; 2) Monitoring tasks; 3) Cost reduction and environmental impact reduction; 4) Inclusion; 5) Donations.

   Future actions: In environmental terms, they express the need to implement a work plan based on previous studies, establish parameters and deadlines for the objectives, the amount to invest, and the economic-environmental return, change procedures, and increase government participation through education, coordination, knowledge, and dissemination.

7. Anthropocentrism: At this point, some managers indicate that there are no serious economic or environmental problems, and their focus is on competing with the maquiladora industry for personnel.

   M6: "I don't see any economic problems; there is plenty of work here, but there is staff turnover." (quote 1:197). "There is no pollution. I am from Mexico City, and there are problems there, but here the industry does not cause environmental damage. I always had allergies there, but here it has not affected me. It does not affect me." (quote 1:485).

   M11: "There are no economic problems. Compared to Spain, where the economy collapsed, nothing has happened here..." (quote 1:300).

8. Environmental concern: Managers express their concerns about environmental issues.

   M1: "There are more and more of us." (quote 1:3).

   M4: "We are destroying the planet." (quote 1:144).

M7: "There is no culture of water." (quote 1:437).

M9: "Something is missing." (quote 1:249).

9. Opinion in favor of environmental protection: At this point, the managers agree that environmental stewardship should be a learning experience for everyone and that it is necessary to know what currently applies to this issue, and they state the following.

   M4: "We try to be kind to our environment." (quote 1:146).

10. Human Resources Management: They indicate that they carry out activities with their employees to help them recognize the importance of the environment, as well as implementing courses and seeking closer relationships with workers to achieve better results in environmental matters.

    M1: "Community well-being…and may the city's needs be met." (quote 1:22).

    M13: "Do it from within the company, offer courses and education in the workplace." (1:366).

11. Circular economy law: regulations should be established, and these guidelines should apply to everyone; it is also important to encourage the introduction of clean energy in this sector.

    M3: "Above all, there must be more regulation, and guidelines must be established in conjunction with the government to implement an efficient program…" (quote 1:398).

12. Responsibility: They recognize that not everything depends on the government; each individual must drive change in habits, motivate, and educate so that families instill care for the social environment and the natural world.

    M1: "I mean, it's not all responsibility to the government, of course, but also down to each of us as responsible citizens…" (quote 1:387).

Group 3. Eco-innovation

13. Employee training and education: Ongoing training is provided on handling chemicals, recycling and waste separation, room cleaning procedures, and the efficient use of water and energy.

M5: "If we have training, what products to use, that are not chemical, that are biodegradable, that are environmentally friendly, and we carry out supervision tasks such as turning off lights, processes, procedures, and they always follow programs such as Green Teams for the hotel industry very closely." (quote 1:189).

M10: "Point one, because when they bring their work supplies, they are all environmentally friendly, they know that, for example, a certain amount of water and product must be used to wash and clean a room, and not because they are trying to save money, but because they are trying to save water. They also turn off the lights; the lights must be turned off, and they must use natural light when cleaning, details like that." (quote 1:294).

M12: "Everyone who joined the company was given training on how to properly wash mops and equipment, how to wash linens properly…" (quote 1:529).

14. Environmental certifications: They state that they comply with environmental regulations, and some have Biosphere certification and sustainability studies from 2020.

M2: "We have Biosphere certification and are conducting sustainability studies in 2020." (quote 1:456).

M7: "We comply with the environmental and psychological standards required of us…" (quote 1:217).

15. Digitalization: Through digitization, they have eliminated paper from many of their procedures, used QR codes for menus, and registered customers via mobile phones.

16. Eco-innovative products and services: Biodegradable supplies, online reservation and payment, energy-saving LED light bulbs, water dispensers on each floor, air dryers, environmentally friendly cleaning products, a water laboratory, and the room key on your cell phone.

M4: "We are coming for a significant investment in the coming months, and it is regarding keys… with this wave of Covid, there was an initiative in which, precisely so as not to touch things and avoid spreading the virus, check-in is now done online, and your key is on your cell phone…" (quote 1:137).

M7: "Supplies such as avocado peel straws." (quote 1:224).

17. Clean energy: There has been little progress on this issue; some hotels use solar energy to heat the pool and reverse osmosis to bottle their own water.

    M3: "At least to say, here with us we use solar panels to heat swimming pools, even if it's not a saving that we also have…" (quote 1:60). "If there are certain things that are already being done, such as the use of solar panels, the use of chemicals for the pool is logged in a logbook" (quote 1:87).

    M4: "The entire roof of our hotel is covered with solar panels. We've had them for two years now. In terms of energy, we are almost self-sufficient because 70% of the electricity we consume comes from our solar panels…" (quote 1:447).

    M5: "In terms of caring for the environment, we are definitely always monitoring what produces the most waste…" (quote 1:186). "…in recent years, we have invested in renewable energy through solar panels…" (quote 1:169).

18. New technologies: Smart floors with light sensors, motion-monitoring systems, and mobile applications for reservations, payments, and customer check-out.
19. Efficient use of resources: They focus on saving detergents, water, and energy; efficient use of washing machines; monitoring equipment through a logbook; and establishing cleaning procedures and processes.

Group 4. Strategies aligned with the circular economy

20. Strategic alliances: With the maquiladora industry, since it is their main client, and at the same time, they jointly carry out actions in favor of the community and the environment.
21. Guest awareness: Through information leaflets, guests are encouraged not to request daily room cleaning or linen changes, thereby reducing water, detergent, and energy consumption.

    M1: "We have a sustainability card in the rooms as part of a program, and if the guest leaves the card on the bed, it means that they do not want their linens changed during their stay." (quote 1:23).

    M2: "Guests are made aware of the amount of water consumed based on the length of their shower through information provided in each room (informative awareness)." (quote 1:40).

22. Digitalization

    M5: "We had the opportunity to take advantage of technology to eliminate everything related to printed paper at check-in." (quote 1:194).

    M6: "A QR code is used for the menu." (quote 1:214).

23. Recycling and waste separation: An important point is that they recognize the value of trash and believe that by recycling cardboard, cans, and paper, they obtain resources for the employee of the month event.

    M2: "Recycling and separation of organic and inorganic waste are encouraged." (quote 1:29).

    M3: "At least here in our hotel, we run recycling programs, we check chemicals, we recycle cardboard, we try to reuse products that can be useful to us, and we try to reduce pollution because it's a very serious problem, not just here in the city, but all over the world." (quote 1:481).

    M8: "We should value waste, waste is gold, and take advantage of it to generate energy, control the companies that are a monopoly in the city." (quote 1:236).

24. Clean energy

    M7: "Energy savers (LED lights) were introduced." (quote 1:385)

    M3: "We use solar panels to heat swimming pools…" (quote 1:60).

25. New technologies: They consider investing in new technologies a way to generate profitability and maintain their image as a socially responsible company.

26. Efficient use of resources: Its main objective is to lower costs through more efficient, renewable energy sources and new technologies. Therefore, its actions are geared towards using less energy, optimizing processes, reducing water consumption, decreasing the use of toxic chemicals, and reducing electricity consumption, pollution, and plastic waste.

    M1: "And yes, of course, as a socially responsible company, I reiterate that we are monitoring the teams to ensure they are working efficiently…" (quote 1:19).

27. Framework of the R's: Actions such as recycling waste, recirculating and reusing water and products, and replacing pumps and systems.

Group 5. Perception of the circular economy

28. Positive perception: They recognize that it is a benefit for everyone, that it is good and necessary to implement it to go hand in hand with caring for the environment, and are totally in favor of it being possible.

    M1: "So, I am definitely in favor of and supportive of making a change, if we can do it..." (quote 1:389).

    M3: "I strongly agree that all these types of processes should be implemented because they help the community more than anything else; they help us feel good about our city. I view it favorably; we just need to look at it and implement it in each company." (quote 1:70).

29. Negative perception: They also point out that it is a new concept that will take time to adapt to; the change will not be so fast because we are not prepared, and it cannot be changed overnight.

3.5 Key Connections Between the Identified Categories

According to the content analysis, Figure 5 shows the key connections between the following categories:

a) Employee human capital and eco-innovation in training and education to optimize the use of energy, water, and resources.

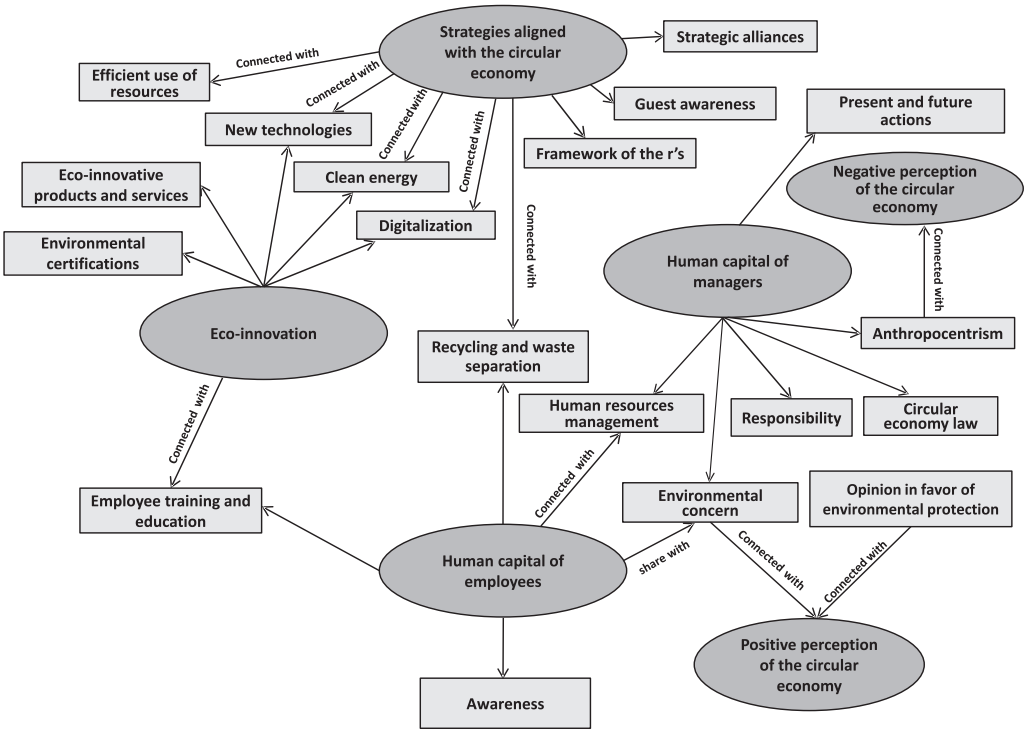
b) The human capital of managers and employees who share their concern for the environment.

c) Managers' human capital and a positive perception of the circular economy in the categories of environmental concern and environmental stewardship.

d) Managers' human capital and a negative perception of the circular economy in the anthropocentric category may influence their ability to adapt to change.

e) Eco-innovations are identified as strategies aligned with the circular economy, including digitalization, efficient resource use, clean energy, and new technologies (see Figure 5).

Figure 5. Networks Between Human Capital, Eco-Innovation, and the Circular Economy



Source: Prepared by the authors based on results from ATLAS.ti 22.

The circular economy strategies accelerate business transitions, thereby reducing consumption of natural resources and materials, waste generation, and polluting emissions that harm the planet. Among the best-known are those integrated into the Ellen MacArthur Foundation's Resolve model (Ellen MacArthur Foundation, 2015), which comprises six strategies: 1) Introducing renewable energy and raw materials to enable ecosystem recovery; 2) Implementing the sharing economy to share assets and shift from being consumers to users; 3) Optimizing resource performance and establishing circular supply chains; 4) Closing the loops of materials and products through recycling, recovery, and remanufacturing; 5) Virtualizing products and digital services, and 6) Replacing inputs and technologies with renewable and biodegradable alternatives.

Further, we have the Rs framework, which prioritizes strategies by type. Those with a high level of circularity avoid the extraction of new materials, energy use, and waste generation. Therefore, refusing, rethinking, reusing, repairing, refurbishing, remanufacturing, reworking, recycling, and recovering are actions implemented to varying degrees in companies.

Based on the data analysis, the presence of strategies such as the following was observed: the efficient use of resources (water, energy, supplies) to reduce costs; recycling and waste separation activities; the introduction of solar energy in some areas; green purchasing; strategic alliances and collaborations between suppliers and customers; and community support through donations of linens, park cleanups, and involvement with civil associations, among other actions aligned with the circular economy. These actions are a starting point for companies in the hotel sector, where human capital is indispensable for driving the circular economy. Their participation in these companies is paramount; they represent the company's image to clients and bring creativity and the ability to deliver quality service, grounded in their experience, training, and education. Ultimately, they have the potential to drive the shift towards a circular economy. However, these companies need to increase their organizational eco-innovation, prioritizing the education, training, and certification of their human capital, conducting audits, establishing controls and monitoring systems, and disseminating their environmental policies. These factors reduce the negative environmental impact, promote the efficient use of resources, and foster a shift in mindset toward nature.

Finally, eco-innovation in the hotel sector is key to implementing circular economy strategies. However, the data indicates significant gaps in this area that companies must address. Among the most relevant is the lack of environmental certifications to monitor their progress in environmental protection. Staff training in environmental management is crucial, as well as entering new markets that demand green products and services.

In this context, the circular economy is a distant goal for companies in the hotel sector, as it proposes an economy where natural resources, energy, and water are used efficiently, new technologies are introduced to reduce emissions, waste, and pollution, and sustainable tourism fosters changes in the thinking, attitudes, and consumption habits of people in organizations, tourists, suppliers, and residents of these cities. Achieving this requires government participation through public policies that promote it through regulations, education, training, incentives, and financing, in line with the needs of the hotel sector in Tijuana and Ciudad Juárez.

4. Discussion

The results are consistent with the idea that, in operationally intensive services such as hospitality, the transition to a circular economy often begins with efficiency measures before evolving into process redesigns, circular purchasing, or business model changes. The literature on eco-innovation underlines that these trajectories respond to the double problem of externality (innovation plus environment) and to the combination of regulatory, technological, and market impulses (Rennings, 2000; Horbach et al., 2012).

In the article, circularity appears as a series of partial strategies (digitalization, waste separation, water/energy conservation) rather than a comprehensive transformation. This notion aligns with the criticism that many definitions and applications of the circular economy remain focused on the reduce-restore-recycle triad, omitting its systemic nature (governance, business models, the role of the consumer). Thus, the finding should not be interpreted as a failure, but rather as an early stage of transition, where internal capabilities and external signals have not yet aligned for a regime shift (Kirchherr et al., 2017).

From an applied economics perspective, this early phase is rational; medium-sized hotels tend to select projects with clearer private returns (reduced energy costs, lower water consumption, fewer inputs) and less technological/organizational uncertainty. The findings show that many managers consider cost-benefit-environmental analysis essential before investing in new technologies. The findings are consistent with evidence from international hotel chains, where the adoption of eco-innovations accelerates when managers perceive a competitive advantage or when external instruments are present to reduce risk, such as incentives, standards, or certifications. (Bohdanowicz, 2006; Menezes & Da Cunha, 2016).

Furthermore, according to the literature reviewed, this article makes a contribution by identifying human capital as a causal mechanism for eco-innovation to become a circular strategy (rather than isolated actions). This result aligns with the Natural-Resource-Based View, which understands sustainable competitive advantage as a function of internal capabilities for pollution prevention and sustainable development. In the hotel industry, such capabilities materialize in organizational routines: training, operational standards, monitoring, internal incentives, and environmental leadership (Hart, 1995). The evidence presented regarding the need for training others and for formal and informal education suggests a typical service-sector

bottleneck: circularity demands consistent behaviors from operational staff, middle management, and senior management, beyond investment in physical assets.

Studies of environmental management in the hotel industry show that, even when awareness exists, implementation depends on how green objectives are translated into practices and metrics within the organization (Bohdanowicz & Martinac, 2006).

In this sense, the article aligns with recent literature on green human resource management (Green HRM) and green human capital (GHC). Green recruitment, training, evaluation, and incentive policies strengthen environmental human capital. They also increase the likelihood of green innovation. This effect is mediated by human capital and environmental knowledge, and depends on managerial environmental concern. These factors help explain why managers interviewed show both pro-change and anthropocentric stances. Managerial differences act as an agency constraint on the adoption of green routines (Alreahi et al., 2022; Munawar et al., 2022; Meng et al., 2023).

However, the article identifies economic, cultural, and knowledge barriers, as well as limitations in specialized human capital. This pattern is consistent with international evidence: even in global supply chains, there are more barriers than incentives to eco-innovate, and motivations are driven by competitive advantages and reputation (Barakagira & Paapa, 2024; Holwerda et al., 2024).

In the hotel and tourism sectors, recent reviews indicate that empirical focus has been on water, energy, and waste, while circular procurement and eco-design lag. This operational bias aligns with the reported results: practices are concentrated on internal operations (efficient use, separation, and monitoring) rather than on redesigning offerings, circular contracts with suppliers, or industrial symbiosis (Bux & Amicarelli, 2022; Bittner et al., 2024).

Finally, the border context adds specific frictions. Managers cite insecurity, deficient urban infrastructure, cost pressures, labor competition from maquiladoras, and water and pollution problems. In terms of local economic policy, this matters because hotel circularity depends not only on the hotel itself but also on the urban ecosystem— security, mobility, services, regulation, waste management, and the availability of green suppliers (Pei et al., 2024).

5. Conclusions and Limitations

Eco-innovation in mid-sized hotels in Tijuana and Ciudad Juárez is incipient and heterogeneous, exhibiting a set of initial practices (recycling, waste separation, water/energy efficiency, digitalization, and some clean energy initiatives), but with uneven implementation across establishments. Qualitative evidence shows that the transition toward circular-economy-aligned strategies operates more as a portfolio of isolated actions than as a systemic change in the organizational model and value chain.

Among the most widespread practices are resource efficiency and control (water, energy, detergents, laundry/cleaning processes); waste separation and recovery (cardboard, aluminum, plastics) with internal incentives; digitalization to reduce paper and increase operational control and traceability; and guest awareness mechanisms (in-room messages, sustainability cards, points programs). The adoption of clean energy still appears to be a limited component. Some hotels report installing solar panels, but investment constraints limit their adoption until a cost-benefit analysis is conducted.

The overarching finding is that human capital (managerial and operational) is the central determinant for scaling up eco-innovation and, consequently, accelerating the adoption of a circular economy. Training, awareness, technological appropriation, and organizational culture appear as causal mechanisms in the narratives. A relevant interpretive tension is identified: managerial perceptions favorable to change (environmental awareness and willingness to innovate) coexist with expressions of anthropocentrism/relative denial of the problem, which can block the adoption and deepening of circular strategies.

The study shows that progress toward circularity requires internal capacities, enabling external conditions, effective regulation, incentives, regulatory dissemination, technical support, and coordination between the government and businesses, especially in urban border contexts where insecurity, the city's image, infrastructure, and industrial pressure affect tourism activity. In terms of its contribution, the work provides original evidence by explicitly linking human capital to eco-innovation and the circular economy from a managerial perspective in medium-sized hotels on the northern border, a sector of economic and environmental relevance. Finally, it is concluded that the circular economy is still a distant goal. To approach it, it is necessary to raise the level of organizational eco-innovation through environmental

certifications, audits, monitoring systems, continuous training, and environmental communication, as well as financing schemes and incentives aligned with economic and environmental returns.

Regarding limitations, the phenomenological approach with 14 interviews offers interpretive depth but limits statistical inference and generalization (results may be influenced by social desirability bias, with managers inclined to report more favorable views of their organization). Even so, it is appropriate for identifying mechanisms (human capital, eco-innovation, and circular strategies) and building hypotheses for future studies. Future work could: 1) Measure environmental performance with consumption and waste data, linking it to training and certifications; 2) Model the adoption of green technologies under financial constraints; 3) Evaluate how the perception of urban risk and the regional productive structure influence sustainable tourism and investment decisions and 4) Conducting comparative studies between international hotel chains and independent hotels, which definitively influence the adoption of sustainable practices.

References

Alreahi, M., Bujdosó, Z., Kabil, M., Akaak, A., Benkó, K. F., Setioningtyas, W. P., & Dávid, L. D. (2023). Green Human Resources Management in the Hotel Industry: A Systematic Review. Sustainability, 15(1), 99. https://doi.org/10.3390/su15010099

Álvarez-Gayou, J. (2003). Cómo hacer investigación cualitativa: fundamentos y metodología. Editorial Paidós Mexicana.

Barakagira, A., & Paapa, C. (2024). Green Practices Implementation for Environmental Sustainability by Five-Star Hotels in Kampala, Uganda. Environment, Development and Sustainability, 26(4), 9421–9437. https://doi.org/10.1007/s10668-023-03101-7

Bittner, N., Bakker, N., & Long, T. B. (2024). Circular Economy and the Hospitality Industry: A Comparison of the Netherlands and Indonesia. Journal of Cleaner Production, 444, 141253. https://doi.org/10.1016/j.jclepro.2024.141253

Bohdanowicz, P. (2006). Environmental Awareness and Initiatives in the Swedish and Polish Hotel Industries—Survey Results. International Journal of Hospitality Management, 25(4), 662–682. https://doi.org/10.1016/j.ijhm.2005.06.006

Bohdanowicz, P., & Martinac, I. (2007). Determinants and Benchmarking of Resource Consumption in Hotels: Case Study of Hilton International and Scandic in Europe. Energy and Buildings, 39(1), 82–95. https://doi.org/10.1016/j.enbuild.2006.05.005

Bux, C., & Amicarelli, V. (2022). Circular Economy and Sustainable Strategies in the Hospitality Industry: Current Trends and Empirical Implications. Tourism and Hospitality Research, 23(4), 624-636. https://doi.org/10.1177/14673584221119581

Ecco-Innovation Observatory (EIO). (2012). Ecco-Innovation Observatory: Methodological Report. Ecco-Innovation Observatory (EIO). https://tinyurl.com/5bsnyrma

Ellen MacArthur Foundation (2015). Delivering the Circular Economy: A Toolkit for Policymakers. Ellen MacArthur Foundation. https://ellenmacarthurfoundation.org/a-toolkit-for-policymakers

Hart, S. L. (1995). A Natural-Resource-Based View of the Firm. Academy of Management Review, 20(4), 986–1014. https://doi.org/10.2307/258963

Holwerda, H., Haanstra, W., & Braaksma, J. (2024). Operationalizing the Circular Economy: A Longitudinal Study on Sustained Circular Action. Sustainability, 16(14), 5874. https://doi.org/10.3390/su16145874

Horbach, J., Rammer, C., & Rennings, K. (2012). Determinants of Eco-Innovations by Type of Environmental Impact: The Role of Regulatory Push/Pull, Technology Push and Market Pull. Ecological Economics, 78, 112-122. https://doi.org/10.1016/j.ecolecon.2012.04.005

Izcara, S. (2007). Introducción al muestreo. Miguel Ángel Porrúa.

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the Circular Economy: An Analysis of 114 Definitions. Resources, Conservation and Recycling, 127, 221–232. https://doi.org/10.1016/j.resconrec.2017.09.005

Menezes, V. de O., & Da Cunha, S. K. (2016). Eco-Innovation in Global Hotel Chains: Designs, Barriers, Incentives and Motivations. Brazilian Business Review, 13(5), 108–128. https://doi.org/10.15728/bbr.2016.13.5.5

Meng, C., Shi, D., & Wang, B. (2023). The Impact of Green Human Capital of Entrepreneur on Enterprise Green Innovation: A Study Based on the Theory of Pro-Environmental Behavior. Finance Research Letters, 58, 104453. https://doi.org/10.1016/j.frl.2023.104453

Munawar, S., Yousaf, H. Q., Ahmed, M., & Rehman, S. (2022). Effects of Green Human Resource Management on Green Innovation through Green Human Capital, Environmental Knowledge, and Managerial Environmental Concern. Journal of Hospitality and Tourism Management, 52, 141–150. https://doi.org/10.1016/j.jhtm.2022.06.009

Pei, X., Italia, M., & Melazzini, M. (2024). Enhancing Circular Economy Practices in the Furniture Industry through Circular Design Strategies. Sustainability, 16(15), 6544. https://doi.org/10.3390/su16156544

Rennings, K. (2000). Redefining Innovation: Eco-Innovation Research and the Contribution from Ecological Economics. Ecological Economics, 32(2), 319–332. https://doi.org/10.1016/S0921-8009(99)00112-3

Scarpellini, S., Valero-Gil, J., Moneva, J. & Andreaus, M. (2020). Environmental Management Capabilities for a Circular Eco-Innovation. Business Strategy and the Environment, 29 (5), 1850-1864. https://doi.org/10.1002/bse.2472

Torres, F., & Grossman, F. (2012). El proceso de innovación en el sector de alojamiento turístico mexicano. Estudios y perspectivas en turismo, 21(2), 372–387. https://www.redalyc.org/articulo.oa?id=180721638005

Velázquez, J., & Vargas, E. (2014). Eco-innovación en turismo: una aproximación al estado de la cuestión. Gestión y ambiente, 17(1), 191-207. https://www.redalyc.org/pdf/1694/169432879012.pdf

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Geoeconomic Strategy for Exportadora de Sal (ESSA): Sustainable Competitive Advantage, Market Diversification and Green Industrial Policy

Estrategia geoeconómica para Exportadora de Sal (ESSA): ventaja competitiva sostenible, diversificación de mercados y política industrial verde

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Abstract

The State-owned enterprise (SOE) Exportadora de Sal, S.A. de C.V. (ESSA) can leverage its scale, product quality, and environmental benefits in the global commodity market. Following the company's full nationalization, the paper reassesses ESSA's competitive position and proposes strategies for geographic diversification, product development, and improved governance. The analysis integrates various tools—e.g., the resource-based view, the natural-resource-based view, etc.—within a qualitative explanatory case-study design. The empirical strategy employs source triangulation and strategic tools—such as SWOT (strengths, weaknesses, opportunities, and threats) analysis and Porter's Five Forces—for diagnosis, including prospective scenarios for 2025–2035. The results show that ESSA's strategic core is underpinned by a combination of scale, high-purity solar salt, favorable geoclimatic conditions, accumulated technical expertise, and a relatively low-carbon production process. ESSA's strengths and weaknesses are highlighted, concluding that it can transition into a model of sustainability for State ownership in Latin America by focusing on natural advantages, market diversification, and improved logistics and governance, thereby advancing Mexico's green industrial policy.

Resumen

La empresa estatal Exportadora de Sal, S.A. de C.V. (ESSA) puede aprovechar su escala, la calidad de sus productos y sus beneficios medioambientales en el mercado mundial de materias primas. Tras la nacionalización total de la empresa, el artículo reevalúa su posición competitiva y propone estrategias de diversificación geográfica, desarrollo de productos y mejora de la gobernanza. El análisis integra distintos instrumentos —por ejemplo, la perspectiva basada en los recursos, la perspectiva basada en los recursos naturales, etc.— en un diseño cualitativo de estudio de caso explicativo. La estrategia empírica emplea la triangulación de fuentes y herramientas estratégicas —como el análisis DAFO (debilidades, amenazas, fortalezas y oportunidades) y las Cinco Fuerzas de Porter— para el diagnóstico, incluidas futuras situaciones hipotéticas para el periodo 2025-2035. Los resultados muestran que el núcleo estratégico de ESSA se sustenta en una combinación de escala, sal solar de alta pureza, condiciones geoclimáticas favorables, experiencia técnica acumulada y un proceso de producción con emisiones de carbono relativamente bajas. Tras destacar sus fortalezas y examinar sus debilidades, se concluye que ESSA puede convertirse en un modelo de sostenibilidad para la propiedad estatal en América Latina, centrándose en las ventajas naturales, la diversificación de mercados y la mejora de la logística y la gobernanza, y así impulsar la política industrial verde de México.

KEYWORDS / PALABRAS CLAVE

Competitiveness, sustainability, industrial policy, international trade, State-owned enterprises (SOEs) / Competitividad, sostenibilidad, política industrial, comercio internacional, empresas estatales.

JEL Classification / Clasificación JEL: *F13; L21; Q56; M16.*

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1. Introduction

Exportadora de Sal, S.A. de C.V. (ESSA), located in Guerrero Negro, Baja California Sur, operates the world's largest solar-salt complex and publicly reports production capacity above eight million tons annually. Its scale, product purity, and low-energy solar evaporation process make it a strategically significant industrial asset for Mexico and an analytically rich case for examining how State ownership, sustainability, and competitiveness can be aligned in global commodity markets.

The company's full nationalization in 2024 reopened an old but unresolved Latin American question: Under what institutional conditions can a State-owned enterprise (SOE) compete internationally while also serving broader industrial policy, regional development, and ecological transition goals? ESSA matters precisely because it does not fit neatly into the conventional stereotype of the inefficient public firm. Its historical export discipline, strong product reputation in the Pacific basin, and environmentally favorable production model suggest a more nuanced reality.

At the same time, ESSA is not free from structural constraints. Its commercial exposure remains highly concentrated in a limited number of external markets; its delivered competitiveness is heavily shaped by port and freight performance; and its current product mix is still dominated by bulk industrial salt. These issues are strategically relevant because future competition will be shaped not only by output volumes, but also by traceability, environmental compliance, logistics reliability, and the capacity to move into higher-value applications.

This article begins with a simple proposition: ESSA possesses the material and organizational conditions to become a competitive green SOE, but that outcome is not automatic. It depends on whether the firm can transform its natural endowments into coordinated capabilities in logistics, certification, market intelligence, governance, and portfolio upgrading.

The contribution of the article is fourfold. First, it refines the theoretical framing of ESSA by reducing generic conceptual discussion and concentrating on how the Resource-Based View (RBV), the Natural-Resource-Based View (NRBV), dynamic capabilities, and institutional analysis illuminate the case. Second, it synthesizes the descriptive discussion of the global salt market to sharpen the strategic diagnosis. Third, it makes the relationship between diagnostic findings and the proposed recommendations more explicit. Fourth, it updates the literature by drawing on recent scholarship on SOEs, sustainability, and green industrial policy.

The guiding research questions are the following:

- Which firm-specific resources and sustainability attributes underpin ESSA's competitive position?
- How do governance and institutional arrangements condition ESSA's capacity to adapt, diversify, and upgrade?
- Which geographic and product diversification pathways are most plausible for strengthening ESSA's strategic autonomy between 2025 and 2035?
- What broader lessons does ESSA offer for Latin American debates on SOEs and green industrial policy?

The remainder of the article is organized as follows. Section 2 presents an integrated theoretical framework. Section 3 explains the methodology. Section 4 develops the strategic diagnosis and proposes an action agenda. Section 5 discusses the implications for SOEs and industrial policy in Latin America, and the conclusion is presented in section 6.

2. Theoretical Framework

Rather than treating the main theories as isolated conceptual blocks, this section uses them as complementary lenses for interpreting ESSA's strategic position. The objective is not to restate the full literature, but to show how each framework clarifies a specific dimension of the case.

2.1 RBV and NRBV: from Resource Endowment to Ecological Advantage

The Resource-Based View (RBV) explains competitive advantage through the possession and organization of valuable, rare, and difficult-to-imitate and difficult-to-substitute resources (Barney, 1991). In ESSA's case, the relevant resources are not abstract. They include exceptional geoclimatic conditions for solar evaporation, industrial-scale salt flats, consistently high product purity, specialized technical know-how accumulated over decades, and a production model with relatively low energy intensity.

The Natural-Resource-Based View (NRBV) extends this logic by arguing that environmental performance can itself become a source of competitive advantage when it improves legitimacy, efficiency, and market access (Hart, 1995). ESSA's solar process is important here because its ecological profile is not merely reputational: in more demanding markets, low-carbon production, traceability, and environmental compliance increasingly function as commercial qualifiers. For ESSA, the strategic issue is therefore not simply whether it has valuable resources, but whether those resources can develop into a credible sustainability-based market position.

2.2 Dynamic Capabilities and Strategic Adaptation

RBV and NRBV help explain why ESSA is well-positioned, but they are less effective at explaining how the firm should adapt to changing market conditions. Dynamic capabilities theory addresses that problem by focusing on the firm's capacity to sense opportunities, seize them, and reconfigure assets and routines under uncertainty (Teece et al., 1997). This perspective is especially useful for ESSA because commodity competition is no longer determined solely by extraction or production efficiency; it also depends on the ability to respond to freight volatility, certification requirements, sustainability reporting demands, and changes in industrial demand.

Recent work on dynamic capabilities for sustainability suggests that organizational adaptation increasingly depends on integrating sustainability-oriented innovation and stakeholder coordination (Ortiz-Avram et al., 2024). In practical terms, ESSA's challenge is to develop capabilities in three connected areas: market sensing for new destinations and applications; strategic seizing through certification, commercial alliances, and product differentiation; and organizational transformation through logistics modernization, traceability systems, and managerial professionalization.

2.3 Institutional Governance and the Return of Green Industrial Policy

Institutional economics highlights that organizations do not perform in a vacuum. Their outcomes are shaped by formal rules, incentive systems, monitoring mechanisms, and the degree to which governance arrangements reduce transaction costs and protect long-term objectives (North, 1990). This dimension is crucial for

ESSA because State ownership can either enhance strategic coordination or amplify rigidities, depending on whether governance is mission-oriented, professionalized, and insulated from short-term political interference.

Recent scholarship has revived industrial policy as a legitimate tool for building resilient supply chains, supporting decarbonization, and positioning national firms in strategic sectors (Benito & Meyer, 2024; Allan & Nahm, 2025). At the same time, newer work on ownership structures and green industrial policy argues that public and hybrid ownership forms can be significative institutional vehicles for sustainability-oriented transformation when incentives, accountability, and strategic clarity are aligned (Amankwah-Amoah, 2024). From this angle, ESSA should be understood not only as a commercial exporter of salt but as a possible platform through which the Mexican State can combine competitiveness, territorial development, and green transition objectives.

Considered as a whole, these perspectives suggest an integrated proposition: ESSA's long-term performance will depend less on the mere possession of natural advantages than on its ability to organize those advantages through adaptive capabilities and credible public governance.

3. Methodology

The article uses a qualitative explanatory case-study design. This approach is appropriate because the objective is not to estimate causal effects statistically, but to identify plausible strategic mechanisms linking resources, environmental attributes, governance arrangements, and market positioning (Yin, 2018).

The empirical strategy relies on source triangulation. The evidence base combines: (i) academic literature on RBV, NRBV, dynamic capabilities, industrial policy, and SOEs; (ii) official public information on ESSA and the Mexican government; (iii) recent institutional and sectoral materials on sustainability and green industrial policy; and (iv) market-oriented information on salt production, logistics, and downstream demand.

The analysis proceeded in four steps. First, the case was coded around its strategic resources, organizational capabilities, market exposure, and governance constraints. Second, the global salt environment was synthesized to identify opportunities and external pressures. Third, strategic tools—SWOT, Porter's Five Forces, and scenario

analysis—were applied to structure the diagnosis. Fourth, the main findings were connected directly to a prioritized strategic agenda for 2025–2035.

Two limitations must be stated. The first is the lack of access to internal financial and operational data, which prevents highly granular benchmarking. The second is the absence of elite interviews with managers, regulators, and buyers. For that reason, the conclusions should be read as analytically grounded strategic inferences rather than as a claim to exhaustive firm-level measurement.

4. Results and Strategic Analysis

4.1 Global Salt Market Conditions and ESSA's External Environment

The global salt market is mature, but it remains strategically significant because it supplies essential inputs to chlor-alkali production, water treatment, food processing, de-icing, pharmaceuticals, and selected energy applications. Market competition, therefore, combines commodity-like price pressure with segment-specific quality requirements. In that context, ESSA does not compete only on volume; it also competes on purity, reliability, logistics and, increasingly, sustainability.

Public and industry information indicate three broad structural features relevant to ESSA. First, production is geographically concentrated, with Asian producers dominating total volume, although not necessarily the premium high-purity segment. Second, freight and port performance remain decisive for delivered competitiveness, especially in long-distance maritime trade. Third, sustainability-related requirements are becoming more salient in industrial procurement and in regulatory environments where buyers demand clearer information on origin, environmental performance, and compliance.

To reduce descriptive repetition, Table 1 summarizes the main market trends and their strategic implications for ESSA (see Table 1).

Table 1. Main Market Trends and their Strategic Implications for ESSA

Market trend	Analytical significance	Implication for ESSA
Greater emphasis on high-purity industrial inputs.	Quality-sensitive segments reward consistency and lower contamination risk.	ESSA's product quality supports upgrading beyond bulk salt.
More demanding environmental and traceability expectations.	Sustainability increasingly affects market access and supplier selection.	Certification and carbon-footprint disclosure can become differentiators.
Persistent logistics volatility.	Freight costs and port reliability materially affect delivered price competitiveness.	Infrastructure and shipping strategy are now central, not secondary.
Concentration of industrial buyers.	Large downstream customers retain bargaining power in contract negotiations.	ESSA needs to diversify its customer base and strengthen long-term contracting.
Re-emergence of industrial policy and resilient supply-chain strategies.	Governments increasingly seek secure and lower-carbon inputs for strategic sectors.	ESSA can position itself within green industrial and supply-chain agendas.

Source: Prepared by the author.

4.2 Strategic Diagnosis of ESSA

4.2.1 Resource Profile and Competitive Position

ESSA's strategic profile is anchored in a combination of large-scale solar evaporation, high product purity, accumulated operational know-how, and a comparatively favorable ecological profile. From an RBV perspective, these characteristics constitute a defensible bundle of valuable, hard-to-replicate resources. The point is not that ESSA faces no competitors, but that few competitors can reproduce the same combination of scale, purity, and process advantages under comparable natural conditions.

4.2.2 Sustainability as a Market Asset Rather than a Narrative Add-On

An important strength of ESSA is that sustainability is embedded in the production process rather than tacked on. Solar evaporation reduces energy intensity relative to more carbon-intensive alternatives, which can support both reputational

legitimacy and market access. However, this advantage will remain underexploited unless it is translated into measurable indicators, certifications, and buyer-facing documentation. In other words, environmental advantage becomes strategic only when it is verified, communicated, and contractually valued.

4.2.3 Operational Efficiency Versus Delivered-Cost Vulnerability

ESSA's production logic is structurally efficient, but delivered competitiveness depends on much more than ex-works cost. Maritime freight, cargo handling, dredging needs, shipping coordination, and port efficiency all affect the final commercial result. All this means that a firm can be operationally efficient at the plant and still lose margin or market flexibility at the logistics stage. For ESSA, logistics is therefore a core strategic variable, not a back-end operational issue.

4.2.4 Excessive Market Concentration

ESSA's export structure remains highly dependent on a small set of external markets, especially in East Asia and North America. That concentration has historically provided scale and continuity, but it also increases exposure to regulatory changes, freight disruptions, industrial downturns, and buyer bargaining pressure. Commercial concentration is thus one of the firm's clearest strategic vulnerabilities.

4.2.5 Governance and Organizational Agility

The 2024 nationalization created a new opportunity to align ownership and strategy, but ownership consolidation alone does not guarantee better performance. What matters is whether governance arrangements produce managerial continuity, investment discipline, accountability, and faster decision-making. ESSA's strategic potential will depend heavily on whether public ownership is organized as a platform for long-term capability building rather than as an additional layer of administrative rigidity.

4.3 SWOT Synthesis

Table 2 summarizes the internal and external diagnoses. Presenting the SWOT as a matrix makes the strategic logic more explicit and avoids repetition across the narrative sections (see Table 2).

Table 2. SWOT Synthesis

Strengths • High-purity solar salt and large-scale production capacity. • Favorable geoclimatic conditions that are difficult to replicate. • Relatively low-energy and low-carbon production process. • Longstanding technical know-how and export experience.	**Weaknesses** • Heavy dependence on a narrow set of export markets. • Logistics and port constraints that weaken delivered competitiveness. • Limited product differentiation beyond bulk industrial salt. • Potential bureaucratic rigidities under public ownership.
Opportunities • Access to sustainability-sensitive markets in Europe and the Middle East. • Premium niches linked to pharmaceuticals, food processing, and specialized industrial uses. • Certification, traceability, and ESG reporting as commercial differentiators. • Alignment with Mexico's green industrial and supply-chain strategies.	**Threats** • Freight volatility and maritime disruption. • Powerful downstream buyers with contract leverage. • More demanding environmental and traceability regulations. • Competitive pressure from subsidized or scale-intensive producers.

Source: Prepared by the author.

4.4 Porter's Five Forces

Rivalry among existing competitors is moderate rather than extreme. Global salt markets are broad, but not all suppliers compete in the same quality segment. ESSA's real competitors are those capable of combining scale, reliable purity, and stable maritime delivery.

The threat of new entrants is low because large-scale solar salt production depends on an unusually favorable geographic location, long development periods, and substantial infrastructure requirements.

Supplier power is limited in the strict sense because ESSA's basic resource base depends primarily on natural conditions rather than on scarce upstream vendors. However, logistics service providers and shipping arrangements can become quasi-strategic bottlenecks.

Buyer power is high. Large industrial consumers can negotiate aggressively on price, quality standards, and delivery conditions, especially when export concentration reduces ESSA's outside options.

The threat of substitutes remains low in ESSA's core uses, but the firm should still monitor technological shifts in downstream industries and potential substitution in specific market niches.

4.5 Strategic Scenarios for 2025–2035

The scenario exercise is designed to clarify the consequences of strategic inertia versus capability building.

Base scenario. ESSA preserves its current export structure and improves only incrementally. This path preserves short-term continuity but leaves the firm exposed to concentration risk and logistics vulnerabilities.

Moderate diversification scenario. ESSA enters selected new markets, secures environmental certifications, and improves contractual and logistics management. This scenario reduces concentration risk without requiring a full organizational overhaul.

Transformative green-upgrading scenario. ESSA combines diversification with logistics modernization, traceability systems, portfolio upgrading, and governance reform. This scenario is the most consistent with the firm's potential to act as a competitive green SOE.

4.6 Linking the Diagnosis to the Strategic Agenda

One of the manuscript's original weaknesses was that some recommendations were not explicitly tied to the strategic diagnosis. Table 3 corrects that problem by mapping the main findings to corresponding responses (see Table 3).

Table 3. Diagnosis and the Strategic Agenda

Key Finding	Why it Matters	Priority Recommendation
High product purity and a favorable solar production process.	These are the foundations of differentiation in quality-sensitive and sustainability-sensitive segments.	Position ESSA as a certified low-carbon supplier and develop premium market narratives.
Export concentration in a small number of destinations.	Commercial dependence weakens bargaining power and increases exposure to external shocks.	Pursue gradual diversification toward Europe, the Middle East, and selected niche markets.
Logistics materially shape delivered competitiveness.	Plant-level efficiency cannot compensate for persistent port and freight bottlenecks.	Prioritize port upgrading, freight strategy, and long-term shipping coordination.
Environmental advantage is real but insufficiently monetized.	Without traceability and measurable sustainability indicators, the advantage remains latent.	Adopt ISO 14001-type systems, life-cycle metrics, and buyer-facing reporting.
Public ownership creates both opportunity and risk.	Strategic coordination improves only if governance becomes more agile and accountable.	Strengthen professional management, performance targets, and board-level strategic oversight.
Bulk commodity sales still dominate the current portfolio.	Limited product differentiation constrains margins and strategic autonomy.	Develop selected higher-value industrial, food-grade, and pharmaceutical applications.

Source: Prepared by the author.

4.7 Proposed Strategic Agenda

Building on the diagnosis, the recommended strategy for ESSA during 2025–2035 should rest on five coordinated priorities:

- Geographic diversification through phased entry into sustainability-sensitive and contract-based markets beyond the traditional Pacific core.
- Product upgrading toward higher-value industrial, food-grade, and pharmaceutical applications that reward purity and process reliability.
- Certification and traceability systems that convert ESSA's ecological profile into a verifiable commercial asset.

- Integrated logistics modernization, including port infrastructure, cargo handling, and shipping strategy.
- Governance reform centered on professional management, strategic planning, and accountability mechanisms compatible with public ownership.

These priorities are mutually reinforcing. Diversification without logistics reform would be fragile; certification without market development would be under-monetized; and product upgrading without governance reform would be difficult to execute. The strategic problem is therefore systemic rather than sequential.

5. Discussion

5.1 From Passive Comparative Advantage to Active Strategic Advantage

The central analytical lesson of the case is that ESSA's natural advantages are substantial but insufficient on their own. A large salt flat, favorable climate, and high purity create a strong starting point, yet they do not automatically generate long-term strategic autonomy. That autonomy depends on the firm's ability to organize those assets through adaptive capabilities, institutional coherence, and forward-looking market positioning.

This distinction matters for broader development debates. Latin American commodity producers often rely on resource abundance as if it were self-sustaining. ESSA illustrates a more demanding reality: resource endowments become durable strategic assets only when they are connected to logistics, certification, innovation, and governance. In that sense, the company's next stage of competitiveness is organizational rather than geological.

5.2 ESSA as a Case of Sustainability-Oriented State Ownership

Recent scholarship has become more attentive to the role of government-owned and SOEs in sustainability transitions. The emerging consensus is not that public

ownership is automatically superior, but that State ownership can be advantageous when it is linked to credible missions, long-term horizons, and governance structures that align strategy with accountability. ESSA fits that debate particularly well because it operates in a sector where environmental performance, supply-chain resilience, and industrial policy now intersect.

The firm, therefore, offers a concrete example of how public ownership can combine commercial viability with broader national goals. If public ownership is organized effectively, ESSA can support regional development, strengthen Mexico's standing in selected industrial chains, and contribute to a more credible green industrial policy agenda. If governance remains rigid or fragmented, however, the same ownership structure could suppress the agility needed for diversification and upgrading.

5.3 Implications for Latin America

Three regional implications follow. First, SOEs should not be assessed solely in terms of the binary opposition between efficiency and inefficiency; they should also be evaluated on whether governance enables strategic learning and sustainability upgrading. Second, ecological attributes can become sources of competitive advantage when they are institutionally translated into standards, certifications, and market access. Third, diversification should be understood not merely as a firm-level commercial tactic but as part of a wider industrial-policy effort to reduce dependence on narrow export structures.

For Latin America, the relevance of ESSA lies precisely in its hybrid nature. It is neither a classical heavy-industry SOE nor a purely private commodity exporter. It is a public firm with rare natural advantages, a tangible sustainability profile, and a realistic pathway toward capability-based upgrading. That combination makes it analytically and policy relevant beyond the Mexican case.

6. Conclusions

This article has argued that ESSA's strategic value lies beyond size. The company combines rare natural conditions, product quality and a relatively favorable ecological profile with the potential to become a more sophisticated actor in international salt markets. However, its future competitiveness will not be determined solely by its

resource endowment. It will depend on whether public ownership is translated into adaptive governance, logistics modernization, credible sustainability systems, and a disciplined diversification strategy.

Theoretically, the case confirms that RBV, NRBV, dynamic capabilities, and institutional analysis are more useful when deployed in combination than in isolation. Empirically, it shows that ESSA remains a strong producer, but its next stage of competitiveness requires organizational and strategic upgrading. From a policy standpoint, the company illustrates how a SOE can function as an instrument of green industrial policy—provided that mission, management, and accountability are aligned.

Future research should deepen the analysis through buyer interviews, trade-flow reconstruction, comparative benchmarking with other large salt producers, and closer examination of how sustainability metrics affect contract formation in industrial markets. These lines of inquiry would help move from strategic diagnosis toward more precise measurement of ESSA's commercial and policy impact.

In sum, ESSA has the components to become an emblematic competitive green SOE in Latin America. The decisive question is no longer whether the firm possesses strategic assets; it does. The question is whether those assets will be organized and governed in ways that transform exceptional natural potential into a durable strategic advantage.

References

Allan, B. B., & Nahm, J. (2025). Strategies of Green Industrial Policy: How States Position Firms in Global Supply Chains. American Political Science Review, 119(1), 420–434. https://doi.org/10.1017/S0003055424000364

Amankwah-Amoah, J. (2024). Sustainable Futures: Toward Institutionalizing Green Industrial Policy. Sustainable Development, 32(6), 7434–7446. https://doi.org/10.1002/sd.3095

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. Journal of Management, 17(1), 99–120. https://doi.org/10.1177/014920639101700108

Benito, G. R. G., & Meyer, K. E. (2024). Industrial Policy, Green Challenges, and International Business. Journal of International Business Studies, 55, 1093–1107. https://doi.org/10.1057/s41267-024-00722-6

Hart, S. L. (1995). A Natural-Resource-Based View of the Firm. *Academy of Management Review, 20*(4), 986–1014. https://doi.org/10.2307/258963

North, D. C. (1990). Institutions, Institutional Change and Economic Performance. Cambridge University Press. https://doi.org/10.1017/cbo9780511808678

Ortiz-Avram, D., Ovcharova, N., & Engelmann, A. (2024). Dynamic Capabilities for Sustainability: Toward a Typology Based on Dimensions of Sustainability-Oriented Innovation and Stakeholder Integration. Business Strategy and the Environment, 33(4), 2969–3004. https://doi.org/10.1002/bse.3630

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. Strategic Management Journal, 18(7), 509–533. http://www.jstor.org/stable/3088148

Yin, R. K. (2018). Case Study Research and Applications: Design and Methods (6th ed.). Sage.

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Barriers to Financing Access for SMEs in Morelos

Barreras de acceso al financiamiento para las mipymes morelenses

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Abstract

The objective of this article was to identify the barriers faced by micro, small, and medium-sized enterprises (MSMEs) in the state of Morelos, Mexico, when accessing external financing. Fieldwork was conducted to collect data, applying 236 surveys to volunteer business owners in the city of Cuernavaca, capital city of the state. A descriptive and correlational analysis was performed. The most relevant findings confirm that MSMEs in Morelos face restricted access to long-term bank loans due to their recent history, high interest rates, and an adverse macroeconomic environment.

Resumen

El objetivo de este artículo fue analizar las barreras que enfrentan las mipymes en el estado de Morelos, México, en el acceso a fuentes de financiamiento externas. Se realizó un trabajo de campo con el fin de recolectar datos; se aplicaron 236 encuestas a empresarios voluntarios de la ciudad de Cuernavaca, capital del estado. Se realizó un análisis descriptivo y correlacional. Los hallazgos más relevantes permiten confirmar que las mipymes morelenses enfrentan un acceso restringido a créditos bancarios de largo plazo, como consecuencia de su breve antigüedad, altas tasas de interés y un entorno macroeconómico adverso.

KEYWORDS / PALABRAS CLAVE

SMEs, financing, loans, banking / mipymes, financiamiento, créditos, banca.

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1. Introducción

De acuerdo con el Inegi (2015), la falta de crédito se constituye en el problema principal que afecta el crecimiento y la permanencia de las empresas. Esta situación continúa presente en años recientes. En la Encuesta Nacional de Financiamiento de las Empresas, Enafin (Inegi y CNBV, 2021), se muestra que, en ese año, el 69.9% de las empresas no solicitó financiamiento y que la falta de éste fue uno de los principales factores que su crecimiento en 2020, lo cual fue señalado por el 32.5% de las compañías encuestadas.

Este problema trae como consecuencia el racionamiento de crédito, el cual obstaculiza que las empresas realicen innovaciones e inversiones que les permitan ampliar la capacidad productiva, lo que a su vez limita su acceso a los mercados. El bajo nivel de desarrollo de esquemas de financiamiento para emprendimientos, en particular el capital de riesgo, representa un obstáculo para la creación y el dinamismo empresarial (Ferraro 2011).

En el caso de México, este racionamiento de crédito trae como consecuencia, entre otros aspectos, que solo el 16.5% de las empresas lograron obtener un crédito; en lo que se refiere a las mipyme, el 84.2% de microempresas —71.6% de las pequeñas y 61.3% de las medianas— no pudieron financiarse en instituciones del sistema financiero (Dini y Stumpo, 2020).

Saavedra y León (2014) señalan que, pese a los esfuerzos de las instituciones financieras públicas y privadas en América Latina para fortalecer el apoyo a las mipymes, los instrumentos disponibles aún se encuentran en una fase incipiente y su penetración en el sector es limitada. En este sentido, aunque todos los países latinoamericanos cuentan con un mercado de valores formal, solo algunos disponen de una plataforma especializada en mipymes (OECD/CAF/SELA, 2024).

Con base en lo anterior, el objeto de esta investigación es analizar las barreras que enfrentan las mipymes morelenses en el acceso a fuentes de financiamiento externas.

Cinco apartados forman este trabajo, incluyendo la introducción: el marco teórico; el método utilizado para desarrollar la investigación; el análisis, interpretación y discusión de los resultados y, por último, las conclusiones y recomendaciones para futuras investigaciones.

2. Marco teórico

Las mipymes enfrentan dificultades para obtener financiamiento, lo que afecta la generación de ingresos y utilidades. La creciente restricción en el financiamiento bancario para las mipymes está vinculada a su capacidad financiera y liquidez. En esta condición, la gestión eficiente de los recursos requiere procesos formales de planeación financiera que respalden decisiones estratégicas enfocadas en la generación de rentabilidad (Jiménez *et al.,* 2013). López (2013) destaca la necesidad de impulsar la formación financiera del empresario mexicano, con el propósito de alinear las estrategias de financiamiento para las mipymes con prácticas internas de gestión más eficientes, lo que contribuiría a mejorar sus resultados empresariales. El entorno financiero influye de manera significativa en la capacidad de las pequeñas empresas para acceder al crédito. En particular, Ferraro (2011) destaca que la combinación de banca pública predominante, instituciones privadas de capital nacional, entidades financieras de menor escala y bancos de desarrollo genera mayores oportunidades de financiamiento para este sector.

Saavedra y Bustamante (2013) explican que las mipymes experimentan racionamiento de crédito cuando el sistema financiero limita el otorgamiento de recursos, aun si dichas empresas demuestran solvencia similar a la de compañías más grandes. Esta restricción persiste incluso cuando están dispuestas a asumir mayores costos financieros. Cuando una empresa se encuentra en la necesidad de cubrir su falta de liquidez e infraestructura básica, para iniciar nuevos proyectos, y no puede acceder a financiamiento externo, acude a financiamiento interno a través de proveedores y fondos provenientes de la familia, los amigos o los socios (Tavera y Salinas, 2011). El apoyo económico de familiares suele percibirse como una opción viable para las mipymes por la ausencia de intereses y requisitos formales; sin embargo, esta fuente se caracteriza por ofrecer montos reducidos, lo que limita su impacto en proyectos de crecimiento empresarial (Saavedra y Tapia, 2013).

Las mipymes en América Latina generalmente recurren al financiamiento interno, reinvierten utilidades y buscan aportes de los socios. Cuando no logran acceder a fuentes formales de financiamiento, tienden a depender de mecanismos de corto plazo, como el crédito comercial, situación que reduce su capacidad de expansión y debilita su posición competitiva (Bloch y Granato, 2007).

De acuerdo con Saavedra y Tapia (2013), aunque las tarjetas de crédito son un instrumento común de financiamiento para las mipymes, implican riesgos financieros

importantes. El atraso en los pagos deriva en cargos por intereses que pueden superar considerablemente el capital originalmente utilizado. A ello se suman contingencias del mercado, como caídas en la demanda o mayor competencia, que afectan la liquidez empresarial. El crédito comercial proporcionado por proveedores constituye un mecanismo frecuente de apoyo financiero empresarial, debido a su flexibilidad operativa y a la posibilidad de acceder a bienes y servicios sin enfrentar procesos bancarios complejos o intereses formales (Tapia, 2013).

La literatura evidencia que el financiamiento en las mipymes se caracteriza tanto por una demanda insatisfecha como por una autoexclusión del sistema bancario. Esta última se explica por factores como tasas elevadas, exigencias de garantías y limitaciones en la calificación crediticia (Allami y Cibils, 2011; Dini y Stumpo, 2020). De acuerdo con Ferraro (2011), las estrategias gubernamentales de apoyo empresarial pueden dividirse en intervenciones de fortalecimiento técnico y en mecanismos de financiamiento directo. Las primeras comprenden iniciativas como incubadoras, centros locales de acompañamiento y servicios especializados que contribuyen al diseño de proyectos, a la mejora de procesos y a la modernización tecnológica.

La literatura identifica dos dimensiones en el análisis de los problemas de las mipymes: factores externos asociados al contexto macroeconómico y estructural, y factores internos vinculados a la gestión y dinámica del negocio. Mientras los primeros son difíciles de modificar por las empresas, los segundos dependen directamente de su capacidad organizativa (Palomo, 2005).

La evidencia señala que las restricciones en el acceso al financiamiento limitan el desarrollo de las mipymes, al impedir la ejecución de proyectos rentables y restringir su crecimiento. Asimismo, la falta de recursos afecta su capacidad de inversión en el capital humano, lo que repercute en la productividad. Estas limitaciones también reducen la capacidad de respuesta de las empresas ante choques externos, como se evidenció durante la pandemia de COVID-19, donde la disminución de la demanda y las interrupciones en las cadenas de suministro afectaron los flujos de efectivo, comprometiendo su operación y supervivencia (Paniagua, 2023).

Diversos estudios sugieren que el acceso al financiamiento está estrechamente vinculado a las características de la empresa. Mientras algunos autores interpretan estas restricciones como una forma de discriminación crediticia, otros las atribuyen a factores estructurales como el tamaño, la antigüedad o el sector de actividad (Guercio *et al.,* 2015), esta limitación estaría incluso impidiendo su desarrollo (De la Cruz *et al*., 2023). Aunque las tarjetas de crédito y los préstamos bancarios

representan alternativas frecuentes de financiamiento para las mipymes, su costo financiero puede resultar elevado en México. Sin embargo, los empresarios suelen valorar factores como la tasa de interés, las garantías y las condiciones del crédito antes de tomar una decisión (Saavedra y Espíndola, 2016).

Jiménez-Rico *et al.* (2023) concluyeron que factores como la antigüedad de la empresa, su tamaño reducido y las ventas anuales son determinantes que limitan el acceso de las mipymes al financiamiento bancario.

La literatura reciente destaca la importancia de fortalecer el entorno institucional para mejorar el acceso al financiamiento de las mipymes. En este sentido, el desarrollo de infraestructura, el impulso a tecnologías *fintech*, la promoción de esquemas de financiamiento alternativo y el fortalecimiento de la competencia en los mercados son elementos clave para ampliar las oportunidades de acceso al crédito (Carvajal y Didier, 2024).

2.1 Acceso restringido a créditos bancarios

Lo anterior lo respaldan datos del Banco de México (2021), que indican que solo el 34.8% de las empresas con hasta 100 empleados reportaron tener créditos bancarios, en comparación con el 54.9% de las grandes empresas. Esto implica una serie de limitantes, como las tasas de interés elevadas, los montos exigidos como garantías y las condiciones generales del mercado, que restringen el acceso al crédito para las mipymes.

Además, las características intrínsecas de las mipymes, como su historial crediticio limitado y su baja capitalización, hacen que estas empresas no puedan acceder a financiamiento de largo plazo, necesario para su expansión y modernización (León y Saavedra, 2018; De la Cruz *et al*., 2023). Por esta razón, recurren a alternativas de corto plazo, como crédito de proveedores, lo que no financia proyectos de innovación o desarrollo.

Diversos estudios internacionales han señalado que en México persisten barreras estructurales que limitan el acceso al financiamiento formal a las mipymes, en especial para empresas jóvenes que no cuentan con historial crediticio. Factores como el uso predominante de efectivo y la existencia de altas tasas de interés agravan las condiciones de acceso a financiamiento (Maravalle y González Pandiella, 2022).

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De acuerdo con la OCDE (2026), en México únicamente el 10% de las mipymes tuvo acceso a financiamiento en 2023, lo que evidencia una limitada cobertura del sistema financiero hacia este sector. Este bajo nivel de acceso refleja la persistencia de restricciones estructurales al crédito empresarial.

> **H_1:** Las mipymes morelenses tienen acceso restringido a créditos bancarios para obtener financiamiento a largo plazo.

2.2 Antigüedad de la mipymes

La falta de experiencia en el mercado de estas empresas afecta su capacidad para obtener financiamiento. La antigüedad de las empresas es a menudo un requisito importante para acceder a créditos, dado que las entidades financieras requieren al menos dos años de operación formal para evaluar el desempeño empresarial y considerar viable un crédito empresarial (Hong *et al*., 2007).

Tavera y Salinas (2011) señalan que el fortalecimiento de nuevos esquemas de financiamiento puede facilitar el acceso a recursos para las mipymes, promoviendo al mismo tiempo una cultura empresarial sólida. Esto contribuiría no solo a la continuidad de sus proyectos, sino también a la generación de efectos positivos en la dinámica económica nacional. La antigüedad incrementa la probabilidad de supervivencia de las mipymes y facilita su acceso a recursos financieros para su desarrollo y competitividad.

De acuerdo con Adam (2024), la percepción del riesgo influye de manera significativa en las decisiones de las mipymes para recurrir al financiamiento externo, puesto que entre mayor antigüedad tienen las empresas, mayor es su confianza para recurrir al financiamiento externo, especialmente cuando es un requisito comprobable.

> **H_2:** La antigüedad comprobable que tienen las mipymes morelenses limita su acceso al financiamiento externo.

2.3 Tasas de interés

Un problema importante que se presenta como el obstáculo principal en la mayoría de los países latinoamericanos en el acceso a los créditos es el que los empresarios refieren como tasas de interés muy elevadas, así como la exigencia de garantías. Las

elevadas tasas de interés son consecuencia de la percepción del alto riesgo en este tipo de empresas. Las exigencias de garantías reales o personales, como hipotecas o avales solidarios, representan una barrera significativa para este sector, en especial por las limitaciones asociadas con su dimensión empresarial (Saavedra y León, 2014).

Por estas razones, las mipymes se ven en muchos casos excluidas del sistema financiero formal o recurren a la banca de desarrollo, que ofrece programas de financiamiento accesibles, aunque limitados, que benefician solo a una fracción de estas empresas (Saavedra *et al.*, 2012). Por ello, la percepción de riesgo elevado para las microempresas representa una barrera significativa que limita su crecimiento y capacidad para acceder a fondos necesarios para operar y expandirse.

La OCDE (2024) destaca que desde 2022 el costo de financiamiento de las mipymes ha aumentado significativamente debido a políticas monetarias más estrictas implementadas por los países para combatir la inflación. Este incremento en las tasas de interés ha resultado en una disminución notable de la concesión de créditos para estas empresas, evidenciando el limitado acceso al crédito.

Asimismo, el costo del financiamiento continúa siendo una barrera relevante, ya que las tasas de interés promedio para créditos a mipymes fueron de 15.59% en 2024, superiores a las observadas en grandes empresas, lo que incrementa la dificultad de acceso a recursos financieros (OEDC, 2026).

> **H_3:** Las altas tasas de interés limitan el acceso al financiamiento de la mipymes morelenses.

2.4 Entorno macroeconómico

En escenarios de incertidumbre económica, la oferta crediticia suele contraerse como mecanismo de mitigación de riesgo para la banca. Esta dinámica es más evidente en países vulnerables a choques externos, donde el acceso al crédito empresarial disminuye y las tasas de interés se incrementan (Fenton Ontañón y Padilla Pérez, 2012).

De acuerdo con Saavedra y Saavedra (2015), la capacidad del empresario para interpretar las condiciones del entorno económico resulta fundamental, ya que permite diseñar estrategias orientadas a reducir el impacto negativo de factores externos sobre la organización. Debido a que dicho entorno representa una barrera, se pone

de manifiesto la necesidad de políticas e iniciativas gubernamentales orientadas a estabilizar la economía y proporcionar herramientas que permitan a estas empresas competir y prosperar.

En una economía de mercado, las empresas compiten por ampliar su participación en el mercado y dependen del financiamiento externo para innovar, mejorar procesos y adaptarse a la digitalización. Por ello, un entorno macroeconómico desfavorable puede limitar significativamente el acceso de estas empresas al financiamiento externo.

Aunque el desarrollo de instituciones *fintech* ha contribuido a ampliar las alternativas de financiamiento, aún persisten limitaciones en sus términos para las mipymes (OECD, 2026).

> **H_4:** El entorno macroeconómico de las mipymes morelenses reduce su acceso al financiamiento externo.

2.5 Barreras internas

Las mipymes suelen enfrentarse a barreras internas para acceder a las fuentes de financiamiento; las principales se describen a continuación.

2.5.1 Formalidad

Un obstáculo común es la nula formalidad en la estructura organizativa y financiera de la empresa. La mayoría de las mipymes operan de manera informal en México, lo que constituye una limitación para el acceso a recursos financieros externos.

Según Valdés y Sánchez (2012), estas organizaciones informales surgen como resultado del proceso de globalización y de las políticas económicas neoliberales que no han modificado a fondo las estructuras competitivas ni el marco jurídico. La falta de formalidad, como no estar registradas ante el fisco o carecer de suficiente antigüedad, impide que muchas de ellas cumplan con los requisitos establecidos por instituciones financieras, como los bancos (Tapia, 2013). Esta situación se relaciona con la carga tributaria que enfrentan las empresas. Al respecto, Giraldo *et al.* (2009) sostienen que muchos empresarios consideran que las cargas fiscales son excesivamente elevadas, lo que incentiva la informalidad. Asimismo, la incapacidad de cumplir con las obligaciones fiscales se traduce en barreras adicionales cuando las empresas intentan acceder a financiamiento, dado que las instituciones

financieras exigen el cumplimiento de estos requisitos como condición para otorgar créditos (Tapia, 2013).

Como lo señalan Zylfijaj *et al*. (2020), el fortalecimiento del sector financiero y el respaldo gubernamental a esquemas de garantía crediticia pueden ser claves para que las pequeñas empresas informales se formalicen y accedan a financiamiento.

> **H_5:** La obtención de un financiamiento externo para las mipymes morelenses está restringido debido a su falta de formalidad.

3. Método

Se realizó un estudio descriptivo y correlacional usando el método de chi cuadrada. Los datos fueron recolectados aplicando encuestas estructuradas, elaboradas para esta investigación, dirigidas a empresarios mipymes ubicados en el municipio de Cuernavaca, Morelos, seleccionado por ser la capital del estado. Según el Directorio Estadístico Nacional de Unidades Económicas, DENUE (Inegi, s.f.), Cuernavaca contaba con 25,275 mipymes, de las cuales 22,588 pertenecen a los sectores de comercio y servicios, que fueron seleccionados para el estudio.

La muestra se calculó tomando como referencia un nivel de confianza del 95% y un margen de error del 5%, lo que resultó en una muestra de 378 empresas. La recolección de datos se llevó a cabo en el periodo entre junio y agosto de 2025. Sin embargo, debido a la naturaleza voluntaria de la participación y a limitaciones en la recolección de datos, se obtuvieron respuestas válidas de 236 encuestas, las cuales integraron la muestra final. En estas condiciones, el margen de error se ajustó a 6.4%, manteniendo el mismo nivel de confianza, formada por 54% de empresas comerciales y 46% de empresas de servicios. En cuanto al tamaño, de acuerdo con la estratificación del Acuerdo publicado en el Diario Oficial de la Federación el 30 de junio de 2009 ("Acuerdo por el…", 2009), se tomó en consideración únicamente el número de trabajadores: el 92% fue de empresas micro y el 8% correspondió a empresas pequeñas.

Se realizó una prueba piloto con cinco empresas para ajustar el diseño de la encuesta. Derivado de esta, se realizaron ajustes en la redacción de los ítems para mejorar su comprensión; se optimizó la estructura del cuestionario y se eliminaron reactivos redundantes, de modo que quedó integrada por preguntas cerradas. Posteriormente, se aplicó la versión final de las encuestas mediante un muestreo no probabilístico, con la participación de sujetos voluntarios que aceptaron participar en la investigación.

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Con base en la revisión de la literatura, se operacionalizaron las variables del estudio, utilizando para las opciones de respuestas en una escala de Likert del 1 al 5 (1= siempre; 2= algunas veces sí; 3= algunas veces sí, algunas veces no; 4 = la mayoría de las veces no, y 5= nunca), como se muestra en la tabla 1 (ver tabla 1).

Tabla 1. Operacionalización de las variables

Variables	**Dimensiones**	**Indicadores** (Instrumento de recolección de datos)
Barreras externas	**Acceso restringido a créditos bancarios** Clarke *et al.,* 2001; Lecuona, 2009; Bebczuk, 2010; Bojórquez y Pérez, 2012; Saavedra y Tapia2013; León y Saavedra, 2018; Galema, 2020.	¿Ha solicitado algún financiamiento para su empresa? ¿Se lo aprobaron? ¿Porque nunca ha solicitado un financiamiento? ¿Le interesaría solicitar un financiamiento alguna vez? ¿Cuál sería el destino del financiamiento? ¿Tiene elaborado un plan de negocios? ¿Tiene estados de cuenta bancarios de su empresa? ¿Sigue su plan de negocios? ¿Renueva su plan de negocios? ¿Cuenta con ingresos para cubrir los pagos de un crédito los primeros meses? ¿Conoce la rentabilidad esperada de su proyecto? ¿Ingresa las entradas de dinero de su empresa al banco? ¿Daría la información exacta de los ingresos de su negocio en una solicitud de crédito? ¿Ha dejado de pagar algún crédito?, ¿por qué? ¿Cómo demostraría los ingresos de su negocio? ¿Dejaría de pagar el crédito si su proyecto no le da la rentabilidad esperada?
	Antigüedad de la mipyme Petersen y Rajan, 1994; Nafin, 2025; Correa y Jaramillo, 2007; Hong *et al*., 2007; Fenton Ontañón y Padilla Pérez, 2012.	¿Cuántos años tiene con su empresa? ¿Alguna vez le han negado un crédito por la antigüedad de su empresa? ¿Cómo comprobaría la antigüedad de su empresa?

Variables	Dimensiones	Indicadores (Instrumento de recolección de datos)
Barreras externas	**Tasas de interés** Fenton Ontañón y Padilla Pérez, 2012; Saavedra y Tapia, 2013; Tapia, 2013; Saavedra y León, 2014; Vasconi, 2017.	En caso de tener un financiamiento o haber contado con alguno, ¿conocía su tasa de interés? ¿Conoce cuáles son las tasas de interés que se manejan para créditos a empresas? ¿Considera que la tasa de intereses de su crédito fue alta? ¿Conoce cuál es el total de interés que pagará por los créditos que solicita? ¿Conoce la diferencia de las tasas de interés? ¿Conoce cuáles son los tipos de tasas de interés que existen? Cuando ha solicitado algún crédito, ¿le explican cuál es su tasa de interés y qué se refiere? ¿Prefiere pagar en un corto o largo plazo sus créditos? ¿Qué opina de los plazos que se dan para pagar sus créditos? ¿Preferiría pagar a largo plazo, aunque esto le genere mayor pago de interés por su crédito?
	Entorno macroeconómico Fenton Ontañón y Padilla Pérez, 2012; Jaramillo y García, 2013; Saavedra y Saavedra, 2015; Smallbone y Welter, 2020; Papenfuß y Schmidt, 2021.	Los precios de sus productos, ¿se han encarecido? ¿Ha realizado algún cambio para mejorar? ¿Ha cerrado alguna vez un negocio por la inseguridad? ¿La inseguridad del estado ha dañado su negocio? ¿Han disminuido sus ventas? ¿Cómo considera la actividad económica de la región?
Barreras internas	**Formalidad** Correa y Jaramillo, 2007; Giraldo *et al*., 2009; Valdés y Sánchez, 2012; Saavedra y Tapia, 2013; Rodríguez y Diaz, 2014; Papenfuß y Schmidt (2021).	¿Se dio de alta desde el inicio de sus operaciones?, ¿por qué? ¿Está dado de alta en la Secretaría de Hacienda y Crédito Público?, ¿por qué? ¿Tomó alguno de los cursos gratuitos que se imparten en el Sistema de Administración Tributaria (SAT)? ¿Conoce el estatus de su opinión de cumplimiento? ¿Conoce cuáles son sus obligaciones fiscales? ¿Necesita estar dado de alta para facilitar el acceso a algún tipo de financiamiento para su empresa? ¿Realiza sus declaraciones en tiempo? ¿Considera que le conviene darse de alta en el SAT?

Fuente: elaboración propia.

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3.1 Análisis de confiabilidad

Se calculó el coeficiente alfa de Cronbach para evaluar la fiabilidad de la escala utilizada en la investigación y se obtuvo el valor de 0.9067, lo que indica una excelente consistencia interna entre los ítems de la escala. En la tabla 8 se presenta el *alfa de Cronbach* de cada ítem, los cuales muestran una confiabilidad alta (ver tabla 8).

4. Resultados

Para analizar los datos obtenidos en la investigación, se utilizó el programa SPSS. La investigación se orientó a determinar la influencia del acceso restringido al crédito bancario en los mecanismos de financiamiento de las mipyme del estado de Morelos. Este análisis puede apreciarse en la tabla 2 (ver tabla 2).

Tabla 2. Acceso restringido a créditos bancarios

Ítems	Media	Mediana	Moda	Desviación estándar
¿Ha solicitado financiamientos para su empresa?	2.996	3	5	1.599
¿Le han aprobado los financiamientos?	2.564	3	3	1.521
En un futuro, ¿piensa solicitar financiamientos para su empresa?	2.479	2	2	1.273
¿Tiene elaborado su plan de negocios?	2.805	2	1	1.605
¿Revisa y renueva su plan de negocios, para ajustarse a los cambios?	2.468	2	2	1.553
¿Conoce la rentabilidad esperada de su empresa?	2.449	2	2	1.153
¿Cuenta con ingresos para cubrir los pagos iniciales de un crédito?	2.254	2	1	1.142
¿Cuenta con los estados de cuenta bancarios de su empresa?	2.619	2	1	1.358
¿Ingresa al banco las entradas de dinero de su empresa?	2.771	3	3	1.377
¿Presenta la información exacta de los ingresos de su negocio en una solicitud de crédito?	2.487	3	3	1.481
¿Dejaría de pagar el crédito si su proyecto no le da la rentabilidad esperada?	3.818	4	5	1.284

Fuente: elaboración propia.

Al comprobar la hipótesis H_1, los resultados muestran que los empresarios solicitan financiamiento de manera ocasional (M=2.564). La falta de planeación financiera también es evidente, ya que el conocimiento de la rentabilidad esperada (M=2.449) y de los planes de negocios actualizados (M=2.468) es limitado. Además, el uso de servicios bancarios y la transferencia financiera resultaron insuficientes, como lo indican los ítems sobre los estados de cuenta (M=2.619) y el manejo de las entradas bancarias (M=2.771). Por último, se observó una actitud menos favorable hacia el cumplimiento de obligaciones crediticias en situaciones complicadas (M=3.818), lo que refleja una percepción de vulnerabilidad económica.

Con lo anterior, se confirma la **H_1**, lo cual coincide con estudios previos que destacan que las instituciones financieras se resisten a otorgar crédito a este sector debido a percepciones de riesgo elevado y a la falta de formalidad administrativa (Clarke *et al*., 2001; Bebczuk, 2010).

Esto evidencia la necesidad de fortalecer las capacidades financieras y de planificación en las mipymes, así como de promover políticas públicas que incentiven el acceso al crédito. En cuanto a la antigüedad de las mipymes, los resultados se observan en la tabla 3 (ver tabla 3).

Tabla 3. Antigüedad de la mipyme

Ítems	Media	Mediana	Moda	Desviación estándar
¿Le han pedido comprobar la antigüedad de su empresa al solicitar un financiamiento?	2.438	2	2	1.251
¿Cuenta con documentos para comprobar la antigüedad de su empresa?	2.118	2	1	1.242
¿Le han negado un crédito por no contar con suficiente antigüedad de su empresa?	3.233	3	3	1.861

Fuente: elaboración propia.

Los hallazgos sugieren que la antigüedad comprobable de las mipymes morelenses desempeña un papel clave en su acceso al financiamiento. La mayoría de los encuestados indican haber enfrentado requisitos de comprobación de antigüedad al solicitar financiamientos (M=2.438, Mdna y Mo=2), lo que señala que el requisito es frecuente, coincidiendo con el estándar establecido por instituciones como Nacional Financiera (Nafin, 2025), que exige al menos dos años de antigüedad para otorgar créditos.

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En cuanto a la disponibilidad de documentos para comprobar la antigüedad, en promedio, las respuestas fueron favorables (M=2.118, Mo=1), lo que indica que los empresarios suelen contar con los documentos necesarios para acreditar la antigüedad de sus negocios.

En lo que se refiere al impacto de la antigüedad insuficiente en el rechazo de créditos, se obtuvo la media más alta (3.233), lo que refleja que los empresarios han enfrentado rechazos debido a no cumplir con la antigüedad requerida. Esto es consistente con la literatura; al respecto, Hong *et al*. (2007) señalan que las mipymes a menudo enfrentan barreras relacionadas con este requisito.

Los resultados respaldan la hipótesis $\mathbf{H_2}$. A pesar de que muchos cuentan con la documentación necesaria, la antigüedad insuficiente sigue siendo una causa común de rechazo, lo que deja ver la necesidad de flexibilizar estos criterios para fomentar el desarrollo de las mipymes.

En lo que toca al conocimiento de las tasas de interés, los resultados pueden observarse en la tabla 4 (ver tabla 4).

Tabla 4. Tasas de interés

Ítems	Media	Mediana	Moda	Desviación estándar
¿Conoce las tasas de interés que se manejan para créditos a empresas?	2.919	3	2	1.351
En caso de tener un financiamiento o haber contado con alguno, ¿conocía su tasa de interés?	2.393	2	3	1.445
¿Considera que la tasa de intereses de sus créditos fue alta?	2.086	2	1	1.365
Cuando ha solicitado algún crédito, ¿le explican cuál es su tasa de interés y que se refiere?	2.727	3	3	1.236
¿Prefiere pagar en a corto plazo sus créditos?	2.491	2	1	1.354
¿Prefiere pagar a largo plazo, aunque esto le genere mayor pago de interés por su crédito?	3.233	4	5	1.616
¿No ha solicitado un financiamiento por las altas tasas de interés?	2.435	2	1	1.475

Fuente: elaboración propia.

Los resultados muestran percepciones desfavorables en los ítems relacionados con el conocimiento de las tasas de interés y su explicación al solicitar los créditos, así como en la preferencia por pagar a largo plazo. Ello podría reflejar una falta de transparencia por parte de las instituciones financieras, así como una percepción negativa hacia el costo del financiamiento a largo plazo.

En ítems como la percepción de altas tasas de interés y la no solicitud de financiamiento por estas, los resultados fueron favorables. Esto indica que, aunque las tasas de interés se perciben como un obstáculo, no siempre constituyen el factor decisivo que limita el acceso al crédito, dado que el empresario valora la oportunidad de contar con recursos cuando los necesita (Bucardo *et al*., 2022).

Saavedra y León (2014) y Saavedra y Tapia (2013) destacan que las altas tasas de interés son un factor crítico que limita a los empresarios para solicitar financiamiento, coincidiendo con los resultados obtenidos en los ítems con percepciones desfavorables.

Los resultados confirman que las altas tasas de interés son una limitante significativa para el acceso al financiamiento, especialmente porque son percibidas como un obstáculo y debido la falta de claridad en la comunicación en los créditos. Esto confirma la $\mathbf{H_3}$ y subraya la importancia de mejorar la transparencia financiera y desarrollar esquemas de crédito a los que puedan acceder las mipymes, para que busquen financiamientos sin temor a los costos excesivos.

En cuanto al entorno macroeconómico, los resultados pueden consultarse en la tabla 5 (ver tabla 5).

Tabla 5. Entorno macroeconómico

Ítems	Media	Mediana	Moda	Desviación estándar
¿Los precios de sus productos y/o servicios se han encarecido?	1.843	2	1	0.952
¿Ha cerrado algún negocio por la inseguridad?	3.135	3	5	1.437
¿La inseguridad del estado ha dañado su negocio?	2.177	2	2	1.108
¿Va aumentando la actividad económica de la región?	3.525	4	5	1.225
¿Tiene beneficios el régimen fiscal en el que se encuentra para acceder a financiamientos para su empresa?	3.631	4	5	1.397
¿Es difícil el acceso a fuentes de financiamiento?	1.919	1	1	1.287

Fuente: elaboración propia.

Los resultados presentados en la tabla 5, reflejan que aspectos como la inseguridad y el régimen fiscal se perciben como barreras significativas. Estos factores generan una percepción desfavorable del entorno macroeconómico y coinciden con estudios previos que destacan los impactos negativos que tienen la inseguridad y las crisis económicas en las mipymes (Jaramillo y García, 2013; Saavedra y Saavedra, 2015).

Saavedra y Saavedra (2015) destacan cómo los empresarios se ven afectados por su entorno macroeconómico, lo que coincide con la percepción desfavorable identificada en los ítems más críticos. La falta de beneficios del régimen fiscal y el impacto negativo de la inseguridad son consistentes con Jaramillo y García (2013), quienes identifican estas problemáticas como barreras estructurales para las mipymes.

Los resultados respaldan que el entorno macroeconómico representa una barrera significativa, por lo tanto, se confirma la $\mathbf{H_4}$. Con esto se observa la necesidad de mejorar las condiciones de seguridad, revisar esquemas fiscales y promover una estabilidad económica que ayude con el acceso al crédito.

Tabla 6. Formalidad

Ítems	Media	Mediana	Moda	Desviación estándar
Cuando abre una empresa ¿se da alta en la Secretaría de Hacienda y Crédito Público?	1.783	1	1	1.144
¿Ha tomado alguno de los cursos gratuitos que se imparten en el SAT?	4.076	5	5	1.295
¿Conoce cuáles son las obligaciones fiscales de su empresa?	2.415	2	1	1.306
¿Tiene su opinión de cumplimiento en positivo?	2.584	2	1	1.475
¿Es necesario estar dado de alta en el SAT para facilitar el acceso a algún tipo de financiamiento para la empresa?	1.855	1	1	1.211

Fuente: elaboración propia.

La mayoría de las mipymes encuestadas cumplen con los requisitos de formalidad, como su registro en el Sistema de Administración Tributaria (SAT) , y conocen sus obligaciones fiscales; sin embargo, el ítem relacionado con la participación en cursos gratuitos ofrecidos por el SAT muestra resultados desfavorables, lo que podría indicar una falta de aprovechamiento de las herramientas de capacitación fiscal que podrían beneficiar la gestión empresarial y el acceso al financiamiento de las mipymes.

Según Valdés y Sánchez (2012) y Saavedra y Tapia (2013), muchas mipymes son informales debido a la carga tributaria, lo que dificulta su acceso a financiamiento. Esto sugiere que, aunque la formalidad se percibe como una ventaja, podría haber otros factores relacionados que afecten el acceso al financiamiento.

Los resultados confirman la **H_5,** esto plantea la necesidad de promover los programas de formación fiscal y acceso a recursos financieros para fortalecer su desarrollo.

4.1 Resultados correlacionales

En el análisis de correlación se utilizó el estudio de tablas cruzadas y el método de chi cuadrado, para evaluar la relación entre acceso a financiamiento y variables como tamaño de la empresa (de acuerdo con el número de trabajadores), nivel de estudios, antigüedad de la empresa y régimen fiscal. Con base en este modelo, se buscó establecer si existía relación entre estas, con el objetivo de determinar si las barreras al financiamiento se relacionan con las características de la empresa y el nivel de estudios del empresario. Estas correlaciones pueden apreciarse en la tabla 7 (ver tabla 7).

Tabla 7. Correlaciones

Relación analizada	χ^2	Significación asintótica (bilateral)	Interpretación
Nivel de estudios –antigüedad de la empresa	106.376[a]	0.000	Existe una relación estadísticamente significativa entre las variables.
Acceso al financiamiento –régimen fiscal	56.637[a]	0.000	Se identifica una asociación significativa, lo que sugiere que el régimen fiscal influye en el acceso al financiamiento.
Acceso al financiamiento –antigüedad de la empresa	30.624[a]	0.060	No se encontró una relación estadísticamente significativa entre las variables.
Nivel de estudios – tamaño de la empresa	113.658[a]	0.000	Existe una relación significativa entre el nivel de estudios y el tamaño de la empresa.
Antigüedad – tamaño de la empresa	123.700[a]	0.000	Se observa una asociación significativa entre la antigüedad y el tamaño de la empresa.

Fuente: elaboración propia.

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e3192 (pp. 115-146)

4.2 Análisis factorial exploratorio

Con el propósito de identificar las dimensiones subyacentes que limitan el acceso al financiamiento externo de las mipymes morelenses, se llevó a cabo un análisis factorial exploratorio utilizando el programa de SPSS, versión 22 para Windows. La validez y pertinencia del modelo se determinaron con la prueba de Kaiser-Meyer-Olkin (KMO) y la prueba de esfericidad de Bartlett. Los resultados indicaron una adecuación con un excelente valor de KMO = 0.861 y una significancia estadística en la prueba de Bartlett de 0.000, lo que indica que la prueba es apta.

En la matriz de comunalidades que se presenta en la tabla 8 se observa que los resultados arrojaron valores superiores a .5 en todas las variables, lo que respalda la calidad de las variables seleccionadas para el análisis, indicando la buena relación con los ítems (ver tabla 8).

Se presentan las comunalidades extraídas de cada ítem cuya carga factorial fue superior a 0.50 y el coeficiente alfa de Cronbach para evaluar la consistencia interna del factor.

Tabla 8. Matriz de comunalidades

Comunalidades	Inicial	Extracción	Alfa de Cronbach
Se ha solicitado financiamiento	1	0.681	0.911
¿Le han aprobado los financiamientos?	1	0.791	0.912
Planea solicitar financiamiento	1	0.641	0.913
Cuenta con plan de negocios	1	0.725	0.911
¿Conoce la rentabilidad esperada de su empresa?	1	0.773	0.911
¿Cuenta con ingresos para cubrir los pagos iniciales de un crédito?	1	0.797	0.909
¿Cuenta con los estados de cuenta bancarios de su empresa?	1	0.762	0.909
¿Ingresa al banco las entradas de dinero de su empresa?	1	0.839	0.909
¿Presenta la información exacta de los ingresos de su negocio en una solicitud de crédito?	1	0.853	0.91
¿Cuenta con documentos para comprobar la antigüedad de su empresa?	1	0.747	0.909
¿Le han negado un crédito por no contar con suficiente antigüedad de su empresa?	1	0.683	0.92

Comunalidades	Inicial	Extracción	Alfa de Cronbach
¿Conoce el status en su buró de crédito?	1	0.726	0.909
¿Tiene buen historial crediticio?	1	0.807	0.909
¿Acumula reservas liquidas de los ingresos de su empresa?	1	0.773	0.91
¿Lleva los registros contables de su empresa?	1	0.826	0.909
¿Guarda los registros contables de su empresa durante cinco años?	1	0.844	0.909
¿Sus declaraciones fiscales reflejan las operaciones reales de su empresa?	1	0.887	0.908
¿Se lleva en su empresa un control semanal y conoce los flujos de efectivo?	1	0.819	0.908
Bienes inmuebles escriturados	1	0.670	0.91
¿Usaría sus bienes inmuebles como garantía para solicitar algún financiamiento para su empresa?	1	0.667	0.911
Tiene un aval	1	0.757	0.909
¿Le sería fácil conseguir un aval para solicitar créditos?	1	0.801	0.91
¿No ha solicitado crédito por no contar con un aval?	1	0.746	0.924
¿Conoce las tasas de interés que se manejan para créditos a empresas?	1	0.637	0.91
¿Conocía su tasa de interés?	1	0.78	0.91
Cuando ha solicitado algún crédito, ¿le explicaron cuál era su tasa de interés y a que se refería?	1	0.711	0.914
¿No ha solicitado un financiamiento por las altas tasas de interés?	1	0.661	0.92
¿Ha cerrado algún negocio por la inseguridad?	1	0.675	0.92
¿Es difícil el acceso a fuentes de financiamiento?	1	0.482	0.918
Cuando abre una empresa, ¿se da alta en la Secretaría de Hacienda y Crédito Público?	1	0.662	0.912
¿Conoce cuáles son las obligaciones fiscales de su empresa?	1	0.671	0.91
¿Tiene su opinión de cumplimiento en positivo?	1	0.714	0.91
¿Es necesario estar dado de alta en el SAT para facilitar el acceso a algún tipo de financiamiento para la empresa?	1	0.706	0.914
¿Calcula el rendimiento de la inversión de su empresa?	1	0.818	0.909
¿Invertiría su dinero para obtener rendimientos?	1	0.583	0.911
¿Utiliza la información financiera para la toma las decisiones financieras en su empresa?	1	0.791	0.909

Comunalidades	Inicial	Extracción	Alfa de Cronbach
Contrata a un contador	1	0.563	0.913
¿Le entrega el contador estados financieros mensuales de su empresa?	1	0.891	0.911
El contador, ¿lo tiene informado sobre las actualizaciones en las obligaciones fiscales que se realizan?	1	0.939	0.911
El contador, ¿le explica los beneficios fiscales que tiene de acuerdo con su régimen fiscal?	1	0.880	0.911
El contador, ¿realiza en tiempo y forma sus declaraciones de impuestos?	1	0.902	0.91

Nota: método de extracción: análisis de componentes principales
Fuente: elaboración propia.

El modelo factorial identificó nueve componentes principales, los cuales explican el 74.21% de la varianza total, como puede verse en la tabla 9. Este nivel de varianza explicada es considerado adecuado en estudios sociales y organizacionales (ver tabla 9).

Tabla 9. Componentes rotados y varianza total explicada

Ítem	C1	C2	C3	C4	C5	C6	C7	C8	C9
¿Ingresa al banco las entradas de dinero de su empresa?	0.843								
¿Cuenta con los estados de cuenta bancarios de su empresa?	0.833								
¿Calcula el rendimiento de la inversión de su empresa?	0.799								
¿Presenta la información exacta de los ingresos de su negocio en una solicitud de crédito?	0.790								
¿Utiliza la información financiera para la toma de las decisiones financieras en su empresa?	0.755								

Ítem	C1	C2	C3	C4	C5	C6	C7	C8	C9
¿Se lleva en su empresa un control semanal y conoce los flujos de efectivo?	0.751								
¿Conoce las tasas de interés que se manejan para créditos a empresas?	0.707								
¿Conoce cuáles son las obligaciones fiscales de su empresa?	0.625								
¿Acumula reservas líquidas de los ingresos de su empresa?	0.543								
Tiene un aval	0.525								
Cuenta con plan de negocios	0.553								
El contador, ¿lo tiene informado sobre las actualizaciones en las obligaciones fiscales que se realizan?		0.923							
El contador, ¿le explica los beneficios fiscales que tiene de acuerdo con su régimen fiscal?		0.900							
¿Le entrega el contador estados financieros mensuales de su empresa?		0.893							
El contador, ¿realiza en tiempo y forma sus declaraciones de impuestos?		0.868							
¿Sus declaraciones fiscales reflejan las operaciones reales de su empresa?			0.748						
¿Tiene buen historial crediticio?			0.741						
¿Lleva los registros contables de su empresa?			0.682						

Ítem	C1	C2	C3	C4	C5	C6	C7	C8	C9
¿Guarda los registros contables de su empresa durante cinco años?			0.647						
¿Cuenta con documentos para comprobar la antigüedad de su empresa?			0.575						
¿Conoce el estatus en su buró de crédito?			0.517						
¿Invertiría su dinero para obtener rendimientos?				0.652					
¿Tiene su opinión de cumplimiento en positivo?				0.584					
¿Le han negado un crédito por no contar con suficiente antigüedad de su empresa?					0.514				
¿Le han aprobado los financiamientos?					0.781				
Cuando ha solicitado algún crédito, ¿le explican cuál es su tasa de interés y que se refiere?					0.739				
¿Conocía su tasa de interés?					0.632				
¿No ha solicitado crédito por no contar con un aval?						0.544			
Se ha solicitado financiamiento						0.640			
¿Es necesario estar dado de alta en el SAT para facilitar el acceso a algún tipo de financiamiento para la empresa?							0.769		
Cuando abre una empresa, ¿se da de alta en la Secretaría de Hacienda y Crédito Público?							0.678		
¿No ha solicitado un financiamiento por las altas tasas de interés?							0.515		

Ítem	C1	C2	C3	C4	C5	C6	C7	C8	C9
¿Es difícil el acceso a fuentes de financiamiento?							0.697		
Contrata a un contador							0.521		
¿Le sería fácil conseguir un aval para solicitar créditos?								0.558	
Planea solicitar financiamiento								0.736	
¿Conoce la rentabilidad esperada de su empresa?								0.539	
¿Cuenta con ingresos para cubrir los pagos iniciales de un crédito?								0.698	
¿Ha cerrado algún negocio por la inseguridad?									0.588
¿Usaría sus bienes inmuebles como garantía para solicitar algún financiamiento para su empresa?									0.608
Bienes inmuebles escriturados									0.532
Autovalores, total	15.967	4.211	3.045	2.161	1.687	1.670	1.450	1.243	1.220
% de la varianza	36.288	9.570	6.921	4.910	3.834	3.796	3.296	2.826	2.773
% acumulado	36.288	45.858	52.858	57.690	61.523	65.319	68.616	71.442	74.215

Fuente: elaboración propia.

La matriz de componentes rotados demostró que los ítems presentaron cargas factoriales predominantes en un solo componente; se presentan únicamente las cargas factoriales mayores a 0.50, lo que demuestra adecuada validez discriminante entre componentes.

El componente 1, que es el que más ítems agrupa, denota la importancia de llevar controles de ingresos y gastos de las empresas a través del uso de cuentas bancarias, así como valerse de la información financiera para la toma de decisiones y la transparencia en la misma. Por otra parte, determina la importancia de que el empresario conozca el rendimiento que genera su negocio, las tasas de interés

que cobran los bancos y las obligaciones fiscales y no menos importante es que cuente con un plan de negocios, un aval y reservas líquidas para imprevistos que le permiten minimizar los riesgos en su negocio. El componente 2 indica la necesidad de tener el apoyo de un profesional contable que mantenga informado al empresario de la situación económica y financiera de la empresa, de todos los aspectos fiscales que se aplican a su régimen fiscal, así como mantenerlo al corriente de las obligaciones fiscales.

El componente 3 se refiere a la necesidad de llevar y guardar los registros contables de acuerdo con lo que señala la Secretaría de Hacienda, declarando las operaciones reales de la empresa ante Hacienda, llevando un buen historial crediticio y resguardando los documentos que comprueben su antigüedad. El componente 4 trata de la necesidad de que el empresario conozca la manera de obtener rendimiento de sus remanentes de efectivo y comprenda además la importancia de contar con una opinión de cumplimiento favorable por parte de la Secretaría de Hacienda. El componente 5 implica la necesidad de tener la antigüedad que solicitan las instituciones bancarias para otorgar el financiamiento, así como el conocimiento que debe tener el empresario acerca de todos los aspectos debido a que los montos de financiamiento son gravados con una tasa de interés y tal vez otras obligaciones colaterales.

El componente 6 determina la necesidad de contar con un aval para solicitar un financiamiento. El componente 7 demuestra que se debe cumplir con el requisito de ser una empresa formal, con un contador profesional, aunque siempre existirá la barrera de las altas tasas de interés con las que se gravan a las mipymes, al considerarlas de alto riesgo. El componente 8 destaca nuevamente la necesidad de contar con un aval para obtener financiamiento, así como con una planeación adecuada para incurrir en endeudamiento, conociendo la rentabilidad esperada de la empresa y un respaldo financiero que le permita garantizar los primeros pagos del préstamo recibido. Por último, el componente 9 señala la necesidad de contar con bienes inmuebles escriturados que sirvan de respaldo para los financiamientos que se soliciten, sin dejar de lado la inseguridad que hoy en día ronda los negocios.

Los resultados anteriores permiten determinar que existen barreras estructurales y sistémicas que deben abordarse mediante una política pública integral para facilitar el acceso al crédito de estas empresas (ver tabla 9).

5. Conclusiones

Se pudieron corroborar los hallazgos previos en la literatura sobre la importancia y los desafíos que enfrentan las mipymes, aun cuando son fundamentales para el desarrollo económico, actuando como el motor que impulsa el crecimiento de los países (Münch *et al*. 2014). Se encontró y comprobó que estas empresas, en particular las microempresas, enfrentan barreras para crecer y permanecer en el largo plazo, La causa principal de ello es la falta de acceso a fuentes de financiamiento (Dini y Stumpo, 2020).

Los hallazgos revelan que sí existen barreras que limitan el acceso de las mipymes a financiamiento externo, barreras que se dividen tanto en factores internos (Palomo, 2005), como son la gestión empresarial, la formalidad y el proceso contable, así como externas, que incluyen antigüedad comprobable, altas tasas de interés, uso efectivo de información financiera, acceso restringido, garantías y entorno macroeconómico. Estos resultados están en consonancia con lo señalado por el Banco Interamericano de Desarrollo (BID, 2005), que señala que el crédito en América Latina es escaso, costoso y volátil, lo que dificulta el crecimiento económico y la reducción de la pobreza en la región.

Con este estudio se refuerza la tesis de que el acceso al crédito no solo está condicionado por factores externos, sino también por factores internos en las mipymes, relacionados con la estructura y la gestión de la empresa (Palomo, 2005). Las empresas que operan en la formalidad tienen más posibilidades de acceder a financiamientos externos debido a que tienen una mayor antigüedad demostrable y documentación en orden. Esto sugiere que son características importantes en la evaluación de riesgo por parte de las entidades financieras.

Los resultados indican que una gestión empresarial adecuada y un proceso contable sólido garantizan un acceso más fácil al financiamiento. Se encontró que factores como la formalidad y las condiciones macroeconómicas pueden tener un mayor peso al tomar decisiones, por lo que debería reevaluarse la mejor forma de apoyo a las mipymes en el ámbito de políticas financieras.

Por esta razón, se sugieren recomendaciones clave a partir de estos hallazgos. Es esencial que las políticas públicas se orienten a incentivar la formalización de las mipymes y mostrarles las oportunidades de financiamiento asociadas con la formalidad (Tapia, 2013). En el contexto del estado de Morelos, es deseable que se implementen programas estatales de financiamiento dirigidos a las mipymes, que

incluyan esquemas de garantía parcial respaldados por el gobierno, con el fin de reducir las barreras asociadas a la falta de avales.

Asimismo, se sugiere el desarrollo de programas de capacitación enfocados en gestión empresarial, financiera, formalización fiscal y uso de la información contable, dirigidos específicamente a empresarios de los sectores comercio y servicios, para que sus empresas tengan un mejor perfil de riesgo y sea más fácil acceder a los financiamientos.

Se sugiere, en especial para quienes cuentan con un nivel de estudios más avanzado, como licenciatura o posgrado, llevar una formación continua en finanzas y gestión empresarial. Eso podría ser la clave para superar las barreras identificadas en esta investigación y lograr un crecimiento sostenible.

De igual forma, se propone el fortalecimiento de los programas de financiamiento del estado de Morelos, como el Fondo Morelos, mediante la flexibilización de los requisitos de acceso, en particular en lo relativo a las garantías exigidas.

Con esta investigación se confirma la existencia de barreras que limitan el acceso a financiamiento externo en las mipymes de Morelos. Se aporta, de esta manera, una nueva perspectiva sobre el acceso al financiamiento en este sector. A su vez, constituye una oportunidad para futuras investigaciones y para el desarrollo de políticas públicas que apoyen el crecimiento de estas empresas en la región.

Sin embargo, esta perspectiva no está exenta de limitaciones, entre estas, la consideración de que la muestra fue de empresarios voluntarios que aceptaron participar en la investigación, de modo que los resultados no pueden generalizarse a toda la población.

Entre las principales líneas de investigación que podrían seguir desarrollándose para estudiar el problema del financiamiento de las mipymes está el acceso a fuentes de financiamiento generadas por las *fintech,* que buscan validarse como impulsoras de la inclusión financiera.

Referencias

"Acuerdo por el que se establece la estratificación de las micro, pequeñas y medianas empresas". (2009, 30 de junio). Secretaría de Economía. Diario Oficial de la Federación. https://dof.gob.mx/nota_detalle.php?codigo=5096849&fecha=30/06/2009#gsc.tab=0

Adam, N. A.L (2024). "Perceived Risk and External Finance Usage in Small- and Medium-Sized Enterprises: Unveiling the Moderating Influence of Business Age"*. Journal of Risk and Financial, 17(*4), 150. https://doi.org/10.3390/jrfm17040150

Allami, C. y Cibils, A. (2011). "El financiamiento bancario de las pymes en Argentina (2002-2009)"*. Revista Problemas del Desarrollo, 42*(165), 61-86. https://www.redalyc.org/articulo.oa?id=11819780004

Banco de México. (2021*). Indicadores Básicos de Créditos a las Pequeñas y Medianas Empresas (PyMEs*). *Datos a septiembre de 2021.* Banco de México. https://www.banxico.org.mx/publicaciones-y-prensa/rib-creditos-a-pymes/%7BABFA8AFD-BE61-6A2E-44F0-E171C99AEF14%7D.pdf

Banco Interamericano de Desarrollo, BID. (2005). *Progreso económico y social en América Latina. Informe 2005. Desencadenar el crédito: cómo ampliar y estabilizar la banca.* BID. https://pmb.parlamento.gub.uy/pmb/opac_css/index.php?lvl=notice_display&id=53368

Bebczuk, R. N. (2010). *Acceso al financiamiento de las pymes en Argentina: estado de situación y propuestas de política*. Cepal (Serie Financiamiento del desarrollo). https://hdl.handle.net/11362/5207

Bloch, R. y Granato, L. (2007). "Las PyMEs y el acceso al crédito". *Observatorio Iberoamericano del Desarrollo Local y la Economía Social, OIDLES, 1*(3), 454-461. https://desarrolloyeconomiasocial.com/index.php/oidles/article/view/674

Bojórquez Zapata, M. I. y Pérez Brito, A. E. (2012). "La gestión financiera en las PYMES familiares de la industria textil en Yucatán". *Revista El Buzón de Pacioli, 12*(77), 52-74.

Bucardo C., A., Saavedra García, M. L. y Vargas Vega, T. de J. (2022). "El perfil emprendedor de los microempresarios en los estados de México y Chiapas". *Apuntes del Cenes, 41*(73), 203-226. https://doi.org/10.19053/01203053.v41.n73.2022.13019

Carvajal, A.F. y Didier, T. 2024. *Boosting SME Finance for Growth: The Case for More Effective Support Policies*. World Bank. http://hdl.handle.net/10986/42213

Clarke, G. R., Cull, R. y Martínez Peria, M. (2001). "Does Foreign Bank Penetration Reduce Access to Credit in Developing Countries? Evidence from Asking Borrowers". *SSRN Electronic Journal*, (202). https://doi.org/10.2139/ssrn.285767

Correa García, J. A. y Jaramillo Betancur, F. (2007). "Una aproximación metodológica y prospectiva a la gestión financiera en las pequeñas empresas". *Contaduría Universidad de Antioquia,* 93-118. https://doi.org/10.17533/udea.rc.2123

De la Cruz, N.; Villanueva, A.; Tolin, L.; Disse, S.; Lensink, R. y White, H. (2023). "PROTOCOL: Effects of Interventions to Improve Access to Financial Services for Micro–, Small– and Medium–sized Enterprises in Low– and Middle– Income countries. An Evidence and Gap Map". *Campbell Systematic Reviews, 19*(3), 1-1. https://doi.org/10.1002/cl2.1341

Dini, M. y Stumpo, G. (coords.) (2020). *MIPYMES en América Latina. Un frágil desempeño nuevos desafíos para las políticas de fomento*. Naciones Unidas.

Fenton Ontañón, R. y Padilla Pérez, R. (2012). *Financiamiento de la banca comercial a micro, pequeñas y medianas empresas en México*. Cepal, Serie de Estudios y perspectivas 135. https://hdl.handle.net/11362/4919

Ferraro, C. (comp.) (2011). *Eliminando barreras. El financiamiento a las pymes en América Latina.* Cepal.

Galema, R. (2020). "Credit Rationing in P2P Lending to SMEs: Do Lender-Borrower Relationships Matter?". *Journal of Corporate Finance,* (65), 1-23 https://doi.org/10.1016/j.jcorpfin.2020.101742

Giraldo Múnera, A., Bedoya Bermúdez, G. y Vargas Restrepo, C. (2009). "Principales limitaciones del empresarismo que afectan el desarrollo económico y social del país". *Revista EAN*, (66), 99–112. https://www.redalyc.org/articulo.oa?id=20620269005

Guercio, M. B., Oliveras, G., Vigier, H. P. y Briozzo, A. E. (2015). "Financiamiento externo desde una perspectiva de género". *Revista Venezolana de Gerencia, 20*(71), 440-554. https://www.redalyc.org/pdf/290/29042408004.pdf

Hong, T., López-Acevedo, G., Flores Lima, R., Rubio Sánchez, M., Slota, E., Tinajero, M. y Beker Busjeet, G. (2007). *Evaluando los programas de apoyo a las pequeñas y medianas empresas en México.* Banco Mundial. https://documents1.worldbank.org/curated/en/486091468049138320/pdf/399120SPANISH01ramas0PYMEs01PUBLIC1.pdf

Instituto Nacional de Estadística y Geografía, Inegi. (2015). *Encuesta Nacional sobre Productividad y Competitividad de las Micro, Pequeñas y Medianas Empresas* (ENAPROCE) 2015. INEGI. https://www.inegi.org.mx/programas/enaproce/2015/

Instituto Nacional de Estadística y Geografía, Inegi, y Comisión Nacional Bancaria y de Valores, CNBV. (2021). Encuesta Nacional de Financiamiento de las Empresas (Enafin) 2021. INEGI, CNBV. https://www.inegi.org.mx/contenidos/programas/enafin/2021/doc/Presentacion_ENAFIN.pdf

Instituto Nacional de Estadística y Geografía, Inegi. (s.f.) Directorio Estadístico Nacional de Unidades Económicas. Inegi. https://www.inegi.org.mx/app/mapa/denue/default.aspx

Jaramillo Garza, J. y García, J. F. (2013). "Modelo probabilístico de quiebra para pequeñas y medianas empresas mexicanas". *Ciencia UANL*, 103-113. https://cienciauanl.uanl.mx/?p=567

Jiménez Sánchez, J. I., Rojas Restrepo, F. S. y Ospina Galvis, H. J. (2013). "La planeación financiera: un modelo de gestión en las mipymes"*. Facultad de Ciencias Económicas y Empresariales, FACE, 13*(1), 137-150. https://ojs.unipamplona.edu.co/face/article/view/1845/6850

Jiménez-Rico, A., Gómez-López, C. S. y Zamilpa, J. (2023). "Determinants of Access to Bank Financing in SMEs in Mexico". *Journal of Risk and Financial Management, 16*(11), 477. https://doi.org/10.3390/jrfm16110477

Lecuona, R. (2009). El financiamiento a las Pymes en México: la experiencia reciente. *Economía*, 69–91. https://hdl.handle.net/20.500.14330/CLA01000315595

León Vite, E.L. y Saavedra García, M.L. (2018). "Fuentes de financiamiento para las MIPyME en México". *Revista Ciencia Administrativa*, (44), 113-142. https://www.uv.mx/iiesca/files/2018/11/16ca201801.pdf

López Mateo, C. (2013). "El presupuesto como base de la planeación financiera en Mipymes de la industria de Productos Naturistas de la Zona Metropolitana de Guadalajara". *Revista Panorama Administrativo, 7*(12), 45-58.

Maravalle, A. y González Pandiella, A. (2022). *Expanding Access to Finance to Boost Growth and Reduce Inequalities in Mexico*. OECD Economics Department Working Papers No. 1717. Organization for Economic Co-operation and Development (OECD). https://doi.org/10.1787/2de3cd7d-en

Münch Galindo, L., Flores Hahn, B. E. y Cacho de la Riva, I. (2014). *Administración: gestión organizacional, enfoques y procesos administrativos*. Pearson.

Nacional Financiera, Nafin. (2025). Financiamiento. https://www.nafin.com/portalnf/content/financiamiento/

Organization for Economic Co-operation and Development, OECD. (2024). *Financing SMEs and Entrepreneurs 2024: An OECD Scoreboard*. OECD Publishing. https://doi.org./10.1787/fa521246-en

Organización para la Cooperación y el Desarrollo Económicos, OCDE, Banco de Desarrollo de América Latina y el Caribe (CAF) y Sistema Económico Latinoamericano y del Caribe (SELA). (2024). Índice de Políticas para PyMEs: América Latina y el Caribe 2024. Hacia una recuperación inclusiva, resiliente y sostenible. OECD Publishing. https://doi.org/10.1787/807e9eaf-es

Organización para la Cooperación y el Desarrollo Económicos, OCDE. (2026). Financing SMEs and Entrepreneurs 2026: An OECD Scoreboard. OECD Publishing. https://doi.org/10.1787/075d8058-en.

Palomo González, M. A. (2005). "Los procesos de gestión y la problemática de las PYMES". *Ingenierías, 8*(28), 25-31. https://www.nacionmulticultural.unam.mx/empresasindigenas/docs/1810.pdf

Paniagua, C. (2023, 16 de agosto). Apoyo a pymes para países más productivos. CAF. https://scioteca.caf.com/handle/123456789/2081

Papenfuß, U. y Schmidt, C. A. (2021). "Understanding Self-Regulation for Political Control and Policymaking: Effects of Governance Mechanisms on Accountability". *Governance, 34*(4), 1115-1141. https://doi.org/10.1111/gove.12549

Petersen Mitchell A. y Rajan Raghuram G. (1994). "The Benefits of Lending Relationships: Evidence from Small Business Data". *Journal of Finance, 49*(1), 3-37. https://doi.org/10.1111/j.1540-6261.1994.tb04418.x

Rodríguez Reyes, M. y Díaz Salazar, P. (2015). "Las MIPYMES y la información contable en 'Mis Cuentas'". *Horizontes de la Contaduría*, 153-163. https://www.uv.mx/iic/files/2018/01/12-B051132.pdf

Saavedra García, M. L. y Bustamante Osorio, S. C. (2013). "El problema de financiamiento de la PYME y el sistema nacional de garantías en Colombia". *Contaduría, Universidad de Antioquia*, (62), 69-88.

Saavedra García, M. L. y Espíndola Armenta, G. (2016). "El uso de la planeación financiera en las pyme de TI de México". *Revista Ciencias Administrativas, 8*, 15-31. https://www.redalyc.org/journal/5116/511653788003/html

Saavedra García, M. L. y León Vite, E. L. (2014). "Alternativas de financiamiento para la Micro, Pequeña y Mediana Empresa Latinoamericana". *Revista Universitaria Ruta*, *16* (2), 5-31. https://doi.org/10.15443/RUTA2023497

Saavedra García, M. L., Milla Toro, S., y Tapia Sánchez, B. (2012). "Factores que impiden el acceso al financiamiento de la MIPyME: El caso de Querétaro". *Investigación en Ciencias Administrativas,* 3, 11-39, https://revistas.uas.edu.mx/index.php/ICA/article/view/1457?articlesBySimilarityPage=2

Saavedra García, M. L. y Saavedra García, M. E. (2015). "El impacto del entorno macroeconómico en el desarrollo de la MIPYME. El caso de México". *Hitos de Ciencias Económico Administrativas,* 21(59), 53-66. https://hdl.handle.net/20.500.14330/CLA01000430676

Saavedra García, M. L. y Tapia Melgarejo, A. R. (2013). "La problemática del financiamiento de la PYME en México: el caso de las sociedades financieras populares". *Revista Visión Contable, 11*(1), 79-131. https://doi.org/10.24142/rvc.n11a3

Smallbone, D. y Welter, F. (eds.). (2020). *A Research Agenda for Entrepreneurship Policy*. Edward Elgar Publishing

Tapia Melgarejo, A. (2013*).* "Fuentes alternas de financiamiento a corto plazo para las mipymes en México" (tesis de maestría). Universidad Nacional Autónoma de México (UNAM).

Tavera Cortés, M. E. y Salinas Callejas, E. (coords.). (2011). *Las MIPYME en México. Crecimiento, Financiamiento y Tecnología.* Instituto Politécnico Nacional.

Valdés Díaz de Villegas, J. A. y Sánchez Soto, G. A. (2012). "Las MIPYMES en el contexto mundial: sus particularidades en México". *Iberoforum*. *Revista de Ciencias Sociales de la Universidad Iberoamericana*, (VII), 126-156.

Vasconi, F. (2017). "Cómo lograr un correcto y más eficiente financiamiento para mi empresa". *IEEM Revista de Negocios, 20*(1), 56-59. https://www.haceremprесa.uy/wp-content/uploads/2018/12/IEEM-febrero-2017-emprendimiento-2.pdf

Zylfijaj, Kujtim y Nikoloski, Dimitar y Tournois, Nadine. (2020). "The Impact of the Business Environment on the Formalization of Informal Firms - The Case of Kosovo". *Comparative Southeast European Studies*, 68(4), 505-529. https://doi.org/10.1515/soeu-2020-0035

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Determinants of Carbon Disclosure Quality: The Role of Corporate Governance and Managerial Discretion in Mexico

Determinantes de la calidad de la divulgación de carbono: el papel del gobierno corporativo y la discreción gerencial en México

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Abstract

This study examines how corporate governance characteristics, managerial discretion (MD), and firms' network embeddedness (measured by board interlocks and centrality) affect the quality of carbon disclosure among firms listed on both the Mexican Stock Exchange (BMV) and the Institutional Stock Exchange (BIV) that are involved in the Carbon Disclosure Project (CDP). The research examines the internal and external dynamics of organizations and is grounded in agency and institutional theories. Using STATA 17, a dataset of 71 companies for the years 2016–2022 was created, and an ordinal logistic panel regression was used to evaluate the impact of corporate governance and MD on carbon disclosure. The primary conclusions imply that an environmental committee and board independence are useful for observing and enhancing sustainable reporting.

Resumen

Este estudio analiza cómo las características del gobierno corporativo, la discreción gerencial gerencial y la integración en la red empresarial (medida por el entrelazamiento y la centralidad de los consejos) afectan la calidad de la divulgación de carbono de las empresas que cotizan tanto en la Bolsa Mexicana de Valores (BMV) como en la Bolsa Institucional de Valores (BIVA) y participan en el Carbon Disclosure Project (CDP; en español, Proyecto de Divulgación de Carbono). La investigación examina la dinámica interna y externa de las organizaciones y se basa en las teorías de agencia e institucional. Mediante STATA 17, se creó un conjunto de datos de 71 empresas para el periodo 2016–2022 y se aplicó una regresión logística ordinal de panel para evaluar el impacto del gobierno corporativo y la discreción gerencial en la divulgación de carbono. Nuestras conclusiones principales indican que la independencia del comité ambiental y de la junta directiva resulta útil para observar y mejorar la presentación de informes de sostenibilidad.

KEYWORDS / PALABRAS CLAVE

Carbon disclosure, managerial discretion, board independence, board interlocks, agency theory / Divulgación de carbono, discreción gerencial, independencia del consejo, consejos entrelazados, teoría de agencia.

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1. Introduction

Carbon disclosure has become increasingly important in environmental disclosure (García et al., 2020; Hahn et al., 2015). The literature identifies two approaches to it: *i)* An opportunistic use aimed at obscuring poor practices and, *ii)* An informative approach intended to reduce information asymmetry and enhance transparency (He et al., 2022; Hopwood, 2009).

Managers may exploit information asymmetries between firms and their stakeholders (Hsueh, 2019) by using socially valued practices such as carbon disclosure (Haque & Ntim, 2020). In contrast, evidence supports the argument that voluntary disclosures increase companies' value (Yu et al., 2020). Greater disclosure can reduce information asymmetry, generating benefits such as increased legitimacy (Datt et al., 2019; O'Donovan, 2002), lower capital costs (García-Sánchez & Noguera-Gámez, 2017), and greater investment (Roychowdhury et al., 2019).

Companies implement corporate governance mechanisms to constrain opportunistic behavior and promote informative disclosure. These mechanisms include the establishment of various committees (Hossain & Farooque, 2019; Krishnamurti & Velayutham, 2018), board structures (Nguyen & Faff, 2006), and a larger number of board members (Wu et al., 2019), which contribute expertise and monitoring capacity. Additionally, companies may leverage connections within the business network, through board interlocks, to exchange experiences and information. These connections may influence disclosure quality by facilitating the dissemination of key facts, norms, and best practices, as well as by increasing external exposure and reputational pressures on firms (Briseño-García et al., 2022).

According to the literature, Latin American countries exhibit stakeholder conflicts, a prevalence of family-owned businesses, and limited attention to local interest groups (Husted & Sousa-Filho, 2019). In this context, managerial discretion (MD) becomes particularly relevant for voluntary disclosure practices (Raimo et al., 2020). High levels of discretion may affect environmental performance and compromise the quality of both financial and non-financial information (Wangrow et al., 2015).

In research on MD, the direct effects of the board of directors have been examined, as highlighted in a previous study (Velte et al., 2020). Previous studies have analyzed MD in relation to governance attributes such as board independence, board size, gender diversity, and the presence of sustainability or environmental committees (Jaggi et al., 2018; Kılıç & Kuzey, 2019). However, the literature on non-financial

disclosures has paid limited attention to the indirect effects of the board of directors on MD, understanding indirect effects as the influence of board characteristics on disclosure quality through MD as an intermediate mechanism. This gap is particularly salient in Latin American capital markets.

Accordingly, this study examines how MD, corporate governance, and ownership structure affect the quality of carbon disclosure among Mexican-listed firms participating in the Carbon Disclosure Project (CDP). Carbon disclosure is directly linked to greenhouse gas emissions, which are largely driven by human activities and have significant environmental impacts. Beyond performance metrics, carbon disclosure reflects firms' strategic responses to decarbonization challenges (Radu & Maram, 2020). Despite its growing prevalence, the quality of carbon disclosure remains uneven. This variability highlights the importance of examining firm-level determinants that shape firms' incentives and capacity to provide transparent and reliable carbon information.

2. Literature Review

2.1 Quality of Carbon Disclosure

Among the non-financial information that has gained significant importance in the last couple of decades, data related to Greenhouse Gas (GHG), particularly carbon dioxide stands out (Cumpean-Luna et al., 2022). Carbon disclosure has been defined in various ways in the literature; however, in every definition there is a consensus that it involves considering the risks, opportunities, benefits, and strategies companies undertake regarding their carbon-related information, similar as Velte et al. (2020) propose: Carbon disclosure is a tool that connects companies with both internal and external stakeholders, providing information about the company's carbon performance, strategies, and outlook. This term is closely linked to climate change because it focuses on carbon emissions. However, it is understood that companies consistently respond to pressure from institutions, investors, shareholders, and, primarily, customers, aiming to decarbonize the global economy to contribute to society's overall well-being (He et al., 2022).

The importance of corporate carbon disclosure varies depending on the perspective from which it is observed. It is significant from an economic standpoint primarily because the literature indicates that it can substantially impact company valuations

by affecting current and future costs of carbon compliance and mitigation, which may represent unaccounted liabilities (Borghei, 2021; He et al., 2022). It can also help companies obtain government subsidies, as is the case under mandatory carbon management reporting regimes, such as the European Union Emissions Trading System (EU ETS) (Tang & Demeritt, 2018).

In the literature on carbon-related information, few studies examine how the quality of Greenhouse Gas (GHG) reporting has developed, evolved, and improved (Comyns & Figge, 2015). Comyns and Figge (2015) conducted relevant research on the quality of such information. They measured disclosure quality using a self-constructed index based on seven dimensions: *i*) Accuracy; *ii)* Integrity; *iii)* Consistency; *iv)* Credibility; *v)* Relevance; *vi)* Timeliness, and *vii)* Transparency. Due to societal pressure over carbon and other GHG emissions, companies began taking action to reduce or offset their carbon footprints. Among these actions, carbon disclosure and performance are underscored; however, the quality of both remains to be determined by stakeholders.

As Pitrakkos and Maroun (2020) aptly state, "quantity" is not the same as "quality." Therefore, they conducted a study to measure the quality of carbon information reported by companies listed on the Johannesburg Stock Exchange. They assessed the quality of their information using eight characteristics of their reports, including: *i)* Density index; *ii)* Attribute; *iii).* Management orientation; *iv)* Integrated; *v) Assurance*; *vi)* Strategy; *vii)* Readability, and *viii)* Repetition. Their study found that disclosure quality is compromised by the level of carbon risk companies face and varies with the legitimacy strategy they employ. These perspectives are particularly relevant to this study, as factors such as legitimacy pressures, external stakeholder demands, and exposure to carbon-related risks shape firms' governance structures and influence MD in disclosure practices.

In the Mexican context, the institutional environment for carbon disclosure comprises both mandatory and voluntary mechanisms. Under the General Law on Climate Change (in Spanish, Ley General de Cambio Climático, LGCC), firms exceeding specific emissions thresholds must report their greenhouse gas emissions to the National Emissions Registry (in Spanish, Registro Nacional de Emisiones, RENE), which establishes a baseline for environmental transparency (Herrero et al., 2026). However, broader carbon disclosure practices remain largely voluntary and are often driven by participation in initiatives such as the CDP.

Previous research has shown that voluntary environmental programs in Mexico can generate spillover effects, encouraging firms to adopt improved environmental

practices and reporting behaviors beyond regulatory requirements (Henriques et al., 2012). More recently, the adoption of Sustainability Reporting Standards (in Spanish, Normas de Información de Sostenibilidad, NIS), aligned with international frameworks, including those issued by the International Sustainability Standards Board (ISSB), suggests a transition toward more standardized and potentially mandatory disclosure practices (IFRS®, 2025). This hybrid regulatory setting makes Mexico a relevant case for examining how governance mechanisms and firm-level characteristics influence the quality of carbon disclosure.

3. Hypothesis Development

Building on agency theory and with an institutional lens, this study argues that corporate governance mechanisms, ownership structures, and firms' network embeddedness shape the quality of carbon disclosure by either constraining or enabling MD. In this context, governance structures influence the incentives and monitoring capacity surrounding disclosure practices, while ownership and interorganizational relationships may affect both the transparency and credibility of reported environmental information.

3.1 Managerial Discretion (MD)

In general, shareholders and stakeholders are interested in organizations engaging in environmental and social practices that create greater value for the company, such as carbon disclosure through the CDP (Shen et al., 2020). Not all voluntary environmental disclosures, however, are value-enhancing. Prior et al. (2008) suggest that managers who align with Corporate Social Responsibility (CSR) activities, such as environmental disclosure, are not necessarily ethical and may use such disclosures to manipulate external stakeholders' perceptions or enhance their job security. Similarly, Velte et al. (2020, p. 14) mention that "Carbon performance and its disclosure are associated with increased managerial discretion, risks of greenwashing, and information overload."

In emerging economies such as Mexico, firms often adopt a defensive stance toward climate-related initiatives (Kolk et al., 2008) and exhibit relatively low levels of environmental responsiveness (Jeswani et al., 2008). Environmental information is frequently disclosed through sustainability reports, which allow greater MD, whereas

involvement in more demanding platforms, such as the CDP, remains limited (Ben-Amar et al., 2017; Matisoff et al., 2013).

Clarkson et al. (2008) note that voluntary environmental disclosure is susceptible to MD, representing an agency problem *per se* that could increase agency costs for companies. Such discretion may result in misleading disclosures and adversely affect stakeholders' decision-making (Callery & Perkins, 2021; Velte et al., 2020).

Similarly, García-Sánchez et al. (2018) find evidence that MD in CSR activities increases market uncertainty, a result comparable to that of Hambrick and Abrahamson (2017). As mentioned earlier, the director's interest is to increase the company's value by reducing information asymmetry. However, in emerging economies like Mexico, it remains challenging to find managers committed to environmental practices such as carbon disclosure, particularly when voluntary (Jeswani et al., 2008). Thus, given the results and arguments developed, and considering that MD may manifest particularly through opportunistic disclosure practices (e.g., greenwashing), which directly undermine the credibility and reliability of reported information (Velte, 2021; Callery & Perkins, 2021), the following hypothesis is proposed:

Hypothesis 1: Managerial discretion negatively affects the quality of carbon disclosure.

3.2 CEO Duality

CEO duality occurs when the same person holds both the CEO and Chairman of the Board positions within a company (Khlif et al., 2021; Pucheta-Martínez & Gallego-Álvarez, 2019). This structure concentrates executive and supervisory authority within a single individual (Al-Shaer et al., 2023; Husted & Sousa-Filho, 2019).

While some studies point to potential benefits, such as faster decision-making and leadership cohesion, agency theory emphasizes the governance risks associated with CEO duality. Power concentration, conflicts of interest, and weakened monitoring mechanisms may impair effective oversight and firm value (Gold et al., 2022; Khan et al., 2021).

From an agency perspective, CEO duality facilitates discretionary decision-making by limiting checks and balances within the board (Garcia-Sanchez et al., 2020). Separating the roles of CEO and board chair is therefore viewed as a governance mechanism that enhances transparency and accountability (Ahmad et al., 2017; Khan et al., 2021). Furthermore, conflicts of interest associated with CEO duality may

discourage investment in long-term sustainability initiatives, which typically entail uncertain, deferred returns (Berrone & Gomez-Mejia, 2009; Rashid et al., 2020). From this perspective, the concentration of power may also weaken the rigor and objectivity of disclosure processes, potentially affecting not only the extent but also the quality and credibility of carbon-related information (Garcia-Sanchez et al., 2020). Therefore, hypothesis 2 is proposed:

Hypothesis 2: CEO duality negatively impacts the quality of carbon disclosure.

3.3 Board Independence

Board independence has traditionally been considered an essential mechanism for shareholders to control and monitor management actions (Kılıç & Kuzey, 2019). Independent directors are less embedded in internal relationships, enabling more objective supervision of management decisions (Nguyen & Nielsen, 2010).

Agency theory suggests that independent boards mitigate managers' self-interested behavior and reduce information asymmetry (Eisenhardt, 1989; Jensen & Meckling, 1976). Previous research highlights the role of independent directors in enhancing transparency and accountability, particularly in areas where MD is pronounced, such as environmental disclosure (Wang & Oliver, 2009; Ammer et al., 2020; Yang et al., 2022).

Empirical evidence indicates that boards with greater independence are more likely to integrate environmental risks into decision-making and to ensure credible disclosure practices (Amiraslani et al., 2025; Ienciu et al., 2012).

Reputational concerns further motivate independent directors to promote truthful and high-quality disclosure (Fernández-Gago et al., 2018). In particular, independent directors may enhance disclosure quality by strengthening verification processes and limiting symbolic or purely impression-management reporting practices (Ammer et al., 2020; Yang et al., 2022). Based on the analyzed studies and the above arguments, hypothesis 3 is proposed:

Hypothesis 3: Board independence positively impacts the quality of carbon disclosure.

3.4 Environmental Committees

Environmental committees operate as specialized subcommittees within boards of directors, providing expertise and oversight on sustainability-related issues (Liao

et al., 2015; Martínez-Ferrero et al., 2021). Their primary role is to design, implement, and monitor environmental strategies, including decarbonization initiatives.

Similar to audit committees in financial reporting, environmental committees enhance the credibility and accuracy of environmental disclosure (Peters & Romi, 2014). Their existence signals organizational commitment to sustainability and facilitates communication with external stakeholders.

Empirical evidence suggests that environmental committees improve CSR strategies and environmental transparency, particularly in firms exposed to higher environmental risks (Orazalin, 2020). In emerging economies, Martínez-Ferrero et al. (2021) show that such committees strengthen firms' sustainability commitment and disclosure practices. Given the above, research hypothesis 4 is proposed:

Hypothesis 4: The presence of an environmental committee positively impacts the quality of carbon disclosure.

3.5 Network Centrality (Board Interlocks)

Board interlocks arise when directors serve on multiple boards simultaneously, creating interorganizational networks that position firms differently in terms of centrality (Palmer, 1983; Freeman, 1978). Firms occupying central positions within these networks benefit from greater visibility, access to information, and influence (Shropshire, 2019).

Institutional theory suggests that centrally positioned firms face stronger mimetic pressures, leading them to adopt widely accepted practices to maintain legitimacy (DiMaggio & Powell, 1983; Suchman, 1995). In the context of carbon disclosure, network centrality may encourage firms to emulate the sustainability practices of leading organizations (Briseño-García et al., 2022; Liu et al., 2022). Beyond adoption, such interorganizational connections may also influence the quality of disclosure by facilitating the dissemination of reporting standards and best practices, and exerting reputational pressures toward more credible and comprehensive environmental information (Lu et al., 2021).

Additionally, Lu et al. (2021) suggest that board interlocks can be crucial in reducing greenhouse gas emissions, highlighting the relevance of interfirm relationships for sustainability practices. The authors propose that this occurs because companies with fewer resources seek to imitate the environmental practices of more central

organizations that have greater resources for sustainability efforts. Considering the review of studies and the arguments presented, research hypothesis 5 is proposed:

Hypothesis 5: The centrality of companies positively impacts the quality of carbon disclosure.

3.6 Family Ownership

Family businesses can be understood through structure-based, inter-organizational, and aspiration-based approaches (Litz, 1995). This study uses a structure-based approach, defining family businesses as those in which ownership and control are concentrated within the family unit. However, the degree of ownership and control may vary (Litz, 1995). These businesses are characterized by having the founder or a family member, by blood or marriage, playing a role in the company, either as an executive, director, or shareholder, individually or collectively (Villalonga & Amit, 2006).

Regarding environmental considerations, companies under family control tend to be more aware of environmental impact and are inclined to pollute less, according to the socioemotional wealth model (Berrone et al., 2010). Additionally, by their essential nature, these businesses contribute significantly to two critical forms of social capital: businesses and families. In Mexico, this plays a significant role as most companies in the Mexican market (around 60–70%) are family-owned (San Martin-Reyna & Duran-Encalada, 2012). These companies have historically cultivated social and business connections, both matrimonial and entrepreneurial, resulting in widespread interconnectedness (Chavarín-Rodríguez, 2011; Chavarín-Rodríguez & Ríos, 2018). Based on the literature review and the above reasons, research hypothesis 6 was formulated:

Hypothesis 6: Family-owned businesses positively impact the quality of carbon disclosure.

4. Methodological Design

4.1 Data Collection

Data collection was carried out across three sources and at various stages. In the first phase, information for the dependent variable was gathered. Information was collected manually from the CDP website (s.f.), which served as the primary

source for this paper, consistent with other studies (Elsayih et al., 2018; Luo, 2019). The dependent variable is the quality of Carbon Disclosure (CD). The CDP website collects and disseminates data on greenhouse gas emissions from companies and cities worldwide (Charumathi & Rahman, 2019).

In the second phase, Bloomberg databases* were consulted to obtain financial statements and related financial information. This database allowed for the collection of data to subsequently calculate the MD variable and the "environmental committee" variable (Env_Comm), as well as other control variables (e.g., profitability—return on assets—(ROA), firm size (F_size), financial leverage (Lev), and industry).

Finally, companies' annual reports (BIVA, s.f.) were downloaded for the mentioned period and served two purposes. Firstly, to fill in missing data from the Bloomberg databases in some variables that include financial information, and secondly, to gather information on the members of the board of directors, as well as the qualifications they possess on each of these boards (e.g., independence, family ties, related parties, among others).

This study excluded companies in the financial sector because, in terms of their accounting, they operate differently from other companies, making it challenging to obtain the first independent variable, MD (Dechow et al., 1995). Also, companies with missing data in the Carbon Disclosure Leadership Index (CDLI)—a widely accepted measurement index developed by experts from the CDP and the accounting firm PricewaterhouseCoopers (PwC) (Krishnamurti & Velayutham, 2018)—and incomplete or discontinued financial information were also removed. The final sample comprised 71 companies and 309 firm-year observations.

4.2 Measurement of Variables

4.2.1 Dependent Variable

As a source for the dependent variable, Mexican companies' involvement in the CDP was used. CDP is a nonprofit organization that has been collecting greenhouse gas emissions data through questionnaires since 2002 (Lewis et al., 2014). It primarily includes large, publicly listed firms with significant exposure to international

* When citing Bloomberg databases, please note that they were accessed via the Bloomberg terminal located at the EGADE Business School, Tecnológico de Monterrey, in 2022.

investors, as participation is voluntary yet often driven by stakeholders and market pressures. Its classification is based on the CDLI.

Based on content analysis, the CDLI calculates disclosure levels from companies' responses to its questionnaire. Specifically, the CDLI evaluates the completeness, consistency, and strategic integration of disclosed information, assigning scores based on predefined criteria applied to firms' responses. This measurement is divided into five disclosure levels for companies: insufficient information (F), disclosure (D-, D), awareness (C-, C), management (B-, B), and leadership level (A-, A) (Jiang et al., 2021). The score increases based on carbon disclosure. A high score reflects comprehensive reporting on internal practices, strategies, and carbon governance, as well as explicit consideration of business-specific climate-change risks and opportunities. In short, a higher score on the CDLI indicates higher-quality carbon disclosure, as it captures not only the extent of disclosure but also the completeness, consistency, and strategic integration of carbon-related information, as reflected in firms' responses to CDP questionnaires (Jiang et al., 2021).

Given the voluntary nature of CDP participation, it is important to acknowledge the potential for sample selection bias, as firms with greater transparency, resources, or exposure to international stakeholders may be more likely to disclose their carbon-related information through this platform.

4.2.2 Independent Variables

4.2.2.1 Managerial Discretion (MD)

For this study, MD is operationalized through earnings management, following Martínez-Ferrero et al. (2017). Earnings management is used to measure MD because it is, *per se*, a discretionary behavior of managers focused on financial statements, and this practice is challenging to observe (Beneish, 2001). It is argued that managers who use their judgment to manipulate financial and regulated information can do the same, and more efficiently, with non-financial and unregulated information. This assumption is consistent with the argument developed in H1, which posits that MD is expected to affect disclosure quality negatively by fostering opportunistic reporting, thereby reducing the credibility and reliability of non-financial information. Following Dechow et al. (1995), earnings management was estimated using the modified Jones model, which decomposes total accruals into discretionary and non-discretionary components through a regression-based approach. The focus is on finding the discretionary accruals, which capture MD in financial reporting. This method is widely

used in the literature for its ability to control for firm-specific economic conditions and has been applied in emerging-market contexts, such as Mexico (Cumpean-Luna et al., 2021).

4.2.2.2 CEO Duality

CEO duality is a crucial concept in the business domain, referring to the situation in which an individual simultaneously serves as both CEO (Chief Executive Officer) and chairman of the board within the same organization (Ahmad et al., 2017). Following the approach used by previous studies (Elsayih et al., 2021; Khlif et al., 2021), the CEO_Duality variable is defined as a binary variable that takes the value "1" if the CEO also holds the position of chairman of the board of directors in the same organization during the study period and "0" otherwise.

4.2.2.3 Board Independence

To ensure that decisions made in publicly traded companies are as transparent as possible and largely avoid potential conflicts of interest among stakeholders, the National Banking and Securities Commission's Law (in Spanish, Ley de la Comisión Nacional Bancaria y de Valores, LCNBV) stipulates an essential requirement. This requirement mandates that at least 33% of the board of directors' members must be external independent directors. Based on the consulted literature, board independence (B_Ind) was measured as a percentage, defined as the number of independent directors of company i in year j divided by the total number of directors of company i in year j (Wu et al., 2019).

4.2.2.4 Environmental Committee

The environmental committee is vital in today's business landscape, addressing environmental issues and promoting sustainable practices in operations and decisions (Liao et al., 2015). An environmental committee in an organization can significantly influence its approach to environmental responsibility and its ability to mitigate adverse environmental impacts (Orazalin, 2020). In this study, the presence of the environmental committee (Env_Comm) is measured using a dichotomous indicator. Following a similar measurement approach used in previous research, the Env_Comm variable is defined as a binary variable equal to "1" if the organization has an operational environmental committee during the analyzed period and "0" if it does not (Martínez-Ferrero et al., 2021).

4.2.2.5 Network Centrality

One requirement for companies listed on the Mexican Stock Exchange (Bolsa Mexicana de Valores, BMV) and the Institutional Stock Exchange (Bolsa Institucional de Valores, BIVA) is to report on the composition of their board of directors. Their annual reports list the members who served each company. The members' data were collected manually by consulting each of the annual reports of the companies listed on the BMV and BIVA for the period 2016-2022. After collecting the names of each member of the sample of 71 companies, a process was developed to determine the total number of shared directors for each company. Subsequently, the calculation of companies' centrality in Mexico's stock exchange network began.

The centrality degree is a fundamental concept in organizational network analysis, introduced by Freeman (1978). This variable measures the importance and influence of a particular node within a network, providing quantitative insight into its position relative to other nodes (Macaulay et al., 2018). Measuring centrality is essential for understanding how information, communication, and power flow through an interconnected network of actors (Takes & Heemskerk, 2016). In line with the theoretical arguments developed in H5, this measure also captures firms' exposure to shared reporting practices and reputational pressures, which may influence the quality and credibility of carbon disclosure.

4.2.2.6 Family Ownership

Family-controlled companies are those in which ownership and management are concentrated within a family unit. Specifically, a company is considered family-owned when controlling shareholders and their family, either through blood or marriage ties, own 5% or more of the company's stock, and at least one of them holds the position of CEO, chairman of the board, vice president, or registered member of the board of directors (Villalonga & Amit, 2006).

The measurement of the family ownership variable aims to identify and categorize companies in which a family unit strongly influences control and decision-making. This approach considers both shareholding and the occupation of key leadership positions in the company by members of the owning family. The choice of a 5% or higher threshold for share ownership and leadership presence is based on previous research indicating that this level of participation is indicative of significant control and influence over the company (Choi et al., 2015). This threshold is consistent with prior literature and reflects meaningful ownership influence in contexts with concentrated ownership structures, such as emerging markets.

Overall, the variables operationalize the study's theoretical framework by capturing how corporate governance mechanisms, MD, ownership structure, and network centrality jointly influence the quality of carbon disclosure.

4.2.3 Control Variables

Corporate governance, financial, and industry-related variables were used as control variables. Firstly, corporate governance mechanisms such as board size (B_size) (Cheng, 2008) and the industry to which company i belongs (Borghei et al., 2016; Zhou et al., 2018) were added. Then, within the financial variables, company size (F_size) (Córdova et al., 2018), profitability (ROA) (Ben-Amar et al., 2017), and financial leverage (Lev) (Ganda, 2018; Hahn et al., 2015) were included.

The size of the board of directors plays a crucial role in decision-making and prioritizing environmental matters (Nguyen & Faff, 2006). The various dynamics and perspectives on the board can influence the company's willingness to disclose its carbon footprint. Additionally, this willingness is influenced by disclosure demands and expectations specific to each industry. In carbon-intensive sectors, the pressure to disclose environmental information is higher (Alsaifi et al., 2020). Table 1 presents the quantification of each variable under study, along with the respective data sources (see Table 1).

Table 1. Measures of the Variables

Variable	Definition / Operationalization	Measurement	Source
DC	Carbon disclosure quality based on firms' responses to CDP questionnaires	Ordinal (F to A) according to CDLI	CDP website
DG	Managerial discretion proxied by accrual-based earnings management	Discretionary accruals (Dechow et al., 1995)	Bloomberg
CEO_Duality	CEO simultaneously holds the position of Chair of the Board	Dummy (1 = duality; 0 = otherwise)	Bloomberg
B_Ind	Proportion of independent directors on the board	% of independent directors	Bloomberg
Env_Comm	Existence of a formal environmental/ sustainability committee	Dummy (1 = exists; 0 = otherwise)	Bloomberg
Centrality	Firm's degree of centrality based on board interlocks	Number of shared directors per firm-year	Annual reports

Variable	Definition / Operationalization	Measurement	Source
F_ Ownership	Family ownership with control and managerial involvement	Dummy (1 = ≥5% ownership + family member in top management/board; 0 = otherwise)	Annual reports
F_Size	Firm size	Natural logarithm of total assets	Bloomberg
B_Size	Board size	Total number of board members	Annual report
ROA	Firm profitability	Return on assets	Bloomberg
Lev	Financial leverage	Total debt/ total assets	Bloomberg
Industry dummies	Industry classification (Industrial, Materials, Consumer Staples, Telecom, Non-basic consumer goods)	Binary variables	Annual reports

Source: Prepared by the author.

4.3 Analysis Techniques and Data Robustness

4.3.1 Multivariate Ordinal Logistic Regression

Because the dependent variable in this study (DC) is measured in an ordinal form (CDLI levels), an ordinal logistic regression model is appropriate, as it accounts for the ordered nature of the categories without assuming a continuous distribution (Hair et al., 2014).

4.3.2 Econometric Model

Based on the literature and the discussions in the previous sections, the following econometric model is used in this research to test the formulated hypotheses:

$$P(y_{it} = j) = \beta_0 + \beta_1 DG_{it} + \beta_2 CEO\_Duality_{it} + \beta_3 B\_Ind_{it} + \beta_4 Env\_comm_{it} + \beta_5 Centrality_{it} + \beta_6 F\_Ownership_{it} + \beta_7 Controls_{it} + \mu_{it}$$

5. Results

5.1 Descriptive Results

This panel descriptive table provides more detailed information than cross-sectional statistics, especially when examining variable characteristics over time, including standard deviations, minimums, and maximums for the "Between" and "Within" methods. Table 2 displays the panel descriptives for this research (see Table 2).

Table 2. Panel Descriptives of Variables

Variable	Mean	Standard Deviation	Min	Max	N	n	T-bar
DC (VD)	2.05	2.57	0.00	8.00	308	71	4.34
DG (VI)	0.03	0.03	0.00	0.14	308	71	4.34
CEO_Duality (VI)	0.24	0.43	0.00	1.00	308	71	4.34
B_Ind (VI)	0.51	0.19	0.00	1.00	308	71	4.34
Env_Comm (VI)	0.22	0.42	0.00	1.00	308	71	4.34
Centrality (VI)	7.62	5.93	0.00	25.00	308	71	4.34
F_ownership (VI)	0.89	0.32	0.00	1.00	308	71	4.34
F_Size (VC)	11.32	1.28	7.36	15.76	308	71	4.34
B_Size (VC)	12.15	3.47	3.00	21.00	308	71	4.34
ROA (VC)	4.21	6.41	-46.90	35.67	308	71	4.34
Lev (VC)	33.27	20.37	0.00	88.42	308	71	4.34
Indust (VC)	0.31	0.46	0.00	1.00	308	71	4.34
Mat (VC)	0.22	0.42	0.00	1.00	308	71	4.34
PCF (VC)	0.28	0.45	0.00	1.00	308	71	4.34
ST (VC)	0.07	0.26	0.00	1.00	308	71	4.34
SyBCNB (VC)	0.11	0.32	0.00	1.00	308	71	4.34

Notes: DV: Dependent Variable; IV: Independent Variable; CV: Control Variable; N: number of observations; n: number of panels (groups); T-bar: average years for each panel.

CD: Carbon Disclosure, MG: Managerial Discretion; CEO_Duality: CEO Duality; B_Ind: Board Independence; Env_Comm: Environmental Committee; Centrality: Network Centrality; F_Ownership: Family Ownership; F_Size: Firm Size; B_Size: Board Size; ROA: Return on Assets; Lev: Financial Leverage; Indust: Industrial; Mat: Materials; PCF: Fast-Moving Consumer Goods; ST: Telecommunications Services; SyBCNB: Non-Basic Consumer Goods and Services

Source: Prepared by the author.

As shown in Table 2, most variables have 308 observations, with 71 groups (companies) per year. Regarding the normality assumption for the data, it is important to note that it is optional in ordinal logistic regression. This is due to the inherent peculiarities of the variables involved and the estimation methodology employed. In this sense, the variables do not need to be normally distributed to conduct an ordinal logistic regression analysis appropriately (Hair et al., 2014).

5.2 Statistical Analysis and Model Robustness

Following the methodology proposed by Dahlmann et al. (2019) for endogeneity, the first stage involved estimating the probability that organizations implement practices related to MD, CEO duality, corporate governance, network centrality, and family ownership. Preliminary findings from the model suggest that the quality of carbon emissions disclosure is not a statistically significant predictor in three of the six analyzed models ($\beta = -0.049$, $P > z = 0.539$). Multicollinearity was also tested using the variance inflation factor (VIF) method, which indicated no multicollinearity among these variables ($VIF < 3.3$). Finally, tests for heteroscedasticity and serial autocorrelation were conducted using the Breusch-Pagan and Wooldridge tests (Wooldridge, 2010), respectively (Breusch & Pagan, 1980; Greene, 2018). Both tests provided evidence of heteroscedasticity and serial autocorrelation.

Given that the dependent variable (DC) is ordinal, the primary estimation approach in this study is the ordinal logistic regression model. However, to address heteroscedasticity and serial autocorrelation and to assess the robustness of the results, the Feasible Generalized Least Squares (FGLS) technique is additionally employed as a complementary estimation strategy. In this context, FGLS treats the dependent variable as continuous, thereby correcting these econometric issues and providing a robustness check for the main findings.

By transforming the original data, the FGLS method seeks to eliminate or reduce the effects of heteroscedasticity and autocorrelation, resulting in a model that satisfies the classical regression assumptions and yields more reliable and efficient estimators (Greene, 2018).

The results from both the ordinal logistic regression and FGLS models are consistent in direction and statistical significance, supporting the robustness of the empirical findings.

Seven regression models were constructed using the Feasible Generalized Least Squares (FGLS) method. Table 3 and Table 3a present the results from the models analyzed (see Table 3 and Table 3a). Regarding the developed models, Model 1 was developed to corroborate the effect of control variables on the dependent variable (DC).

Table 3. Regression Models using the Feasible Generalized Least Squares Method (FGLS)

	Model 1			**Model 2**			**Model 3**			**Model 4**		
DC	β	S.E.	P>z	β	S.E.	P>z	β	S.E.	P>z	β	S.E.	P>z
DG				-1.038	4.681		-0.842	4.698		0.975	4.708	
CEO_Duality							-0.138	0.290		-0.253	0.291	
B_Ind										1.668	0.672	**
Env_Comm												
Centrality												
F_ownership												
F_Size	0.811	0.102	***	0.807	0.103	***	0.808	0.103	***	0.829	0.102	***
B_Size	0.147	0.039	***	0.147	0.039	***	0.149	0.039	***	0.162	0.039	***
ROA	0.034	0.020	*	0.034	0.020	*	0.034	0.020	*	0.032	0.020	
Lev	0.016	0.007	**	0.016	0.007	**	0.016	0.007	**	0.013	0.007	**
Indust	0.241	0.427		0.237	0.427		0.205	0.432		0.174	0.428	
Mat	0.660	0.458		0.649	0.460		0.620	0.464		0.637	0.460	
PCF	0.352	0.444		0.332	0.453		0.307	0.456		0.394	0.453	
ST	0.272	0.592		0.257	0.596		0.231	0.598		0.234	0.592	
SyBCNB (omitted)												
_cons	-9.927	1.147	***	-9.847	1.203	***	-9.823	1.203	***	-11.027	1.286	***
N° obs	308			308			308			308		
N° groups	71			71			71			71		
Obs per group	1-7			1-7			1-7			1-7		
Wald Chi2(8) =	139.44			139.51			139.84			148.81		
Prob > chi2 =	0.0000			0.0000			0.0000			0.0000		

Source: Prepared by the author.

Table 3a. Extension of Regression Models using the Feasible Generalized Least Squares Method (FGLS)

	Model 5			**Model 6**			**Model 7**		
DC	β	S.E.	P>z	β	S.E.	P>z	β	S.E.	P>z
DG	1.288	4.592		0.060	4.575		0.925	4.555	
CEO_Duality	-0.162	0.285		-0.379	0.295		-0.236	0.300	
B_Ind	1.344	0.660	**	1.839	0.684	**	1.797	0.679	**
Env_Comm	1.188	0.297	***	0.977	0.307	***	0.884	0.307	**
Centrality				-0.072	0.029	**	-0.056	0.030	*
F_ownership							-0.956	0.430	**
F_Size	0.866	0.100	***	0.925	0.102	***	0.846	0.107	***
B_Size	0.148	0.039	***	0.213	0.047	***	0.218	0.046	***
ROA	0.024	0.020		0.021	0.020		0.018	0.019	
Lev	0.008	0.007		0.012	0.007	*	0.008	0.007	
Indust	0.117	0.418		0.097	0.414		-0.002	0.413	
Mat	0.550	0.449		0.709	0.449		0.665	0.446	
PCF	0.357	0.441		0.161	0.444		0.127	0.441	
ST	0.503	0.581		0.537	0.576		0.611	0.572	
SyBCNB									
_cons	-11.168	1.255	***	-12.269	1.321	***	-10.538	1.525	***
N° obs	308			308			308		
N° groups	71			71			71		
Obs per group	1-7			1-7			1-7		
Wald Chi2(8) =	172.49			181.9			189.76		
Prob > chi2 =	0.0000			0.0000			0.0000		

Note: ***p<0.01 **p<0.05 *p<0.1

Source: Prepared by the author.

Next, the first independent variable (DG) is included in Model 2. In this case, including only the first predictor variable yielded a negative coefficient (β = -1.038) with no significant effect (P> z = 0.825). This value changes from Model 4 onwards, with a positive sign in subsequent models. In Model 3, the second predictor variable (CEO_ Duality) was included, with a coefficient (β = -0.138) and p-value (P > z = 0.633), indicating

no statistical significance for the dependent variable. Unlike Model 1, the previous predictor variable, CEO_Duality, shows a consistently negative effect in the remaining models. For Model 4, the variable B_Ind was added, which showed a positive and significant relationship with DC (β = 1.669, P > z = 0.013). As with the previous variable, B_Ind did not lose significance or change sign in subsequent models.

Moving to Model 5, the Env_Comm variable was added, which has the most significant value for DC in these models (β = 1.189, P > z = 0.000). Similarly, its results remained consistent. Subsequently, Model 6 was analyzed, including the Centrality variable. This variable showed a significant but contrary-to-expected effect, negatively impacting DC. Finally, to test the hypotheses, Model 7 was analyzed, which includes all the study variables, including family ownership. The findings of this model allow decisions to be made about the rejection or non-rejection of the hypotheses. Given the ordinal logistic specification, coefficients can be interpreted in terms of odds ratios (exp(β)), indicating the change in the likelihood of moving to a higher category of the dependent variable.

Starting with H1, it is observed that the direction of the effect is positive, contrary to what was proposed in the hypothesis development, and its p-value does not show adequate significance (β = 0.925 and P>z = 0.839). Continuing with H2, Model 7 shows an effect consistent with the hypothesis developed in the hypothesis development section; as with the previous variable, it lacks statistical significance (β = -0.235, P > z = 0.432), so H2 is rejected. Regarding H3, B_Ind showed a significant effect in the theoretically predicted direction (β = 1.797, P > z = 0.008), supporting H3. In odds-ratio terms, this implies that firms with higher board independence are approximately six times more likely to achieve higher levels of carbon disclosure quality. Similarly, for H4, Env_Comm showed a positive and significant effect on the quality of carbon disclosure (β = 0.883, P > z = 0.004), supporting H4. This suggests that firms with environmental committees are about 2.4 times more likely to achieve higher disclosure levels.

Moving on to H5, the analysis yielded an interesting result for centrality since, although it showed a significant effect on the dependent variable, it was in the opposite direction (negative effect) (β = -0.055 and P>z = 0.066) to what was proposed in the theoretical section, which is why H5 was rejected. This indicates a slight reduction (5%) in the likelihood of reaching higher disclosure categories. Similarly, F_Ownership showed a significant effect but was inconsistent with the hypothesis development (β = -0.955, P > z = 0.026), so H6 had to be rejected. This result implies a substantial reduction (around 62%) in the likelihood of achieving higher disclosure quality.

6. Discussion

Through the theoretical lenses of agency theory and institutional theory, this research aimed to shed light on the mechanisms and underlying forces that shape decisions and practices regarding the quality of carbon disclosure in the Mexican business context. Thus, the first hypothesis suggested that MD, as measured by earnings management, would diminish the quality of companies' carbon disclosure listed on the Mexican stock market. However, the results obtained do not support this expectation. Although the relationship shows a positive sign, contrary to expectations, no significant effect is observed between earnings management and the quality of carbon disclosure, so H1 is rejected.

The second hypothesis is related to CEO duality, for which, in line with agency theory, a negative effect on the quality of carbon disclosure was proposed, appealing to phenomena inherent to the CEO duality phenomenon, such as power concentration in one person, lack of checks and balances (Walls & Hoffman, 2013), as well as a potential risk of conflicts of interest between management and shareholders or interest groups (Khlif et al., 2021).

However, similar to the first hypothesis, this paper's findings show results in the expected direction (negative), but they do not reach statistical significance, leading to the rejection of H2. In the literature, studies in developed countries, specifically the United States, such as Walls and Hoffman (2013), have found no statistically significant effect between these two variables. They argue that this concentration of power may affect decision-making and organizational behavior, thereby limiting the influence of independent directors. Similarly, in developing countries, a non-significant relationship can be found both in Latin America (Briano-Turrent & Saavedra-García, 2015) and in Malaysia (Ahmad et al., 2017), attributing it mainly to the lack of separation between the roles of CEO and chairperson, which may lead to less attention to CSR reporting, as the CEO's focus is primarily on operational and financial performance.

These results should be interpreted with caution, as the lack of statistical significance does not provide sufficient evidence to draw definitive theoretical implications about governance dynamics. These first two hypotheses have significant implications for agency theory, particularly for the "principal-principal" approach (Husted & Sousa-Filho, 2019). Rather than indicating a confirmed shift in theoretical frameworks, these findings may suggest a potential context-specific dynamic in which traditional monitoring mechanisms do not strongly influence disclosure quality.

The lack of pressure on managers to improve carbon disclosure could be cautiously interpreted as an alignment of interests between key corporate players (shareholders and managers) with short-term goals. However, this relationship is not directly tested in the empirical model. This could contribute to the literature on agency theory by suggesting that, in specific contexts, such as the Mexican one, the "principal-principal" approach may offer a complementary perspective to the traditional "principal-agent" conflict, which focuses more on the long term (Peng & Sauerwald, 2013), rather than implying its substitution.

The results for H3 reveal that board independence positively and significantly affects the quality of carbon disclosure by Mexican companies listed on the stock market, so this hypothesis is not rejected. This positive relationship between board independence and the quality of carbon disclosure supports the formulated hypothesis. It suggests that having an independent board of directors can foster more transparent disclosure practices and a commitment to environmental issues (García-Sánchez *et al.*, 2018).

As for H4, a positive effect was hypothesized between the presence of an environmental committee and the quality of carbon disclosure. The results of this study showed a positive and significant effect, which does not invalidate H4. It is worth noting that the studies in the literature were all conducted on companies in developed countries. To the best of this author's knowledge, this study contributes to the limited literature examining the presence of an environmental committee and the quality of environmental disclosure, specifically carbon disclosure, in the context of a developing country. The most similar study is by Martínez-Ferrero et al. (2021), which finds that establishing a CSR committee is crucial for managing CSR-related opportunities and risks, ensuring the achievement of corporate objectives, and meeting stakeholders' needs and demands.

Regarding the fifth hypothesis, which posits that companies' centrality would positively affect the quality of carbon disclosure, the results yielded an unexpected conclusion. It was found that firm centrality has a significant but negative effect on the quality of carbon disclosure, so the hypothesis is rejected. This implies that, contrary to the initial hypothesis (H5), more central companies in the Mexican business network tend to provide lower-quality carbon disclosure. These results, which differ from expected theoretical relationships, should be interpreted with caution. While previous literature generally suggests that network centrality may facilitate the dissemination of practices, its specific effect on disclosure quality remains less clear, which may help explain the observed divergence.

Several alternative explanations should be considered in this particular context, including measurement limitations in capturing network centrality or model specification effects that may influence the observed relationship. Therefore, these findings highlight the need for further research on the role of interorganizational networks in shaping disclosure quality. Although it is possible to consider that network position may interact with managerial behavior, such as discretion in disclosure practices, this mechanism is not directly tested in this study and should be interpreted as exploratory.

Finally, the results for H6 contradicted expectations, indicating a significant negative effect on the quality of carbon disclosure; thus, H6 is rejected. These results are surprising, primarily because most of the study's subject companies are family-owned and have long been present in the Mexican market (San Martin-Reyna & Duran-Encalada, 2012). Therefore, it was expected that firms would demonstrate a strong commitment to social welfare and normative pressures, taking actions to benefit the environment, such as improving the quality of carbon disclosure. However, the results showed the opposite: family-owned companies reduced the quality of carbon disclosure. These findings may reflect competing theoretical mechanisms in which socioemotional wealth considerations coexist with incentives for opacity and for the preservation of control. Consequently, the negative relationship should be interpreted as context-dependent rather than as definitive evidence of a single underlying explanation.

7. Conclusions

This study reveals significant findings on the determinants of carbon disclosure quality among Mexican companies involved in the CDP and listed on the Mexican stock market. Firstly, it has been determined that MD and duality do not significantly affect the quality of carbon disclosure. The results should be interpreted with caution, as the absence of statistical significance does not imply the absence of underlying governance dynamics; rather, it suggests that their effects may be context-dependent or influenced by other organizational factors.

In contrast, the findings demonstrate that board independence and the presence of an environmental committee have a positive and significant impact on the quality of carbon disclosure. This suggests that having an independent board and forming committees dedicated to environmental issues fosters greater accountability and transparency regarding carbon emissions and sustainability. More broadly, these

results highlight a pattern in which internal governance mechanisms play a more consistent role in enhancing disclosure quality.

Furthermore, the results show that network centrality and family ownership negatively affect the quality of carbon disclosure among the companies studied. These findings highlight the importance of considering context and ownership structure when analyzing environmental disclosure quality. Rather than suggesting an inherent limitation, these results may reflect differences in incentives, monitoring effectiveness, and strategic priorities associated with ownership, concentration, and network positioning.

Overall, the study contributes to the literature by integrating corporate governance, MD, and network perspectives in an emerging-market context, thereby providing a more comprehensive understanding of the determinants of carbon disclosure quality. From a practical perspective, the findings suggest that strengthening governance mechanisms may be more effective than relying solely on ownership structures or network position to improve disclosure practices. From a policy perspective, these results indicate that regulatory efforts to enhance transparency may benefit more from promoting governance mechanisms than from relying exclusively on mandatory disclosure requirements.

Finally, some limitations should be acknowledged, including the use of earnings management as a proxy for MD, the ordinal nature of the dependent variable, and the complementary use of alternative estimation techniques. Additionally, the focus on firms involved in CDP may limit the generalizability of the findings, as these companies are more likely to exhibit greater transparency and stakeholder engagement. Future research could explore different measures and contexts to further validate and extend these findings.

References

Ahmad, N. B., Rashid, A., & Gow, J. (2017). CEO Duality and Corporate Social Responsibility Reporting: Evidence from Malaysia. Corporate Ownership and Control, 14(2), 69–81. https://doi.org/10.22495/cocv14i2art7

Alsaifi, K., Elnahass, M., & Salama, A. (2020). Market Responses to Firms' Voluntary Carbon Disclosure: Empirical Evidence from the United Kingdom. Journal of Cleaner Production, 262, 121377. https://doi.org/10.1016/j.jclepro.2020.121377

Al-Shaer, H., Albitar, K., & Liu, J. (2023). CEO Power and CSR-Linked Compensation for Corporate Environmental Responsibility: UK Evidence. Review of Quantitative Finance and Accounting, 60(3), 1025–1063. https://doi.org/10.1007/s11156-022-01118-z

Amiraslani, H., Deller, C., Ittner, C. D., & Keusch, T. (2025). Board Risk Oversight and Environmental and Social Performance, Journal of Accounting and Economics, 79(2-3), 101754. https://doi.org/10.1016/j.jacceco.2024.101754

Ammer, M. A., Aliedan, M. M., & Alyahya, M. A. (2020). Do Corporate Environmental Sustainability Practices Influence Firm Value? The Role of Independent Directors: Evidence from Saudi Arabia. Sustainability, 12(22), 1–21. https://doi.org/10.3390/su12229768

Ben-Amar, W., Chang, M., & McIlkenny, P. (2017). Board Gender Diversity and Corporate Response to Sustainability Initiatives: Evidence from the Carbon Disclosure Project. Journal of Business Ethics, 142(2), 369–383. https://doi.org/10.1007/s10551-015-2759-1

Beneish, M. D. (2001). Earnings Management: A Perspective. Managerial Finance, 27(12), 3–17. https://doi.org/10.1108/03074350110767411

Berrone, P., Cruz, C., Gomez-Mejia, L. R., & Larraza-Kintana, M. (2010). Socioemotional Wealth and Corporate Responses to Institutional Pressures: Do Family-Controlled Firms Pollute Less? Administrative Science Quarterly, 55(1), 82–113. https://doi.org/10.2189/asqu.2010.55.1.82

Berrone, P., & Gomez-Mejia, L. R. (2009). Environmental Performance and Executive Compensation: An Integrated Agency-Institutional Perspective. Academy of Management Journal, 52(1), 103–126. https://doi.org/10.5465/amj.2009.36461950

Bolsa Institucional de Valores (BIVA). (s.f.). Emisoras inscritas. https://www.biva.mx/empresas/emisoras_inscritas/emisoras_inscritas

Borghei, Z. (2021). Carbon Disclosure: A Systematic Literature Review. Accounting & Finance, 61(4), 5255–5280. https://doi.org/10.1111/acfi.12757

Borghei, Z., Leung, P., & Guthrie, J. (2016). The Nature of Voluntary Greenhouse Gas Disclosure: An Explanation of the Changing Rationale: Australian Evidence. Meditari Accountancy Research, 24(1), 111–133. https://doi.org/10.1108/MEDAR-02-2015-0008

Breusch, T. S., & Pagan, A. R. (1980). The Lagrange Multiplier Test and Its Applications to Model Specification in Econometrics. The Review of Economic Studies, 47(1), 239–253. https://doi.org/10.2307/2297111

Briano-Turrent, G. del C., & Saavedra-García, M. L. (2015). La composición del consejo de administración y la estructura accionaria como factores explicativos de la transparencia en el gobierno corporativo en Latinoamérica: evidencia en empresas cotizadas de Argentina, Brasil, Chile y México. Estudios Gerenciales, 31, 275–286. https://www.elsevier.es/es-revista-estudios-gerenciales-354-articulo-la-composicion-del-consejo-administracion-S012359231500011X

Briseño-García, A., William Husted, B., & Arango-Herera, E. (2022). Do Birds of a Feather Certify Together? The Impact of Board Interlocks on CSR Certification Homophily. Journal of Business Research, 144, 336–344. https://doi.org/10.1016/j.jbusres.2022.01.080

Callery, P. J., & Perkins, J. (2021). Detecting False Accounts in Intermediated Voluntary Disclosure. Academy of Management Discoveries, 7(1), 40–56. https://doi.org/10.5465/amd.2018.0229

Carbon Disclosure Project (CDP). (s.f.). https://cdp.net/en/data/scores

Charumathi, B., & Rahman, H. (2019). Do Women on Boards Influence Climate Change Disclosures to CDP? Evidence from Large Indian Companies. Australasian Accounting, Business and Finance Journal, 13(2), 5–31. https://doi.org/10.14453/aabfj.v13i2.2

Chavarín-Rodríguez, R. (2011). Los grupos económicos en México a partir de una tipología de arquitectura y gobierno corporativos. Una revisión de sus explicaciones teóricas. El Trimestre Económico, 78(309), 193–234. https://doi.org/10.20430/ete.v78i309.31

Chavarín-Rodríguez, R., & Ríos, J. G. (2018). Los diez mayores grupos económicos de México y su impacto económico. CIMEXUS, 13(2), 175–199. https://cimexus.umich.mx/index.php/cimexus/article/view/295

Cheng, S. (2008). Board Size and the Variability of Corporate Performance. Journal of Financial Economics, 87(1), 157–176. https://doi.org/10.1016/j.jfineco.2006.10.006

Choi, Y. R., Zahra, S. A., Yoshikawa, T., & Han, B. H. (2015). Family Ownership and R&D Investment: The Role of Growth Opportunities and Business Group Membership. Journal of Business Research, 68(5), 1053–1061. https://doi.org/10.1016/j.jbusres.2014.10.007

Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2008). Revisiting the Relation Between Environmental Performance and Environmental Disclosure: An Empirical Analysis. Accounting, Organizations and Society, 33(4–5), 303–327. https://doi.org/10.1016/j.aos.2007.05.003

Comyns, B., & Figge, F. (2015). Greenhouse Gas Reporting Quality in the Oil And Gas Industry. Accounting, Auditing & Accountability Journal, 28(3), 403–433. https://doi.org/10.1108/AAAJ-10-2013-1498

Córdova, C., Zorio-Grima, A., & Merello, P. (2018). Carbon Emissions by South American Companies: Driving Factors for Reporting Decisions and Emissions Reduction. Sustainability, 10(7), 1–16. https://doi.org/10.3390/su10072411

Cumpean-Luna,J., Briseño, A., & Arango, E. (2021). Gestión de ganancias en el riesgo de quiebra de las empresas públicas mexicanas. Revista de Ciencias Sociales, 27(1), 127-143. https://doi.org/10.31876/rcs.v27i1.35302

Cumpean-Luna, J., Briseño, A., & Zorrilla Del Castillo, A. L. (2022). To Disclose or Not to Disclose? A Bibliometric Analysis of Carbon Disclosure [¿Divulgar o no divulgar? Un análisis bibliométrico de la divulgación de carbono]. Trascender: Contabilidad y Gestión, 7(21), 143-165. https://doi.org/10.36791/tcg.v7i21sept-dic.178

Dahlmann, F., Branicki, L., & Brammer, S. (2019). Managing Carbon Aspirations: The Influence of Corporate Climate Change Targets on Environmental Performance. Journal of Business Ethics, 158(1), 1–24. https://doi.org/10.1007/s10551-017-3731-z

Datt, R. R., Luo, L., & Tang, Q. (2019). The Impact of Legitimacy Threat on the Choice of External Carbon Assurance. Accounting Research Journal, 32(2), 181–202. https://doi.org/10.1108/ARJ-03-2017-0050

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting Earnings Management. The Accounting Review, 70(2), 193–225. https://www.jstor.org/stable/248303

DiMaggio, P. J., & Powell, W. W. (1983). The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. American Sociological Review, 48(2), 147–160. https://doi.org/10.2307/2095101

Eisenhardt, K. M. (1989). Agency Theory: An Assessment and Review. Academy of Management Review, 14(1), 57–74. https://doi.org/10.2307/258191

Elsayih, J., Datt, R., & Hamid, A. (2021). CEO Characteristics: Do They Matter for Carbon Performance? An Empirical Investigation of Australian Firms. Social Responsibility Journal, 17(8), 1279–1298. https://doi.org/10.1108/SRJ-04-2020-0130

Elsayih, J., Tang, Q., & Lan, Y.-C. (2018). Corporate Governance and Carbon Transparency: Australian Experience. Accounting Research Journal, 31(3), 405–422. https://doi.org/10.1108/ARJ-12-2015-0153

Fernández-Gago, R., Cabeza-García, L., & Nieto, M. (2018). Independent Directors' Background and CSR Disclosure. Corporate Social Responsibility and Environmental Management, 25(5), 991–1001. https://doi.org/10.1002/csr.1515

Freeman, L. C. (1978). Centrality in Social Networks Conceptual Clarification. Social Networks, 1(3), 215–239. https://doi.org/10.1016/0378-8733(78)90021-7

Ganda, F. (2018). The Effect of Carbon Performance on Corporate Financial Performance in a Growing Economy. Social Responsibility Journal, 14(4), 895–916. https://doi.org/10.1108/SRJ-12-2016-0212

García, E. A. da R., Carvalho, G. M. de, Boaventura, J. M. G., & Souza Filho, J. M. de. (2020). Determinants of Corporate Social Performance Disclosure: a Literature Review. Social Responsibility Journal, 17(4), 445–468. https://doi.org/10.1108/SRJ-12-2016-0224

García-Sánchez, I. M., Martínez-Ferrero, J., & García-Benau, M. A. (2018). Integrated Reporting: The Mediating Role of the Board of Directors and Investor Protection on Managerial Discretion in Munificent Environments. Corporate Social Responsibility and Environmental Management, 26(1), 29–45. https://doi.org/10.1002/csr.1655

García-Sánchez, I. M., & Noguera-Gámez, L. (2017). Integrated Information and the Cost of Capital. International Business Review, 26(5), 959–975. https://doi.org/10.1016/j.ibusrev.2017.03.004

Garcia-Sanchez, I. M., Raimo, N., & Vitolla, F. (2020). CEO Power and Integrated Reporting. Meditari Accountancy Research, 29(4), 908-942. https://doi.org/10.1108/MEDAR-11-2019-0604

Gold, N. O., Taib, F. M., & Ma, Y. (2022). Firm-Level Attributes, Industry-Specific Factors, Stakeholder Pressure, and Country-Level Attributes: Global Evidence of What Inspires Corporate Sustainability Practices and Performance. Sustainability, 14(20). https://doi.org/10.3390/su142013222

Greene, W. H. (2018). Econometric Analysis (6th ed). Prentice Hall.

Hahn, R., Reimsbach, D., & Schiemann, F. (2015). Organizations, Climate Change, and Transparency: Reviewing the Literature on Carbon Disclosure. Organization and Environment, 28(1), 80–102. https://doi.org/10.1177/1086026615575542

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). Multivariate Data Analysis (7th ed.). Pearson Education Limited.

Hambrick, D. C., & Abrahamson, E. (2017). Assessing Managerial Discretion Across Industries: A Multimethod Approach. Academy of Management Journal, 38(5), 1427–1441. https://doi.org/10.5465/256864

Haque, F., & Ntim, C. G. (2020). Executive Compensation, Sustainable Compensation Policy, Carbon Performance and Market Value. British Journal of Management, 31(3), 525–546. https://doi.org/10.1111/1467-8551.12395

He, R., Luo, L., Shamsuddin, A., & Tang, Q. (2022). Corporate Carbon Accounting: A Literature Review of Carbon Accounting Research from the Kyoto Protocol to the Paris Agreement. Accounting & Finance, 62(1), 261–298. https://doi.org/10.1111/acfi.12789

Henriques, I., Husted, B. W., & Montiel, I. (2012). Spillover Effects of Voluntary Environmental Programs on Greenhouse Gas Emissions: Lessons from Mexico. Journal of Policy Analysis and Management, 32(2), 296-322. https://doi.org/10.1002/pam.21675

Herrero, M., Escoto, C., Manzo, L., & Ramírez, G. (2026). Environment & Climate Change Laws and Regulations Report 2026 Mexico. In D. Abrahams & T. Gillett (Eds.), Environment and Climate Change Law 2026: A Practical Cross-Border Resource to Inform Legal Minds (23rd ed.). International Comparative Legal Guides. https://iclg.com/practice-areas/environment-and-climate-change-laws-and-regulations/mexico

Hopwood, A. G. (2009). Accounting and the Environment. Accounting, Organizations and Society, 34(3–4), 433–439. https://doi.org/10.1016/j.aos.2009.03.002

Hossain, M., & Farooque, O. (2019). The Emission Trading System, Risk Management Committee and Voluntary Corporate Response to Climate Change: A CDP Study. International Journal of Accounting & Information Management, 27(2), 262–283. https://doi.org/10.1108/IJAIM-04-2017-0050

Hsueh, L. (2019). Opening up the Firm: What Explains Participation and Effort in Voluntary Carbon Disclosure by Global Businesses? An Analysis of Internal Firm Factors and Dynamics. Business Strategy and the Environment, 28(7), 1302–1322. https://doi.org/10.1002/bse.2317

Husted, B. W., & Sousa-Filho, J. M. de. (2019). Board Structure and Environmental, Social, and Governance Disclosure in Latin America. Journal of Business Research, 102, 220–227. https://doi.org/10.1016/j.jbusres.2018.01.017

Ienciu, I.-A., Popa, I. E., & Ienciu, N. M. (2012). Environmental Reporting and Good Practice of Corporate Governance: Petroleum Industry Case Study. Procedia Economics and Finance, 3, 961–967. https://doi.org/10.1016/S2212-5671(12)00258-4

International Financial Reporting Standards (IFRS®) Foundation. (2025). IFRS Sustainability Disclosure Standards (ISSB Standards): Application Around the World: Jurisdictional Profile: Mexico. https://www.ifrs.org/content/dam/ifrs/publications/sustainability-jurisdictions/pdf-profiles/mexico-ifrs-profile.pdf

Jaggi, B., Allini, A., Macchioni, R., & Zagaria, C. (2018). The Factors Motivating Voluntary Disclosure of Carbon Information: Evidence Based on Italian Listed Companies. Organization and Environment, 31(2), 178–202. https://doi.org/10.1177/1086026617705282

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. Journal of Financial Economics, 3(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Jeswani, H. K., Wehrmeyer, W., & Mulugetta, Y. (2008). How Warm is the Corporate Response to Climate Change? Evidence from Pakistan and the UK. Business Strategy and the Environment, 17(1), 46–60. https://doi.org/10.1002/bse.569

Jiang, Y., Luo, L., Xu, J., & Shao, X. (2021). The Value Relevance of Corporate Voluntary Carbon Disclosure: Evidence from the United States and BRIC Countries. Journal of Contemporary Accounting & Economics, 17(3), 100279. https://doi.org/10.1016/j.jcae.2021.100279

Khan, M. K., Ammar Zahid, R. M., Saleem, A., & Sági, J. (2021). Board Composition and Social & Environmental Accountability: A Dynamic Model Analysis of Chinese Firms. Sustainability, 13(19). https://doi.org/10.3390/su131910662

Khlif, H., Samaha, K., & Amara, I. (2021). Internal Control Quality and Voluntary Disclosure: Does CEO Duality Matter? Journal of Applied Accounting Research, 22(2), 286–306. https://doi.org/10.1108/JAAR-06-2020-0114

Kılıç, M., & Kuzey, C. (2019). The Effect of Corporate Governance on Carbon Emission Disclosures: Evidence from Turkey. International Journal of Climate Change Strategies and Management, 11(1), 35–53. https://doi.org/10.1108/IJCCSM-07-2017-0144

Kolk, A., Levy, D., & Pinkse, J. (2008). Corporate Responses in an Emerging Climate Regime: The Institutionalization and Commensuration of Carbon Disclosure. European Accounting Review, 17(4), 719–745. https://doi.org/10.1080/09638180802489121

Krishnamurti, C., & Velayutham, E. (2018). The Influence of Board Committee Structures on Voluntary Disclosure of Greenhouse Gas Emissions: Australian Evidence. Pacific-Basin Finance Journal, 50, 65–81. https://doi.org/10.1016/j.pacfin.2017.09.003

Lewis, B. E. N. W., Walls, J. L., & Dowell, G. W. S. (2014). Difference in Degrees: CEO Characteristics and Firm Environmental Disclosure. Strategic Management Journal, 35(5), 712–722. https://doi.org/10.1002/smj.2127

Liao, L., Luo, L., & Tang, Q. (2015). Gender Diversity, Board Independence, Environmental Committee and Greenhouse Gas Disclosure. British Accounting Review, 47(4), 409–424. https://doi.org/10.1016/j.bar.2014.01.002

Litz, R. A. (1995). The Family Business: Toward Definitional Clarity. Family Business Review, 8(2), 71–81. https://doi.org/10.1111/j.1741-6248.1995.00071.x

Liu, N., Hu, H., & Wang, Z. (2022). The Relationship Between Institutional Pressure, Green Entrepreneurial Orientation, and Entrepreneurial Performance: The Moderating Effect of Network Centrality. Sustainability, 14(19), 12055. https://doi.org/10.3390/su141912055

Lu, J., Yu, D., Mahmoudian, F., Nazari, J. A., & Herremans, I. M. (2021). Board Interlocks and Greenhouse Gas Emissions. Business Strategy and the Environment, 30(1), 92–108. https://doi.org/10.1002/bse.2611

Luo, L. (2019). The Influence of Institutional Contexts on the Relationship Between Voluntary Carbon Disclosure and Carbon Emission Performance. Accounting & Finance, 59(2), 1235–1264. https://doi.org/10.1111/acfi.12267

Macaulay, C. D., Richard, O. C., Peng, M. W., & Hasenhuttl, M. (2018). Alliance Network Centrality, Board Composition, and Corporate Social Performance. Journal of Business Ethics, 151(4), 997–1008. https://doi.org/10.1007/s10551-017-3566-7

Martínez-Ferrero, J., Lozano, M. B., & Vivas, M. (2021). The Impact of Board Cultural Diversity on a Firm's Commitment Toward the Sustainability Issues of Emerging

Countries: The Mediating Effect of a CSR Committee. Corporate Social Responsibility and Environmental Management, 28(2), 675–685. https://doi.org/10.1002/csr.2080

Martínez-Ferrero, J., Villarón-Peramato, Ó., & García-Sánchez, I. M. (2017). Can Investors Identify Managerial Discretion in Corporate Social Responsibility Practices? The Moderate Role of Investor Protection. Australian Accounting Review, 27(1), 4–16. https://doi.org/10.1111/auar.12138

Matisoff, D. C., Noonan, D. S., & O'Brien, J. J. (2013). Convergence in Environmental Reporting: Assessing the Carbon Disclosure Project. Business Strategy and the Environment, 22(5), 285–305. https://doi.org/10.1002/bse.1741

Nguyen, H., & Faff, R. (2006). Impact of Board Size and Board Diversity on Firm Value: Australian Evidence. Corporate Ownership and Control, 4(2 A), 24–32. https://doi.org/10.22495/cocv4i2p2

Nguyen, B. D., & Nielsen, K. M. (2010). The Value of Independent Directors: Evidence from Sudden Deaths. Journal of Financial Economics, 98(3), 550–567. https://doi.org/10.1016/j.jfineco.2010.07.004

O'Donovan, G. (2002). Environmental Disclosures in the Annual Report: Extending the Applicability and Predictive Power of Legitimacy Theory. Accounting, Auditing & Accountability Journal, 15(3), 344–371. https://doi.org/10.1108/09513570210435870

Orazalin, N. (2020). Do Board Sustainability Committees Contribute to Corporate Environmental and Social Performance? The Mediating Role of Corporate Social Responsibility Strategy. Business Strategy and the Environment, 29(1), 140–153. https://doi.org/10.1002/bse.2354

Palmer, D. (1983). Broken Ties: Interlocking Directorates and Intercorporate Coordination. Administrative Science Quarterly, 28(1), 40. https://doi.org/10.2307/2392384

Peng, M. W., & Sauerwald, S. (2013). Corporate Governance and Principal–Principal Conflicts. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199642007.013.0029

Peters, G. F., & Romi, A. M. (2014). Does the Voluntary Adoption of Corporate Governance Mechanisms Improve Environmental Risk Disclosures? Evidence from Greenhouse Gas Emission Accounting. Journal of Business Ethics, 125(4), 637–666. https://doi.org/10.1007/s10551-013-1886-9

Pitrakkos, P., & Maroun, W. (2020). Evaluating the Quality of Carbon Disclosures. Sustainability Accounting, Management and Policy Journal, 11(3), 553–589. https://doi.org/10.1108/SAMPJ-03-2018-0081

Prior, D., Surroca, J., & Tribó, J. A. (2008). Are Socially Responsible Managers Really Ethical? Exploring the Relationship between Earnings Management and Corporate Social Responsibility. Corporate Governance: An International Review, 16(3), 160–177. https://doi.org/10.1111/j.1467-8683.2008.00678.x

Pucheta-Martínez, M. C., & Gallego-Álvarez, I. (2019). An International Approach of the Relationship Between Board Attributes and the Disclosure of Corporate Social Responsibility Issues. Corporate Social Responsibility and Environmental Management, 26(3), 612–627. https://doi.org/10.1002/csr.1707

Radu, C., & Maram, S. (2020). The Value Relevance of Reported Carbon Emissions. Journal of Management and Governance, 25, 347-377. https://doi.org/10.1007/s10997-020-09547-5

Raimo, N., Vitolla, F., Marrone, A., & Rubino, M. (2020). The Role of Ownership Structure in Integrated Reporting Policies. Business Strategy and the Environment, 29(6), 2238–2250. https://doi.org/10.1002/bse.2498

Rashid, A., Shams, S., Bose, S., & Khan, H. (2020). CEO Power and Corporate Social Responsibility (CSR) Disclosure: Does Stakeholder Influence Matter? Managerial Auditing Journal, 35(9), 1279-1312. https://doi.org/10.1108/MAJ-11-2019-2463

Roychowdhury, S., Shroff, N., & Verdi, R. S. (2019). The Effects of Financial Reporting and Disclosure on Corporate Investment: A Review. Journal of Accounting and Economics, 68(2–3), 1–27. https://doi.org/10.1016/j.jacceco.2019.101246

San Martin-Reyna, J. M., & Duran-Encalada, J. A. (2012). The Relationship Among Family Business, Corporate Governance and Firm Performance: Evidence from the Mexican Stock Exchange. Journal of Family Business Strategy, 3(2), 106–117. https://doi.org/10.1016/j.jfbs.2012.03.001

Shen, Y., Su, Z. W., Huang, G., Khalid, F., Farooq, M. B., & Akram, R. (2020). Firm Market Value Relevance of Carbon Reduction Targets, External Carbon Assurance and Carbon Communication. Carbon Management, 11(6), 549–563. https://doi.org/10.1080/17583004.2020.1833370

Shropshire, C. (2019). Board Interlocks and Diversification Strategies. In D. D. Bergh (Ed.), Oxford Research Encyclopedia of Business and Management. Oxford University Press. https://doi.org/10.1093/acrefore/9780190224851.013.149

Suchman, M. C. (1995). Managing Legitimacy: Strategic and Institutional Approaches. Academy of Management Review, 20(3), 571–610. https://doi.org/10.2307/258788

Takes, F. W., & Heemskerk, E. M. (2016). Centrality in the Global Network of Corporate Control. Social Network Analysis and Mining, 6(1), 97. https://doi.org/10.1007/s13278-016-0402-5

Tang, S., & Demeritt, D. (2018). Climate Change and Mandatory Carbon Reporting: Impacts on Business Process and Performance. Business Strategy and the Environment, 27(4), 437–455. https://doi.org/10.1002/bse.1985

Velte, P. (2021). Environmental Performance, Carbon Performance and Earnings Management: Empirical Evidence for the European Capital Market. Corporate Social Responsibility and Environmental Management, 28(1), 42–53. https://doi.org/10.1002/csr.2030

Velte, P., Stawinoga, M., & Lueg, R. (2020). Carbon Performance and Disclosure: A Systematic Review of Governance-Related Determinants and Financial Consequences. Journal of Cleaner Production, 254, 120063. https://doi.org/10.1016/j.jclepro.2020.120063

Villalonga, B., & Amit, R. (2006). How Do Family Ownership, Control and Management Affect Firm Value? Journal of Financial Economics, 80(2), 385–417. https://doi.org/10.1016/j.jfineco.2004.12.005

Walls, J. L., & Hoffman, A. J. (2013). Exceptional Boards: Environmental Experience and Positive Deviance from Institutional Norms. Journal of Organizational Behavior, 34(2), 253–271. https://doi.org/10.1002/job.1813

Wang, Y., & Oliver, J. (2009). Board Composition and Firm Performance Variance: Australian Evidence. Accounting Research Journal, 22(2), 196–212. https://doi.org/10.1108/10309610910987510

Wangrow, D. B., Schepker, D. J., & Barker, V. L. (2015). Managerial Discretion: An Empirical Review and Focus on Future Research Directions. Journal of Management, 41(1), 99–135. https://doi.org/10.1177/0149206314554214

Wooldridge, J. M. (2010). Econometric Analysis of Cross Section and Panel Data (2nd ed). The MIT Press. http://www.jstor.org/stable/j.ctt5hhcfr

Wu, K., Sorensen, S., & Sun, L. (2019). Board Independence and Information Asymmetry: Family Firms Vs Non-Family Firms. Asian Review of Accounting, 27(3), 329–349. https://doi.org/10.1108/ARA-05-2018-0110

Yang, H., Yao, D. (Troy), & Qu, X. (2022). How Does Independent Directors' Reputation Influence Pay-For-Performance? Evidence from China. Accounting & Finance, 62(1), 959–1007. https://doi.org/10.1111/acfi.12815

Yu, H.-C., Kuo, L., & Ma, B. (2020). The Drivers of Carbon Disclosure: Evidence from China's Sustainability Plans. Carbon Management, 11(4), 399–414. https://doi.org/10.1080/17583004.2020.1796142

Zhou, Z., Zhou, H., Peng, D., Chen, X., & Li, S. (2018). Carbon Disclosure, Financial Transparency, and Agency Cost: Evidence from Chinese Manufacturing Listed Companies. Emerging Markets Finance and Trade, 54(12), 2669–2686. https://doi.org/10.1080/1540496X.2018.1428796

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- Deberá incluir una introducción que refleje con claridad los antecedentes del trabajo, su desarrollo y conclusiones.
- Las notas de pie de página deberán estar en la hoja correspondiente y deberán usarse para aclarar conceptos o cuestiones editoriales, pero no para las referencias bibliográficas.

Requisitos para referencias bibliográficas (normas APA 7.ª edición) y formato de materiales

Referencias bibliográficas

1. Solo deben incluirse las referencias citadas en el texto, sin agregar ni omitir ninguna. Estas deberán aparecer completas en una sección independiente, al final del artículo, antes de cualquier apéndice.
2. Las referencias se organizarán de acuerdo con el sistema de citación APA (7.ª edición):
   - **Alfabéticamente** por el apellido del primer autor.
   - **Cronológicamente**, dentro de cada autor, desde las publicaciones más antiguas a las más recientes.
3. Toda fuente citada en el cuerpo del texto debe estar incluida en las referencias. Esto es válido para:
   - Artículos científicos.

- Libros.
- Documentos oficiales.
- Leyes, bases de datos u otros materiales de consulta.

Cada referencia debe contener toda la información necesaria para identificar la fuente, incluyendo el **DOI** (Digital Object Identifier) cuando esté disponible. Es obligatorio verificar que las URL asociadas al DOI sean funcionales y que sigan este formato: https://doi.org/

En caso de fuentes con acceso restringido (como periódicos de pago o bases de datos cerradas), **no se incluirá la URL**.

Correspondencia entre texto y referencias

Los autores deben garantizar una correspondencia exacta entre las citas en el texto y las entradas en la lista de referencias:

- Todos los trabajos citados deben figurar en la bibliografía.
- Verificar cuidadosamente la ortografía de los nombres de los autores y las fechas de publicación.

Ejemplos de formato APA (7.ª edición) para las referencias

1. **Libros**

   Formato

   - Autor (apellido e inicial del nombre). Año de publicación (entre paréntesis). Título del libro (en cursivas). Número de edición (si es relevante, entre paréntesis). Editorial.

   Ejemplo:

   - Castel, R. (1997). *Las metamorfosis de la cuestión social: Una crónica del asalariado* (1.ª ed.). Paidós.

   Libros con múltiples autores

   - De Mattos, C. y Ducci, M. E. (2005). *Santiago en la globalización: ¿una nueva ciudad?* (2.ª ed.). Lom.

   Nota: En libros con tres o más autores, se usará *et al.* después del primer autor:

   - Dellanegra, G. *et al*. (1983). *Los países del Atlántico Sur: Geopolítica de la Cuenca de la Plata.* Pleamar.

2. **Artículos de revistas**

   Formato

   - Autor (apellido, inicial del nombre). Año (entre paréntesis). Título del artículo. Nombre de la revista (en cursivas), volumen (en cursivas), número (entre paréntesis), intervalo de páginas. DOI o URL, si está disponible.

   Ejemplo:

   - Gardner, H. (1983). La teoría de las inteligencias múltiples. *Revista Española de Investigación en Educación*, *9*(2). https://ict.edu.ar/renovacion/wp-content/uploads/2012/02/Gardner_inteligencias.pdf

3. Bases de datos y fuentes electrónicas

- World Bank (WB). (s.f.). *Poverty and Inequality Platform (PIP).* Recuperado el 27 de noviembre de 2024 de https://pip.worldbank.org/home

Siempre buscar e incluir el DOI, si está disponible. El DOI se puede buscar en: http://search.crossref.org/

Formato de materiales gráficos y tablas

1. Ilustraciones, fotografías y diagramas

- Cada elemento debe incluir leyenda, título, numeración consecutiva (Figura 1, Figura 2, etc.), y la fuente de origen.
- Las imágenes deben estar libres de derechos de autor y enviarse en alta resolución (300 dpi).
- Los diagramas deben enviarse en versión editable para su corrección (pdf, ppt u otros).

2. Tablas y gráficas

- Se deben crear en Word o Excel, con títulos claros y numeración consecutiva (Tabla 1, Gráfica 1, etc.) y en versión editable para su corrección.
- El título debe estar centrado y en negritas (tipografía Arial). En la parte inferior, la fuente se indicará en letra de 10 puntos.

Nota: Las fuentes de tablas o gráficas que no sean de elaboración propia también deben incluirse en la lista de referencias bibliográficas.

Ecuaciones y apéndices

1. Ecuaciones

- Presentar cada ecuación en una línea separada, centrada y numerada consecutivamente en el margen derecho (p. ej., (1), (2), (3)).

2. Pruebas matemáticas y tablas extensas

- Si son demasiado amplias, deben incluirse en un apéndice. Los autores deben explicar los resultados y su significado en el cuerpo del texto.

Otros

- Información del autor(es): en la última página deberán incluirse los datos generales del autor (es): nombre completo, centro o departamento al que se encuentra(n) adscrito(s) laboralmente, dirección postal institucional, dirección de correo electrónico, orcid y un breve resumen de su experiencia académica (no mayor a 250 palabras).
- Los manuscritos deben ir acompañados de la Carta de originalidad y la Autorización para comunicación pública de obra literaria (artículo).

Acerca de este sistema de publicación

Esta revista utiliza Open Journal Systems (https://openjournalsystems.com), que es un gestor de revistas de acceso abierto y un *software* desarrollado, financiado y distribuido de forma gratuita por el proyecto Public Knowledge Project sujeto a la Licencia General Pública de GNU.

Guidelines for Authors

The Anáhuac Journal is a semiannual publication from the School of Business and Economics at Universidad Anáhuac Mexico.

The Anáhuac Journal receives unpublished articles that have not appeared in any print or electronic media, nor have been simultaneously proposed for publication in other journals or editorial entities.

Articles should come from research and studies, and offer original results in the following subject areas:

a) Corporate law
b) Corporate government
c) Corporate social responsibility
d) Corporate ethics
e) Leadership and Management
f) Entrepreneurship and Innovation
g) Marketing
h) Economics and Strategy
i) Finance and Accounting
j) Decision making
k) Economics
l) Innovation

About the Process

1. *The Anáhuac Journal* uses the OPJ (Open Journal Systems) editorial management system, and all manuscripts submitted shall be uploaded to this system. Authors are required to register and submit their articles along with:

– Letter of Originality

All authors and co-authors sign it and provide its data.

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– Authorization for public communication of literary works (article)

https://www.anahuac.mx/mexico/files/Authorization%20for%20public%20communication%20of%20literary%20work_Revistas%20Univ%20Anahuac%20Mexico.docx

2. Works are submitted to two judges, who will anonymously determine whether: a) to publish the work without changes, b) to publish the work with minor corrections, c) to publish the work after a complete review, or d) to reject the work. In the event the judges are not in agreement in their decision, the text will be sent to a third judge, whose decision will be final. All works submitted will be considered by judges not affiliated with the author's institution.

3. Accepted articles will be published in the journal and authors will be notified of this decision within four months from the submission of the original document.

4. The journal reserves the right to make the editorial changes it deems necessary.

Requirements and Formal Aspects for Submitting Works

As part of the submission process, authors are required to confirm their article meets all the following elements. Submissions that do not meet these guidelines will be returned to the author. In accordance with editorial policies, all submissions shall be received through this platform; manuscripts that are sent directly by e-mail will not be received. In addition, you must read and comply with all editorial policies set forth in the "Policies" section of the journal's website menu: https://revistas.anahuac.mx/index.php/the_anahuac_journal/index

including the policy on the use of artificial intelligence (AI) and the code of ethics, among others.

Minimum Structure of the Work

- WORD format (.doc or .docx), Arial Font, 12 points and 1.5 cm spacing.
- The maximum length is 25 pages letter size (215.9 x 279.4 mm), including tables, charts, references and appendices.
- Articles may be written in Spanish or English and should include title of the article and an abstract in both languages. In all cases, including articles in Spanish, the stylistic quality of the final version is the responsibility of the author or authors.
- Abstract of up to 180 words, which should include 5 keywords maximum and the JEL (Journal of Economic Literature) classification, which can be downloaded from: https://www.aeaweb.org/econlit/jelCodes.php?view=jel
- The title, abstract and keywords in Spanish and English should be placed at the beginning of the article.
- An introduction should be included that clearly reflects the work's background, development and conclusions.
- Footnotes should appear on the corresponding page and should not be used for bibliographical references.

Requirements for Bibliographic References (APA 7th edition) and Format of Materials

Bibliographical References

1. Only references cited in the text should be included, without adding or omitting any. These should appear in full in an independent section, at the end of the article, before any appendix.
2. References should be organized according to the APA citation system (7th edition):
    - **Alphabetically** by the last name of the first author.
    - **Chronologically**, within each author, from the earliest to the most recent publications.
3. All sources cited in the body of the text must be included in the references. This is valid for:
    - Scientific articles.
    - Books.
    - Official documents.
    - Laws, databases or other reference materials.

Each reference must contain all the necessary information to identify the source, including the **DOI** (Digital Object Identifier) when available. It is mandatory to verify that the URLs associated with the DOI are functional and follow this format: https://doi.org/

In the case of sources with restricted access (such as pay journals or closed databases), **the URL should not be included**.

Correspondence Between Text and References

Authors must ensure an exact correspondence between citations in the text and entries in the reference list:

- All works cited should be listed in the bibliography.
- Carefully check the spelling of the authors' names and the references in the bibliography.

Examples of APA Format (7th edition) for References

1. **Books**

   Format

   - Author (last name and first initial). Year of publication (in parentheses). Title of the book (in italics). Edition number (if relevant, in parentheses). Publisher.

   Example:

   - Castel, R. (1997). *Las metamorfosis de la cuestión social: Una crónica del asalariado* (1st ed.). Paidós.

   Multi-Authored books

   - De Mattos, C., & Ducci, M. E. (2005). *Santiago en la globalización: ¿una nueva ciudad?* (2nd. ed.). Lom.

   Note: In books with three or more authors, et al. should be used after the first author:

   - Dellanegra, G. et al. (1983). *Los países del Atlántico Sur: Geopolítica de la Cuenca de la Plata*. Pleamar.

2. **Journal Articles**

   Format

   - Author (last name, first initial). Year (in parentheses). Title of the article. Name of the journal (in italics), volume (in italics), number (in parentheses), page range. DOI or URL, if available.

   Example:

   - Gardner, H. (1983). La teoría de las inteligencias múltiples. *Revista Española de Investigación en Educación*, *9*(2). http://ict.edu.ar/renovacion/wp-content/uploads/2012/02/Gardner_inteligencias.pdf

3. **Databases and Electronic Sources**

   - World Bank (WB) (n.d.). Poverty and Inequality Platform (PIP). Retrieved November 27, 2024 from https://pip.worldbank.org/home.

Always search for and include the DOI, if available. The DOI can be searched at: http://search.crossref.org/

Format of Graphical Materials and Tables

1. **Illustrations, photographs and diagrams**
    - Each element must include caption, title, consecutive numbering (Figure 1, Figure 2, etc.), and the source of origin.
    - Images should be copyright free and sent in high resolution (300 dpi).
    - Diagrams should be sent in editable version for correction (pdf, ppt or others).
2. **Tables, graphs & figures**
    - They should be created in Word or Excel, with clear titles and consecutive numbering (Table 1, Graph 1, etc.) and in editable version for correction.
    - The title should be centered and in bold (Arial font). At the bottom, the font should be indicated in 10-point font.

Note: The sources of tables or graphs that are not self-made should also be included in the list of bibliographical references.

Equations and Appendices

1. **Equations:**
    - Each equation should be presented on a separate line, centered and numbered consecutively in the right margin (e.g., (1), (2), (3)).
2. **Extensive mathematical proofs and tables**
    - If they are too extensive, they should be included in an appendix. Authors should explain the results and their significance in the body of the text.

Others

- Author information: general information about the author(s) should be included on the last page: full name, center or department and/or university, zip code of the institution, e-mail address, orcid, and a summary of their academic experience (no more than 250 words).
- Manuscripts should be accompanied by the Letter of Originality and Authorization for public communication of literary works (article).

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