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Social culture and lean–green practices: perspectives from medium and large firms in Ecuador

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Abstract

Purpose – This study explores how social culture (SC) influences the adoption of lean–green practices (LGN) in medium- and large-sized firms in Ecuador. Drawing on Hofstede's cultural framework, it examines how cultural dimensions – Power Distance (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance (UAI), Long-Term Orientation (LTO), and Indulgence (IVR) – shape managerial values and, ultimately, the implementation of lean–green strategies. These strategies are considered across three main domains: supplier relationships (RLS), customer relationships (SCR), and internal business processes (BSP).

Design/methodology/approach – The research applied a non-experimental, correlational design, using an online survey with 262 senior executives from companies listed in the Merco corporate reputation ranking. Data were analyzed through structural equation modeling (SEM).

Findings – Results show that all cultural dimensions have a significant effect on lean–green practices. Among them, LTO and MAS stand out as particularly influential in shaping SCR and BSP.

Originality/value – By linking social culture directly to lean–green practices, this study positions culture as a strategic enabler of organizational sustainability. It offers practical guidance for aligning sustainability initiatives with cultural values, highlighting implications that are especially relevant for firms operating in dynamic and fast-changing emerging economies.

Keywords Continuous improvement, Total productive maintenance, Lean 4.0, Leadership for lean, Design for lean six sigma

Paper type Research paper

1. Introduction

Culture influences how individuals and organizations perceive their environment, attribute meaning to their actions and make decisions (McCracken, 1986). In organizational contexts, cultural values operate as a form of "collective mental programming" (Hofstede, 2011), guiding strategic orientations, leadership behaviors and responses to sustainability pressures. This is especially relevant as firms adopt lean–green approaches – an evolution of Lean systems that incorporates environmental objectives alongside operational efficiency (Cherrafi *et al.*, 2018; Fercoq *et al.*, 2013). Although these practices contribute to economic, social and environmental performance (Abreu *et al.*, 2017; Bhattacharya *et al.*, 2019; Dhingra *et al.*, 2014), their effectiveness depends heavily on contextual factors, particularly the cultural norms through which sustainability is interpreted and enacted.

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Despite progress in understanding lean–green management (Santoso and Kasih, 2024), a significant gap remains: the cultural foundations that enable or constrain lean–green adoption are still insufficiently explored, particularly in emerging economies. Most available studies come from European or Asian contexts, where cultural logics and organizational behaviors differ markedly from those in Latin America. Recent Latin American scholarship highlights that sustainability practices cannot be divorced from the patterns that shape managerial behavior – such as hierarchy, relational networks and collective orientations. Evidence from Brazil and Mexico suggests that sustainability efforts often become fragmented or symbolic when they fail to align with deeper cultural structures (Garibaldi De Hilal, 2006; Medina-Álvarez and Sánchez-Medina, 2023). These findings challenge the dominant assumption that cultural traits exert linear effects on sustainable practices, instead calling for a contextualized understanding that captures the hybrid, informal and relational dynamics characteristic of Latin American organizations.

Within this broader landscape, Ecuador remains an understudied case. Although Hofstede's framework characterizes the country as high in power distance, strong in uncertainty avoidance and predominantly collectivist – with moderate masculinity and long-term orientation (Beugelsdijk and Welzel, 2018) – it remains unclear how these cultural patterns shape the implementation of lean–green practices. Limited empirical evidence from the region restricts understanding of how social culture influences supply chain decisions, customer relationships or internal process improvements in contexts marked by institutional fragility and relational management styles. At the same time, comparative studies such as those by van Dun *et al.* (2024) and macro-level analyses by Lee *et al.* (2022) highlight that cultural dimensions can either foster or inhibit sustainability and green economic performance, reinforcing the importance of cultural alignment when designing and implementing lean–green strategies.

Latin American scholarship goes beyond the traditional view that culture merely "enables" or "constrains" sustainability, arguing instead that culture actively reconfigures how sustainability is interpreted and practiced. In many organizations across the region, sustainability initiatives emerge as hybrid arrangements that combine formal environmental or social objectives with informal norms, relational expectations and embedded power asymmetries. The persistent tensions between hierarchy and community, between standardized procedures and everyday improvisation, and between collective identities and individual aspirations reveal the limits of universal sustainability models that overlook local dynamics. These dynamics also show that the cultural values expressed in the daily practices of executives can directly shape environmental and operational performance. When organizational culture and strategy intent are coherently aligned, companies are better positioned to advance sustainability initiatives in ways that are both effective and measurable within their own institutional realities (Thawornsujaritkul and Boonnual, 2024).

Against this background, the present study seeks to address these gaps by examining how social culture influences the adoption of lean–green practices in medium- and large-sized companies in Ecuador. Drawing on Hofstede's cultural dimensions, the study explores how national cultural values shape leaders' orientations toward supplier relationships, customer-focused sustainability initiatives, and internal process improvements. In doing so, the study contributes to the literature in three ways. First, it extends existing research on lean–green management to a Latin American context that remains largely underrepresented in empirical studies on organizational sustainability. Second, it integrates Hofstede's cultural framework with operational sustainability practices, linking cultural dimensions directly to three key organizational domains: supplier relationships, customer relationships and internal business processes. Third, the study provides evidence that cultural influences on lean–green adoption are not uniform but vary across different segments of the organizational value chain, offering

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a more nuanced understanding of how contextual cultural factors in emerging economies shape sustainability initiatives.

The remainder of the paper is organized as follows. The paper proceeds with the development of the theoretical framework and hypotheses, followed by a description of the methodology, presentation of the results, discussion and theoretical and managerial implications.

2. Theoretical framework

Prior studies on Lean–green practices highlight the role of social culture as one of the most important factors underlying managerial behavior, organizational routines and the adoption of operational practices. Dubey *et al.* (2017) found that, within organizations, culture influences the level of top management involvement. Accordingly, leaders' cultural values may shape how organizations approach hierarchy, collaboration, risk and long-term orientation, thereby conditioning the effectiveness of managerial and operational decisions (Kotiloglu *et al.*, 2024).

However, existing studies tend to examine culture and Lean–green practices separately. Moreover, empirical evidence remains limited for emerging economies, particularly in Latin America, where a narrow understanding of their joint effects persists. In fact, van Dun *et al.* (2024) argue that most studies on Lean transformation have been conducted in the northwestern hemisphere, raising concerns about intercultural generalizability and about the understanding of managerial leadership styles required to guide Lean transformations effectively. As a result, it remains challenging to fully understand how Lean–green practices and national cultures mutually influence each other (Danese *et al.*, 2018). This fragmentation in the literature suggests that existing research has often treated cultural context as a background condition rather than as an active explanatory variable. Consequently, the mechanisms through which national cultural values shape the interpretation and operationalization of sustainability-oriented practices remain insufficiently theorized.

Ecuador represents a highly relevant empirical context for examining the relationship between social culture and Lean-green practices in small and medium-sized enterprises, given its condition as a volatile emerging economy. The country is characterized by recurrent macroeconomic fluctuations, regulatory instability and intense exposure to external shocks, which intensify uncertainty for firms and constrain access to financial, technological and institutional resources (Bunce and Carrillo-Maldonado, 2023; Galvez, 2025; González Bautista *et al.*, 2024; Martinez *et al.*, 2025). The World Bank (2025) Macro Poverty Outlook for Ecuador further highlights persistent structural challenges, including low long-term economic growth, fiscal uncertainty and high levels of informality, with more than 50% of employment being informal and a productive structure dominated by micro and small enterprises, which account for approximately 97% of formal businesses in the country. Within this context, Ecuador moved from moderate GDP growth in 2023 to an economic contraction in 2024, followed by a recovery in 2025 with favorable growth rates, clearly reflecting the country's macroeconomic volatility and sensitivity to both internal and external shocks that shape economic performance and firm-level decision-making (World Economic Outlook, 2025).

2.1 Social culture

Social culture refers to the system of shared values, beliefs and behavioral expectations that develop over time within a society and shape how individuals interpret authority, collaboration, competition and risk (Hofstede *et al.*, 2010; McCracken, 1986). These values, learned through long-standing socialization processes, influence preferences for hierarchy (Power distance Index, PDI), autonomy [Individualism, (IDV)], achievement orientation [Masculinity, (MAS)], reliance on rules (Uncertainty avoidance index, (UAI)], future-oriented planning [Long-term orientation, (LTO)] and the pursuit of gratification or restraint [Indulgence versus restraint, (IVR)]

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(Hofstede, 2011). Although members of a society may not share identical cultural traits, these dimensions describe broad tendencies that affect how people reason, interact and respond to organizational demands.

Within firms, social culture becomes embedded in routines, leadership styles, and strategic decisions, shaping how managers prioritize goals, resolve conflicts, distribute authority and engage with stakeholders. Prior research shows that these cultural dimensions have measurable effects on organizational performance, influencing aspects such as innovation capacity, coordination mechanisms and responses to sustainability pressures (Nazariana *et al.*, 2017).

Culture is a critical variable for explaining the context of collective decision-making, as it constitutes a general condition that shapes organizational processes and managerial behavior, including how organizations respond to performance information and make strategic decisions across different environments (Kotiloglu *et al.*, 2024). According to Junejo *et al.* (2025), an organizational culture that values sustainability strengthens leadership capabilities and technological practices, thereby improving sustainable logistics performance. Accordingly, cultural values and leadership behaviors emerge as key determinants in the effective integration of sustainable practices within logistics operations.

2.2 Lean green practices

Lean management emerged in the 1950s, with the Toyota Production System, designed by Taiichi Ohno to eliminate waste, optimize resources and involve workers as active problem-solvers in continuous improvement (Cherrafi *et al.*, 2018; Gutiérrez Pulido, 2010; Yin *et al.*, 2018). Over time, this operational philosophy evolved beyond efficiency to integrate environmental objectives, resulting in a more holistic approach that generates economic, social and ecological value (Abreu *et al.*, 2017; Bhattacharya *et al.*, 2019; Dhingra *et al.*, 2014). Within this evolution, lean–green emerged as a strategy that aligns process improvement with the reduction of ecological impact, strengthening sustainable competitive advantages (Aher *et al.*, 2025; Duarte and Cruz-Machado, 2012).

Lean–green practices (LGN) extend traditional Lean by combining productive efficiency with environmental sustainability, seeking to "do more with less" in a responsible way (Souza Farias *et al.*, 2019). This integrated perspective encompasses the reduction of pollutant emissions, energy savings, recycling, proper waste management and the efficient use of natural resources (Fercoq *et al.*, 2013; PMI, 2022; Zhan *et al.*, 2018). By merging Lean's principles of respect for people and continuous improvement with green objectives, Lean–Green strategies enhance operational performance while reducing the environmental footprint across production and supply chain processes.

Lean practices deliver notable improvements in operational efficiency, particularly through waste reduction and process optimization, which closely align with the objectives of green supply chain management initiatives. However, evidence suggests that such initiatives do not yield significant improvements in corporate performance when implemented in isolation, and their effectiveness is substantially enhanced only when combined with Lean practices (Gál *et al.*, 2025). Moreover, the integration of traditional Lean operational practices with digital technologies can strengthen firms' capabilities to achieve sustainability objectives. This combination is especially valuable for organizations seeking to improve environmental performance and progress toward a more sustainable and greener economy (Costa *et al.*, 2024).

2.3 Hypothesis development: social culture and lean-green practices

The literature consistently shows that LGNs have the potential to enhance sustainability outcomes; however, their effectiveness varies substantially across organizational and cultural

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contexts in which they are implemented (Bhattacharya *et al.*, 2019). While internal factors such as leadership commitment, employee training and resource allocation are essential enablers, growing evidence suggests that organizational and social culture constitute the most decisive underlying conditions shaping the success of Lean–green initiatives. Recent studies indicate that many firms continue to prioritize traditional Lean tools focused on efficiency, rather than fully integrating environmental objectives into operational routines (Ikram *et al.*, 2022). Even when supply chain integration improves human resource practices and sustainability-oriented processes, these efforts do not always translate into superior business performance (Sahu *et al.*, 2024). Such mixed findings point to the role of social culture as a key interpretive mechanism through which lean–green principles are internalized, adapted or resisted across supplier relationships, customer engagement, and internal processes (Santoso and Kasih, 2024; Touriki *et al.*, 2021). These inconsistencies also suggest that the effectiveness of lean–green initiatives cannot be fully explained through technical or operational variables alone. Instead, cultural values may shape how organizations interpret efficiency, environmental responsibility and stakeholder expectations, thereby influencing the extent to which sustainability initiatives become embedded in everyday managerial practices.

Comparative research further reinforces the importance of cultural context. For example, van Dun *et al.* (2024) show that, despite similar openness-to-change values, Brazilian managers place significantly greater emphasis on relational trust and operational flexibility than their Dutch counterparts, highlighting the need for organizational identities capable of navigating culturally embedded priorities. Hristov and Chirico (2023) argue that sustainability becomes genuinely effective only when economic, environmental and social objectives are aligned with cultural and organizational criteria, underscoring that sustainability strategies cannot be detached from the values, norms and behavioral patterns that guide managerial decision-making.

Beyond the organizational level, macro-level evidence demonstrates that national cultural dimensions systematically shape green economic performance. Lee *et al.* (2022) find that IDV, UAI, and LTO tend to support green development. In contrast, PDI, MAS and IVR often constrain it. Importantly, their findings indicate that national cultural profiles mediate the effectiveness of regulatory and technological initiatives: in highly individualistic or indulgent societies, regulation tends to lose efficacy, while in more masculine cultures, technological pathways yield stronger outcomes. These results reinforce the argument that Lean–green strategies must be aligned with the cultural architecture of each national context to achieve sustained impact.

This perspective is particularly relevant for Ecuador, where the cultural profile is characterized by high Power Distance, strong Uncertainty Avoidance and a predominantly collectivist orientation, combined with moderate levels of MAS and LTO (Beugelsdijk and Welzel, 2018; Hofstede Insights, 2025). Such traits influence managerial preferences for hierarchy, standardized procedures and risk mitigation, which may either facilitate or constrain the adoption of Lean–green practices depending on how they are configured (Aktan and Castellucci, 2025). Empirical evidence shows that dimensions such as MAS, PDI and IDV significantly shape management styles and decision-making processes (Aguilar-Rodríguez *et al.*, 2021), functioning as a cognitive lens through which managers interpret uncertainty, prioritize actions and balance tradition with innovation (Beugelsdijk *et al.*, 2015; Sağlam and Abdullahi, 2021).

Recent Latin American scholarship further strengthens this argument by demonstrating that culture does not merely enable or inhibit sustainability initiatives – it actively shapes their meaning and implementation. Studies from Brazil, Mexico and the wider region reveal that organizational sustainability often emerges as a hybrid construct, combining formal sustainability goals with

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informal norms, relational networks and hierarchical tensions. In Brazil, organizational dynamics frequently oscillate between hierarchy and relationalism, generating ambiguous sustainability outcomes (Garibaldi De Hilal, 2006), while evidence from Mexican ecotourism firms shows that collectivist or clan-oriented cultures do not automatically lead to stronger social sustainability (Medina-Álvarez and Sánchez-Medina, 2023). These findings challenge assumptions from European and East Asian research that often treat cultural effects as linear and homogeneous. In this sense, the dominant models derived from European and East Asian contexts may overlook the complex institutional and relational dynamics that characterize many Latin American organizations. As a result, sustainability practices in these contexts may evolve through hybrid arrangements that combine formal managerial frameworks with informal cultural norms. Instead, Latin American organizations exhibit sociocultural contradictions – such as informality versus formal procedures, relational authority versus structural hierarchy and community-oriented values coexisting with strong personalism – that fundamentally shape how LGN are interpreted, negotiated and institutionalized.

On the other hand, Hluszko *et al.* (2024), argue that a significant share of the Latin American industry continues to underestimate the social dimension of sustainability, focusing primarily on the measurement and control of environmental impacts. This situation underscores the need to accelerate the transition toward more comprehensive sustainability models, in which environmental, social and governance (ESG) criteria are explicitly integrated into key organizational processes such as supplier selection and occupational safety, to strengthen sustainable practices across Latin American firms. Empirical evidence indicates that ESG performance is significantly higher in firms that invest in environmental innovation, as innovation exerts a positive influence on environmental, social and governance outcomes. However, this relationship is not homogeneous, because cultural dimensions such as MAS, IDV, IVR and PDI may positively or negatively moderate the impact of innovation on ESG performance. Therefore, it is essential to understand how environmental innovation, in interaction with social culture, can contribute to mitigating inequality, poverty and other socio-environmental challenges in Latin America, thereby promoting more equitable development and the preservation of the natural environment (Souza *et al.*, 2024).

Empirical evidence further supports the pivotal role of culture. Countries that combine low PDI with high IDV tend to adopt more robust environmental practices (Zaher, 2023), and cultural dimensions are directly linked to sustainable competitiveness in emerging markets Cahyadi *et al.* (2024). In addition, lean culture and leadership – particularly in the context of Industry 4.0 and the circular economy – have been found to rely on cultural traits such as respect, collectivism, continuous improvement and authority distribution, as well as competencies related to empowerment, problem solving, experimentation and performance orientation (Gatell and Avella, 2024). It identifies three key cultural domains: values and principles (respect, collectivism, distribution of authority), customer orientation (focus on clients and performance) and operational excellence (continuous improvement, problem-solving, good working conditions). In parallel, lean leadership is characterized by four sets of competencies: customer-oriented (teamwork, developing clients and suppliers), personal development (empowerment, servant leadership, continuous learning), lean principles (experimentation, zero defects, process expertise) and performance-driven (setting and deploying targets).

This review suggests that the present study's contribution is not to propose a new cultural theory, but to extend established cultural theory into a relatively underexplored domain: the adoption of lean–green practices in an emerging Latin American economy. By doing so, the study also responds to calls in the literature for more context-sensitive analyses of

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sustainability practices, particularly in emerging economies where cultural, institutional and economic conditions interact in ways that differ from those observed in more extensively studied industrialized contexts. More specifically, the study tests whether national cultural dimensions shape operational sustainability in differentiated ways across customer, supplier and internal processes, rather than assuming homogeneous cultural effects across the organization.

Based on this review, the following is proposed:

- The cultural dimensions of leaders – PDI, IDV, UAI, MAS, LTO and IVR – constitute the latent construct of social culture (SCL).
- Social culture (SCL) positively influences the adoption of lean–green practices (LGN).
- The adoption of lean–green practices (LGN) is reflected in three operational domains: (1) supplier relationships (RLS); (2) customer relationships (SCR); and (3) internal processes (BSP).

3. Method

The conceptual model was evaluated using an online survey administered to executives from medium- and large-sized firms in Ecuador. The study employed a nonexperimental, correlational, cross-sectional design, appropriate for examining associations between variables without manipulating the conditions under which they occur. An intentional sampling strategy was used, given its suitability for research that depends on informants with direct expertise and managerial experience relevant to the phenomenon of interest (Etikan *et al.*, 2016). Data analysis was conducted with IBM (2023), applying structural equation modeling (SEM) to assess both the measurement and structural components of the proposed model.

These relationships are illustrated in Figure 1.

The theoretical framework was explicitly translated into statistical hypotheses. Accordingly, SEM was used to test: (1) whether the cultural dimensions exhibit significant factor loadings on the latent construct SCL; (2) whether SCL exerts a positive and statistically significant effect on the adoption of lean–green practices (LGN); and (3) whether the three operational domains of LGN – supplier relationships (RLS), customer relationships (SCR), and business processes (BSP) – load significantly onto the LGN construct.

This hierarchical modeling approach is theoretically grounded in Hofstede's conceptualization of culture as a multidimensional yet integrated system of values, in which individual dimensions represent distinct yet interrelated manifestations of a broader cultural orientation. Modeling culture as a higher-order construct enables analysis to capture its systemic influence on organizational practices while reducing model complexity and mitigating multicollinearity among correlated cultural dimensions.

From a methodological perspective, second-order constructs in SEM are appropriate when lower-order factors are conceptually coherent and empirically related, enabling more parsimonious structural models and more straightforward interpretation of higher-level effects. This approach is consistent with prior SEM-based research that operationalizes culture as a hierarchical construct when examining its impact on organizational behavior and performance.

3.1 Participants

The participants of the study were executives from medium and large companies in Ecuador, belonging to both the private and public sectors, and engaged in manufacturing, commercialization, and service activities. The firms were drawn from the Merco Empresas (2024), which annually ranks the companies with the best reputation in the country. The ranking is audited by KPMG,

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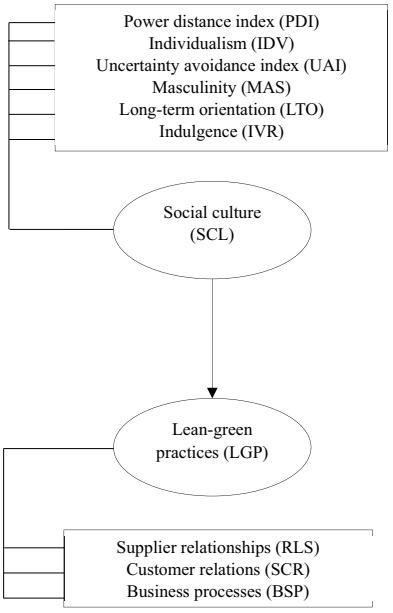


Figure 1. Research model

which ensures reliability and relevance in the selection of cases. The executives were intentionally chosen for being responsible for strategic decision-making within their organizations, which allows for the consideration that their cultural orientations may directly influence the adoption of lean-green practices. This sampling strategy ensured a sufficiently broad and diverse participation.

3.2 Procedures

Participants were recruited through an electronic survey administered via Microsoft Forms. A purposive sampling was employed, as the main objective was to gather information directly from individuals with strategic decision-making authority, whose comprehensive view of organizational operations and authority in the implementation of sustainable policies is essential for the study. This type of sampling is widely recommended when there is a need to select key informants with specialized knowledge about the investigated phenomenon (Etikan *et al.*, 2016). Furthermore, this justifies the approach, as access to top-level executives in this study depends on organizational authorization, availability and willingness to participate. Random selection would not guarantee that the individuals with actual decision-making authority would respond, nor that firms would allow their executives to participate. For this reason, purposive sampling remains the most methodologically coherent and operationally viable approach when the objective is to gather information from high-level informants whose expertise cannot be substituted by random selection.

As an inclusion criterion, the Merco Companies ranking 2024 was used, which evaluates corporate reputation at a national level and is audited by KPMG, ensuring the reliability and formality of the selected organizations. Based on this ranking, companies from the manufacturing, commercialization and services sectors, both public and private, were identified, and direct contact was established with executives who met the required profile.

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The strategy enabled the formation of a diverse sample, encompassing various sectors, economic activities, genders and ages. It thus allowed for the analysis of the influence of social culture on the adoption of lean-green practices within the organizational context.

Participants were sent a link to the survey, and the survey's follow-up was carried out via a tracking system. In the event of a low response rate, reminder emails were sent or new candidates who met the criteria were contacted. The confidentiality of the information collected was also guaranteed, with participants assured that the data collected in the survey would never be used to identify them or their companies. In total, five reminders were sent to participants to respond to the study within the period established in this phase of the research. To compensate for the absence of probabilistic replacement mechanisms, the study implemented an intensive follow-up strategy – combining multiple reminders and targeted re-contact with eligible executives – which helped increase participation while maintaining the methodological logic of purposive, expert-based sampling.

In this way, 368 answers were obtained, of which 262 were considered valid after a first cleaning of the data, in which cases with many missing values and outliers were eliminated (Sarstedt *et al.*, 2017). Although the approach is non-probabilistic, the sample is considered methodologically sufficient due to the strategic profile of the respondents, who are managers, directors and executives responsible for leading the organizational structure. The study of organizations, particularly their management practices and company culture, prioritizes information over the number of observations, as it considers the data provided by key informants to have very high analytical value, enabling the drawing of firm conceptual conclusions (Patton, 2014). In the same way, the representativeness of the sample, because the participants come from companies that are part of the Merco ranking, which ensures sectoral and geographical diversification, also adds greater consistency, depth and potential transferability of the results of this study.

3.3 Measures

A structured instrument was designed based on a five-point Likert scale, intended to evaluate the cultural dimensions proposed by Hofstede and lean-green practices in the organizational context. Although Likert scales are ordinal, extensive methodological research supports their use in SEM. Rhemtulla *et al.* (2012) show that Likert scales with five or more categories approximate continuous data sufficiently for maximum likelihood estimation. Similarly, Kline (2016) and Byrne (2010) note that SEM routinely uses Likert-type items because latent constructs are conceptually continuous and measurement error is modeled explicitly. Early work by Bentler and Chou (1987) also demonstrated that treating Likert items as continuous yields robust parameter estimates when sample sizes are adequate. Thus, the use of a five-point Likert scale in this study is consistent with accepted SEM practices.

The cultural dimensions were adapted from Hofstede (2011), widely used in cross-cultural and organizational research. Meanwhile, the items associated with lean-green practices were taken from scales developed by Duarte and Cruz-Machado (2013b) and Aher *et al.* (2025), aimed at assessing sustainability in the supply chain. The cultural dimensions included were: PDI, IDV, UAI, MAS, LTO and IVR. Each dimension was operationalized with items adapted to the Ecuadorian business environment, such as: "We all have the same rights and opportunities" (PDI), "We care for one another" (IDV), and "There is tolerance for risk and new ideas are proposed" (UAI). About lean-green practices, three key dimensions were evaluated: supplier relationship (RLS), customer relationship (SCR) and business processes (BSP). The items measured aspects such as collaborative work, strategic agreements, maintenance practices and environmental actions. Representative examples include: "Periodic analyses are carried out on

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the polluting effects of the logistics process" (BSP) and "There is collaborative work for the development of new products" (SCR).

The instrument was subjected to a content validation process in which specialists in organizational management and sustainability assessed its conceptual clarity, relevance and suitability for the Ecuadorian business context. To test internal consistency, Cronbach's alpha was calculated for each subscale, with coefficients above 0.70, which confirmed an acceptable level of reliability (Hair *et al.*, 2019). In addition, a confirmatory factor analysis (CFA) verified the structural validity of the instrument and the adequacy of the measurement model. To reduce the risk of common method bias (CMB), recommended procedures were applied, including the balanced wording of items with both positive and negative formulations (Jordan and Troth, 2020). Reverse-coded items were carefully designed so as not to undermine content validity or conceptual integrity, while minimizing potential confusion among respondents. The final set of items is presented in Table 1.

4. Results

4.1 Descriptive results

Before model estimation, the data set was examined for outliers to ensure the robustness of statistical inference. Univariate outliers were assessed through standardized z-scores, while multivariate outliers were evaluated using Mahalanobis distance, following established SEM guidelines. Observations exceeding recommended thresholds were carefully inspected. Rather than automatically removing extreme cases, each potential outlier was evaluated for substantive plausibility, ensuring that valid but extreme organizational responses were not excluded. This conservative approach preserves the representativeness of the sample while minimizing the risk of parameter-estimation distortion.

Most participants worked in the services sector (68.7%), followed by commercialization (23.7%) and, to a lesser extent, manufacturing (7.6%). The private male sector accounted for 54,6% of the total cases, with a notable presence in commercialization (21.8%) and services (29.0%). In contrast, women in the public sector, who represented 13.4% of the sample, were exclusively engaged in service activities, with no participation in manufacturing or commercialization. Manufacturing activity was marginal, representing only 7.6% of the cases, present only among men (from both sectors) and women from the private sector.

Regarding age distribution, the age group between 36 and 45 years was the most represented (32.4%), with predominance in service activities, both among men and women, and in both sectors. This result suggests that middle-aged adults constitute the operational

Table 1. Questionnaire items with their Cronbach's α of the constructs, mean, minimum, maximum and variance

Construct	Items	Cronbach's α	Mean	Min.	Max.	Var.
SCL	PDI: Power distance index	0.911	4.142	3.927	4.431	0.037
	IDV: Individualism	0.883	4.029	3.672	4.221	0.050
	UAI: Uncertainty avoidance index	0.632	3.873	3.641	4.011	0.023
	MAS: Masculinity	0.864	3.971	3.740	4.141	0.028
	LTO: Long-term orientation	0.908	4.027	3.958	4.118	0.007
	IVR: Indulgence versus restraint	0.714	4.073	3.828	4.168	0.016
LGN	RLS: Supplier relationships	0.893	3.936	3.775	4.145	0.017
	SCR: Customer relations	0.923	4.247	4.164	4.351	0.008
	BSP: Business processes	0.946	3.732	3.305	4.252	0.077

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core of the analyzed organizations. They were followed by participants aged 26–30 years (13.7%), with cross-cutting representation across all segments. The younger age groups (20–25 years) and the older age groups (over 61 years) showed lower participation, reaching a combined total of 9.7%, which could be attributed to lower labor incorporation or the beginning of retirement processes. Table 2 presents the detailed demographic characteristics of the study sample.

4.2 Confirmatory factor analysis

To validate the measurement model, a confirmatory factor analysis (CFA) was conducted using maximum likelihood estimation, following the recommended two-step SEM procedure (Anderson and Gerbing, 1984; Kline, 2016). CFA was used to examine the factorial structure of

Table 2. Participants' demographic characteristics ($n = 262$)

Gender	Commercialization	Activity Services	Manufacturing	Total
Male				
Private				
Age				
20–25	17	15	0	32
26–30	16	0	0	16
31–35	0	5	0	5
36–40	12	15	0	27
41–45	0	28	5	33
46–50	0	7	0	7
51–55	0	6	0	6
61 and older	12	0	5	17
Total	*57*	*76*	*10*	*143*
Public				
Age				
36–40	0	7	0	7
41–45	0	17	5	22
51–55	0	5	0	5
Total	*57*	*29*	*5*	*34*
Female				
Private				
Age				
26–30	0	5	5	10
31–35	0	5	0	5
36–40	0	30	0	30
41–45	5	0	0	5
Total	*5*	*40*	*5*	*50*
Public				
Age				
20–25	0	5	0	5
26–30	0	5	0	5
36–40	0	5	0	5
46–50	0	5	0	5
51–55	0	5	0	5
56–60	0	10	0	10
Total	*0*	*35*	*35*	*35*

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the latent constructs, assess the indicators' reliability, and evaluate convergent and discriminant validity (Hoyle, 2015).

Before estimating the full model, the indicators were examined for normality, missing values and multicollinearity, ensuring compliance with the assumptions of maximum likelihood estimation (Kline, 2016).The measurement model was then estimated, and model fit was evaluated using multiple global fit indices, as recommended in the SEM literature. The model demonstrated satisfactory fit according to widely accepted thresholds (Hair *et al.*, 2019; Hu and Bentler, 1999), with CFI, TLI, and IFI values exceeding 0.90 and RMSEA below 0.08, indicating an adequate representation of the covariance structure. All standardized factor loadings were statistically significant at $p < 0.01$, exceeded the threshold of 0.50, and in most cases surpassed 0.70—demonstrating strong item–construct relationships and supporting the unidimensionality of the factors. These results, presented in Table 3, confirm that the indicators adequately capture the conceptual meaning of each latent variable.

Convergent validity was established through the Average Variance Extracted (AVE), with all constructs exceeding the recommended minimum of 0.50 (AVE > 0.50), indicating that the latent variables explain more than half of the variance in their indicators. Composite reliability (CR) values also exceeded 0.70 (CR > 0.70), supporting the internal consistency of the measurement scales (Hair *et al.*, 2019; Henseler *et al.*, 2015).

Discriminant validity was assessed using the maximum shared variance (MSV) and the Fornell–Larcker criterion. For all constructs, AVE values exceeded the MSV, and the square root of each AVE was greater than the inter-construct correlations, confirming the distinctiveness of the latent variables. MaxR(H) values also fell within acceptable ranges, reinforcing the stability and reliability of the constructs.

Figure 2 provides a graphical representation of the measurement model, displaying standardized factor loadings and inter-construct relationships. The diagram visually confirms the adequacy of the measurement structure and aligns with the fit indices obtained (Hu and Bentler, 1999).

4.3 Structural equations model

Figure 3 presents the structural equation modeling (SEM). Modification indices were analyzed to improve the model's overall fit, suggesting the correlation of certain measurement errors within the SLC and LGN factors due to their conceptual and empirical relationship. After these adjustments, the standardized path coefficients proved to be statistically significant ($p < 0.01$), which supports the structural validity of the model and confirms the strength and relevance of the proposed relationships (Henseler *et al.*, 2015). Finally, the coefficient of determination (R^2) of the endogenous variable (LGN) generated a value of 0.845, indicating that the lean green practices are explained in 84,5%.

Table 4 presents the results of the structural model estimates and their statistical significance. All associations showed statistical significance at 99% (p-value < 0.001), which supports the

Table 3. Validity analysis

Validity anaysis	CR	AVE	MSV	MaxR(H)	SCL	LGN
Social culture (SCL)	0.892	0.581	0.519	0.905	*0.762*	
Lean green practices (LGN)	0.835	0.631	0.519	0.883	0.720***	*0.794*

Note(s): CR = critical region; AVE = average variance extracted; MSV = maximum shared variance; MaxR(H) = maximum reliability. Significance of correlations: †$p < 0.100$; *$p < 0.050$; **$p < 0.010$; ***$p < 0.001$

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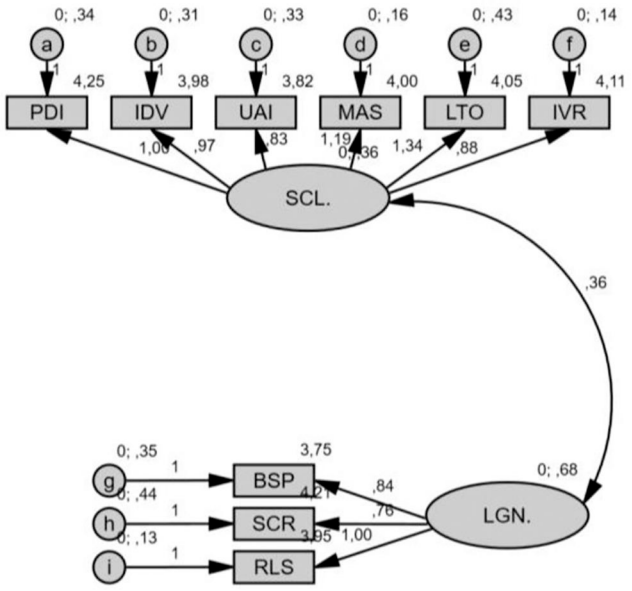


Figure 2. Measurement model CFA Amos

robustness of the structural model (Henseler *et al.*, 2015; Hu and Bentler, 1999). In particular, it is confirmed that SCL positively influences LGN, demonstrating a direct, strong and significant relationship between social culture and lean-green practices. This suggests that culture acts as a key trigger for sustainable organizational behavior.

Likewise, the results validate the structure of the SCL construct, demonstrating that it consistently explains Hofstede's six cultural dimensions. Similarly, the LGN construct showed a satisfactory fit as a second-order latent variable, given that all its critical loads (CR) were above 10, with p-values < 0.001, thus confirming its factorial validity and its capacity to represent lean-green practices comprehensively.

5. Discussion

This study examined the relationship between SCL and LGN among executives of medium and large firms in Ecuador. The results show a positive, statistically significant association between these variables, indicating that business leaders' cultural values are associated with organizational decisions regarding LGN adoption. Within SCL, LTO and SCR were the most influential factors. In particular, the prominence of LTO and SCR calls for a deeper reflection on why they outperformed others and what this means for sustainability in Ecuador's corporate landscape. The sample profile – predominantly male, experienced decision-makers working in service-oriented firms – suggests that LGN adoption is associated with leaders who rely on accumulated managerial expertise to navigate economic volatility. This may help explain the centrality of LTO: in an unstable context, long-term vision functions as a managerial buffer against short-term uncertainty. However, this also raises the possibility that LGN adoption is more reactive than transformative, responding to external pressures rather than emerging from proactive strategic commitments.

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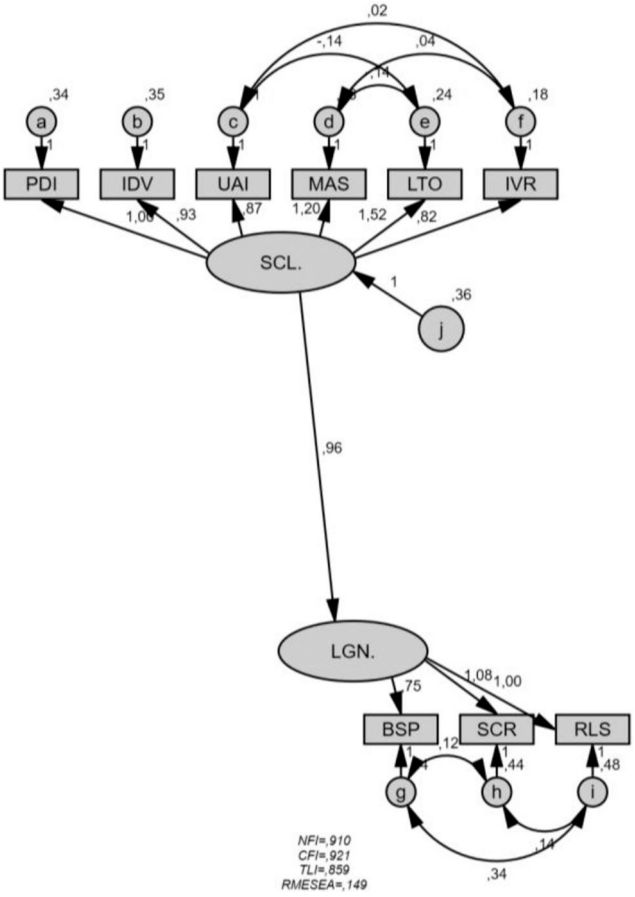


Figure 3. Chart of the SEM

The macroeconomic shocks that Ecuador experienced in 2024 – including economic contraction, energy shortages and security crises – reinforce this interpretation; the country's GDP declined by about 2.5% (World Bank Group, 2025). Under such conditions, sustainability initiatives may become intertwined with organizational resilience strategies. In this context, leaders may rely more heavily on customer relationships as stabilizing mechanisms. The dominance of the service sector in the sample could also contribute to this pattern, as customer-oriented sustainability practices are typically more visible in service industries than in manufacturing contexts. While SCR appears robust, supplier relationships and internal processes show weaker associations, suggesting that sustainability may be advancing unevenly within organizations. This challenges the common assumption in the LGN literature that supply-chain integration evolves synchronously.

LGN thus arises as a strategic response that integrates continuous quality and productivity improvement – through cost, time and waste reduction – with environmental risk mitigation (Duarte and Cruz-Machado, 2013a, 2013b; Jum'a *et al.*, 2022). Sustained eco-efficiency not only

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Table 4. Structural model estimates and their statistical significance

Hypotheses	Estimate	S.E.	C.R.	*p*-value	Decision
LGN ← SCL	0.959	0.092	10.391	***	Support
PDI ← SCL	1.000	–	–	–	–
IDV ← SCL	0.926	0.083	11.164	***	Support
UAI ← SCL	0.865	0.082	10.568	***	Support
MAS ← SCL	1.202	0.090	13.424	***	Support
LTO ← SCL	1.517	0.113	13.434	***	Support
IVR ← SCL	0.815	0.068	11.966	***	Support
RLS ← LGN	1.000	–	–	–	–
SCR ← LGN	1.081	0.090	11.947	***	Support
BSP ← LGN	0.753	0.068	11.079	***	Support

Note(s): SCL = social culture; LGN = lean-green practices; PDI = power distance index; IDV = individualism; UAI = uncertainty avoidance; MAS = masculinity; LTO = long-term orientation; IVR = indulgence; RLS = relationship with suppliers; SCR = customer relations; BSP = business processes; S.E. = standard error; C.R. = critical region. Significance of correlations: *p*-values < 0.001 are denoted as significant

strengthens organizational resilience but also creates competitive advantages that go beyond cost or product quality, as they are rooted in the firm's social and environmental responsibility (Dickson, 2025). This aligns with previous research highlighting the contribution of high-performing employees to sustainability through direct productivity gains and waste minimization (Thawornsujaritkul and Boonnual, 2024; Visamitanan and Assarut, 2021). These dynamics support the argument that LGN achieves meaningful effectiveness only when embedded in organizations' cultural fabric (Hristov and Chirico, 2023; Santoso and Kasih, 2024).

Beyond LTO, other cultural dimensions also contribute to LGN adoption, especially within SCL, followed by supplier relationships and, to a lesser extent, business processes. MAS reinforces the pursuit of excellence and visible performance, supporting quality improvements but potentially overshadowing softer aspects of sustainability, such as stakeholder inclusion or shared decision-making. PDI's moderate effect indicates that hierarchy continues to structure sustainability governance; centralized authority facilitates coordination but may limit grassroots innovation. IDV, unexpectedly relevant in a collectivist context, suggests that personal initiative and discretion remain key to tailoring customer service and enabling operational flexibility. Meanwhile, UAI's emphasis on rules and transparency strengthens standardization but may constrain experimentation – a necessary condition for continuous improvement. These interactions suggest that cultural dimensions do not simply "support" sustainability; rather, they may shape – and in some cases limit – its scope and depth of sustainability initiatives within organizations.

A deeper insight from this study concerns how LTO and MAS translate into leadership practices. Leaders who prioritize perseverance, planning and achievement set demanding targets and seek differentiation through measurable results – conditions that facilitate LGN adoption but may also place disproportionate emphasis on outcomes rather than learning processes. This duality mirrors findings from Latin American scholarship: sustainability becomes effective when embedded in cultural norms, yet these norms can also generate hybrid or contradictory outcomes. For instance, hierarchical preferences (PDI) can accelerate decision-making but constrain collaborative problem-solving; strong performance cultures (MAS) may drive efficiency but downplay social inclusion; and long-term perspectives (LTO) may coexist with relational behaviors that resist formalization. The Ecuadorian case,

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therefore, illustrates that LGN initiatives must negotiate cultural tensions rather than merely leverage cultural strengths.

From the perspective of the MAS, leaders emphasize competitiveness, achievement and excellence, valuing visible performance, measurable success and market differentiation. This translates into efforts to: (1) pursue ambitious goals; (2) promote performance-oriented cultures; (3) strengthen quality, innovation, and competitive positioning; and (4) achieve tangible results with customers and in internal processes.

The broader implication is that Ecuadorian firms do not adopt LGN uniformly. Instead, the shared cultural profile – characterized by hierarchical coordination, risk aversion, relational trust and performance orientation – appears to support certain sustainability trajectories while constraining others. Leaders in these firms invest in innovation, talent development, and long-term partnerships. Still, their actions may reflect a selective adaptation of LGN principles shaped by social expectations and managerial routines. In this sense, leadership can be understood as both a driver and a filter through which cultural values are translated into sustainability-oriented organizational practices. This observation is consistent with the argument advanced by Hofstede (2011) and subsequent research that organizational culture cannot be separated from the broader social culture in which firms operate, as cultural dimensions such as PDI or long-term orientation (LTO) may influence structural design, team management, and sustainability strategies (Beugelsdijk and Welzel, 2018).

From this perspective, the findings suggest that leadership in Ecuadorian medium- and large-sized firms plays an important role in mediating how cultural values are expressed in sustainability practices. Leaders who combine long-term orientation, performance orientation, balanced hierarchical coordination and risk-management capabilities appear more likely to support the integration of LGN initiatives, particularly in customer relationships, followed by supplier relationships and internal processes. Although these patterns should be interpreted within the study's context and design, they suggest that alignment between cultural values and strategic decisions can strengthen organizational resilience and competitive positioning in rapidly changing environments. In the Ecuadorian context – especially among outward-oriented and well-established firms – leadership therefore appears to evolve toward models that combine strategic foresight, adaptability, and social awareness, enabling organizations to improve efficiency, foster innovation and promote sustainability-oriented practices.

6. Implications

6.1 Theoretical implications

The results of this study contribute to the literature on SCL on sustainability by linking Hofstede's cultural dimensions with the adoption of LGN through a structural model that connects cultural values with operational decision-making.

First, the study reinforces existing theories suggesting that national cultural values shape organizational behavior. The results indicate that cultural dimensions are not only reflected in individual attitudes but are also associated with the adoption of sustainability-oriented organizational practices. This supports the view that culture operates as a structural context within which managerial decisions and strategic orientations are interpreted and enacted.

Second, the prominence of LTO within the SCL construct suggests that leadership styles characterized by perseverance, strategic planning and future-oriented thinking play an important role in sustainability-oriented decision-making. In this sense, the findings contribute to the literature by highlighting how long-term cultural values can be associated with organizational approaches that prioritize durable environmental and operational improvements rather than short-term efficiency gains.

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Thirdly, the study extends cultural theory into the domain of operational sustainability by showing how LTO may be linked to the adoption of LGN. This finding suggests that long-term oriented leadership can support the integration of sustainability objectives into organizational routines and operational strategies, particularly in emerging economies where firms must balance efficiency, competitiveness and environmental responsibility.

Fourth, the role of MAS offers an additional theoretical insight. The findings suggest that achievement-oriented cultural values may reinforce an organizational emphasis on performance, innovation and competitive differentiation, which, in turn, can support the implementation of lean–green initiatives. This observation contributes to the literature by showing that MAS need not conflict with sustainability objectives; rather, it can align performance-oriented motivations with improvements in efficiency and environmental responsibility.

Finally, other cultural dimensions – such as PDI, IDV and UAI – also appear to play complementary roles in shaping LGN. Rather than operating independently, these dimensions interact to form a broader cultural configuration that influences organizational decision-making. This suggests that sustainable management models should be understood as emerging from the interaction of multiple cultural values rather than from a single dominant cultural trait.

6.2 Managerial implications

The findings provide important implications for business leaders, policymakers and educational institutions, especially in emerging markets such as Ecuador.

First, the results highlight the importance of aligning prevailing cultural values – particularly LTO and MAS – with sustainability strategies. Organizations that integrate values such as strategic planning, perseverance and performance orientation into their operational routines may be better positioned to implement lean–green initiatives while maintaining organizational legitimacy and stakeholder support.

Second, given the strong association between LTO and LNG, managers may benefit from developing sustainability-oriented strategic frameworks that prioritize long-term planning and continuous improvement. This includes investing in innovation, human capital development and sustainable technologies to strengthen trust-based relationships with customers, suppliers and communities.

Third, the role of MAS suggests that performance-oriented cultures can support sustainability efforts when environmental and operational objectives are framed as sources of competitive advantage. Leaders can therefore promote high-performance cultures, clear evaluation systems, and innovation-driven practices that simultaneously enhance operational efficiency and environmental responsibility.

Fourth, the results indicate that cultural awareness can play an important role in strategic decision-making. Organizations that assess and understand their cultural environment may be better able to design sustainability initiatives that align with existing social values and managerial practices, thereby facilitating the internal adoption of lean–green strategies and improving stakeholder acceptance.

Fifth, from an operational perspective, the findings suggest that culture can influence productivity and supply-chain coordination by shaping how organizations allocate resources, manage partnerships and implement process improvements. In contexts where institutional pressures for sustainability are still emerging, cultivating an organizational culture that values long-term planning, collaboration, and innovation may support the gradual adoption of sustainability-oriented practices.

Sixth, the results also offer policymakers in emerging economies relevant insights. Public institutions may benefit from designing regulatory and incentive frameworks that take into account prevailing cultural characteristics, such as long-term orientation, hierarchical coordination

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and risk avoidance. Policy instruments such as sector-specific sustainability standards, tax incentives for clean technologies, and capability-building programs for SMEs could facilitate the diffusion of lean–green practices. Moreover, public policies that encourage collaboration between firms, research institutions, and industry associations may help create ecosystems that support the cultural and organizational changes required for sustainability transitions.

Finally, the findings highlight the importance of strengthening education in sustainable management. Universities and business schools can contribute by incorporating content related to culture, leadership and sustainability into their curricula, helping future managers understand how cultural values influence organizational decision-making. Executive training programs that promote long-term planning, collaborative problem-solving and sustainability-oriented leadership may also support the broader adoption of LGN in emerging economies.

7. Limitations and recommendations for future research

Although this study provides empirical evidence on the influence of Hofstede's cultural dimensions on the adoption of LGN, several limitations should be considered when interpreting the findings and when outlining directions for future research.

First, the study relied on a purposive, nonprobability sample of executives from medium- and large-sized firms in Ecuador. While this approach was appropriate for accessing key informants with strategic decision-making responsibilities, it limits the possibility of generalizing the findings to the broader population of firms. In addition, the sample shows a sectoral imbalance, with a stronger representation of companies from the services sector. Because service-oriented firms face different operational and environmental dynamics than manufacturing or industrial firms, the results should be interpreted cautiously. Future research could address this limitation by employing more balanced sectoral samples or by focusing on specific industries to provide deeper intra-sectoral analyses and strengthen the external validity of the model.

Second, although the inclusion of organizations from both the public and private sectors and the participation of executives with diverse demographic profiles enrich the data set, the present study did not conduct comparative analyses across these groups. Future studies could explore how cultural dimensions and sustainability practices vary across gender, sectoral affiliation, organizational size or managerial experience, thereby providing a more nuanced understanding of the social and organizational conditions that shape LGN adoption.

Third, the research was conducted exclusively in Ecuador, an emerging economy with specific institutional and cultural characteristics. While this context provides valuable insights into sustainability practices in Latin America, the findings may not be directly transferable to other national contexts. Replication studies in other countries – particularly in Latin America or in emerging economies with comparable institutional environments – would help assess the cross-context applicability of the proposed model and further refine the understanding of cultural influences on sustainable management practices.

Finally, the cross-sectional design of the study limits the ability to infer causal relationships or to observe how the relationship between culture and sustainability practices evolves. The results, therefore, reflect associations at a specific moment rather than long-term dynamics. Longitudinal research designs, tracking organizations or leaders over time, would allow future studies to examine the temporal stability of cultural influences and identify more robust causal mechanisms in the adoption of LGN.

Despite these limitations, the study contributes to the literature by providing context-sensitive evidence on the cultural foundations of sustainable organizational practices in an underexplored emerging economy, offering a basis for further theoretical and empirical development in the field.

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8. Conclusion

The study examined how cultural dimensions influence the adoption of LGN in medium and large companies in Ecuador. The findings extend Hofstede's model into the field of organizational sustainability and show that cultural dimensions do not exert the same level of influence. In this context, LTO and MAS stand out as the strongest drivers of customer-centered sustainability. These results are especially relevant in emerging economies, where cultural values strongly shape managerial behavior. LTO contributes by providing strategic vision, long-term planning and sustained commitment, while MAS reinforces a results-oriented mindset, open communication and attention to the customer experience. Together, these cultural traits form a powerful combination that helps firms not only reduce waste and improve efficiency but also build stronger, more responsible, and environmentally conscious relationships with their markets.

Beyond confirming existing theoretical expectations, the study contributes context-sensitive empirical evidence showing that cultural dimensions shape lean–green adoption in differentiated ways across organizational domains in an emerging Latin American economy. In this sense, the study broadens Hofstede's cultural theory by incorporating a sustainability perspective, demonstrating that the adoption of lean–green practices is neither linear nor uniform. Instead, it depends on hybrid cultural configurations that shape how organizations legitimize and implement sustainability initiatives. Each cultural dimension may therefore operate either as an enabler or a constraint, depending on the stage of the value chain where it exerts influence. For emerging economies such as Ecuador, this suggests that leaders who pursue ambitious and visible goals while prioritizing long-term sustainability over immediate gains are more likely to foster an organizational culture oriented toward responsible growth, measurable performance and shared value creation.

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