Received: 24 April 2020 | Revised: 29 May 2020 | Accepted: 15 June 2020

DOI: 10.1002/bse.2572

RESEARCH ARTICLE

Business Strategy and the Environment

WILEY

Does green innovation affect the financial performance of Multilatinas? The moderating role of ISO 14001 and R&D investment

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Funding information
Spanish Ministry of Education and Science, Grant/Award Numbers: ECO2013-47009-P, ECO2016-75909-P, CAS18/00134; Business and Economics School of the University of Granada; Regional Government of Andalusia, Grant/Award Number: P11-SEJ-7988

Abstract

The purpose of this study is to explore the relationship between green innovation (GI) and financial performance (FP) in emerging markets multinationals from Latin America (Multilatinas). Aligned with the natural resource-based view and institutional theory, and using moderated and hierarchical linear regression analyses with panel data from 86 listed firms during the period 2013–2017, we find that implementing effective GIs is not associated with greater FP. The paper also analyses the moderating effect of Environmental Management Systems (ISO 14001) and research and development (R&D) investment on the relationship between GI and FP. We find that Multilatinas' implementation of ISO 14001 does not affect the way they adopt GI and thus does not enhance their levels of FP, but a positive moderating effect is generated as companies increase their level of R&D investment. The paper expands knowledge of the way GI affects Multilatinas' FP, and these findings have policy implications for managers, policy makers, government and other institutions.

KEYWORDS

green innovation, Multilatinas, Environmental Management Systems, ISO 14001, research and development, R&D, emerging markets multinationals, Latin America

1 | INTRODUCTION

In recent years, green innovation (GI) has become a topic of interest as a key piece in the transition towards more sustainable production and consumption models that seek value creation both for different stakeholders, such as consumers and companies, and for the natural environment (Bocken, Short, Rana, & Evans, 2014). Customers frequently demand satisfaction on GI issues, requiring firms to possess and accumulate adequate resources (Hart, 1995). GI also requires a fundamental change in the organizational competencies needed to manage these resources (Russo & Fouts, 1997) to enable the firm to implement sustainable practices that respond properly to these environmental needs (Kammerer, 2009).

GI involves changes in both resource and organizational capability (Ryszko, 2016). These changes include the initiative itself, participation of staff in developing sustainable ideas and actions (Smerecnik & Andersen, 2011) and ability to share knowledge among members of the organization (Wong, 2013). GI is socially complex because its implementation requires companies to develop communication and cooperation relationships with various actors in their value network, such as supplier and customer partners (e.g., De Marchi & Grandinetti, 2013). In addition, GI may serve as a source of institutional legitimacy in home and foreign markets (Aguilera-Caracuel & Ortiz-de-Mandojana, 2013).

Organizations decide to adopt GI for several reasons (Brunnermeier & Cohen, 2003; Dangelico, 2016; Horbach, 2008).

Some are motivated only by having to comply with national and international laws (Dangelico & Pujari, 2010), industrial relationships (Antonioli & Mazzanti, 2017) or pressures from different stakeholders (Guoyou, Saixing, Chiming, Haitao, & Hailiang, 2013; Kassinis & Vafeas, 2006). Others support GI voluntarily, seeking to create opportunities for business organizations (Calza, Parmentola, & Tutore, 2017) as result of the firm's profit orientation (Bansal & Roth, 2000), cost savings, managerial environmental concerns (Chang & Chen, 2013), organizational slack (Berrone, Fosfuri, Gelabert, & Gomez-Mejia, 2013), corporate environmental ethics (Chang, 2011) and dynamic capabilities (Huang & Li, 2017), among other issues.

Although many studies concentrate on the relationship between GI and the firm's financial performance (FP; Aguilera-Caracuel & Ortiz-de-Mandojana, 2013; Dangelico & Pontrandolfo, 2015; Marín-Vinuesa, Scarpellini, Portillo-Tarragona, & Moneva, 2018; Przychodzen & Przychodzen, 2015; Tang, Walsh, Lerner, Fitza, & Li, 2018), the results in the literature are mixed and inconclusive. Studies have been undertaken primarily in developed countries (Horbach, 2008) and pay little attention to emerging markets multinationals (EMMs; e.g., Danso, Adomako, Amankwah-Amoah, Owusu-Agyei, & Konadu, 2019; Duque-Grisales & Aguilera-Caracuel, 2019; Gallego-Álvarez, 2018). Even less research has focused on resolving managerial concerns regarding the GI–FP relationship in EMMs with headquarters based in Latin American countries (Multilatinas). Due to Multilatinas' tremendous competitiveness in both cost and knowledge-intensive activities (Duque-Grisales, Aguilera-Caracuel, Guerrero-Villegas, & García-Sánchez, 2020), the international business literature is interested in analysing these firms' environmental and social management approaches (Jormanainen & Koveshnikov, 2012). The extant literature focuses on Multilatinas' strategies for internationalization (Aguilera, Ciravegna, Cuervo-Cazurra, & Gonzalez-Perez,- 2017; Ciravegna, Lopez, & Kundu, 2016; Cuervo-Cazurra, 2008; Huesca-Dorantes, Michailova, & Stringer, 2018), competitiveness (Carneiro & Brenes, 2014; Herrero, 2014) and corporate social responsibility (CSR; Duque-Grisales & Aguilera-Caracuel, 2019; Duque-Grisales et al., 2020). However, the field lacks both evidence on the impact of GI on Multilatinas' FP and analysis of the variables that condition this relationship. The goal of this study is to provide concrete evidence and guidelines to encourage business administrators that Multilatinas can achieve GI and superior FP simultaneously. In filling this research gap, it is especially important that our study provides evidence not only of the impact of GI on Multilatinas' FP but also analyses relevant variables that can affect this relationship.

Recent studies suggest that different types of moderating variables can strengthen or weaken the GI–FP relationship (Przychodzen & Przychodzen, 2015). These variables include organizational capability, certification standards (Horbach, Rammer, & Rennings, 2012; Rennings, Ziegler, Ankele, & Hoffmann, 2006), human resource management (Antonioli, Mancinelli, & Mazzanti, 2013), research and development (R&D) investment (Demirel & Kesidou, 2011), policy orientation (Ghisetti & Pontoni, 2015) and market resource intensity (Tariq, Badir, & Chonglerttham, 2019; Wagner, 2010). This study therefore focuses on two very important issues in the academic literature that have received little study in the context of the Multilatinas.

First, we analyse the moderation of Environmental Management Systems (EMSs; specifically, ISO 14001) in the relationship of GI development to FP in Multilatinas. By improving organizations' eco-friendly image and thus their international legitimacy (Bansal & Hunter, 2003), certification has improved firms' sustainability (Iraldo, Testa, & Frey, 2009) and resulting FP (Dowell, Hart, & Yeung, 2000). Pressure to imitate leaders in the sector (Delmas & Burbano, 2011) is motivating many multinationals in developing regions to implement EMS to obtain certification. The 10% annual growth in global certifications (frequently ISO 14001) reveals the significance of EMS to investors and companies (Khan & Johl, 2019). Further, Inoue, Arimura, and Nakano (2013) show that voluntary environmental management (ISO 14001 maturity and effectiveness) stimulates organizations to innovate in environmental technology by guiding their R&D expenditure.

Research is, however, inconclusive. Opposing arguments show that firms may adopt merely token EMS to improve corporate image without reducing their environmental impact (Ferrón-Vílchez, 2017; Peña-Vinces & Delgado-Márquez, 2013; Testa, Iraldo, & Daddi, 2018). Such 'greenwashing' rarely leads to innovation in environmental practice and thus does not greatly impact FP. Still, Blackman (2008) shows that firms in emerging economies implement environmentally friendly standards to develop processes that improve quality and reduce environmental impact even in the absence of strong environmental regulation. Multilatinas' growing desire for the global legitimacy granted by EMS on the international market seems to follow this trend, yet little is known about the organizational changes and procedures required to implement these systems (especially ISO 14001) and the GI they foster. We do not know whether ISO 14001 advances Multilatinas' GI, producing long-term improvement in FP.

In addition to analysing EMS, we must analyse the role of R&D investment in the relationship of GI to FP. Ghisetti and Pontoni (2015) show that both companies and governments promote GI through R&D investment, and a strong body of empirical research on multinationals based in developed countries shows great effectiveness of R&D investment in this context to stimulate innovation (Dilling-Hansen, Madsen, & Smith, 2003; Lee & Min, 2015), reduce green costs (King & Lenox, 2002) and improve productivity (Wakelin, 2001). Although firms in developing economies tend to perceive that they lack resources to commit to costly long-term innovations, they must evaluate the effects of such commitments to determine whether they are beneficial in the long run. The benefits of investing in R&D go beyond developing new knowledge. Firms simultaneously increase their absorptive capacity and thus their capability to gain and transform more valuable knowledge (Caloghirou, Kastelli, & Tsakanikas, 2004; Cohen & Levinthal, 1990), potentially strengthening infrastructure and implementation of GI in the firm's policies and processes. Thus, Multilatinas may improve their FP greatly by adopting this longer term approach to GI.

The current study provides three fundamental improvements. First, it extends knowledge in the international business literature by broadening institutional theory (DiMaggio & Powell, 1983; Scott, 2005) and the natural resource-based view (NRBV) of firms (Aragón-Correa, 1998; Hart, 1995) to analyse both the influence of GI on FP in the context of Multilatinas and the moderating effects of EMS (ISO 14001) and R&D investment in that relationship. Second, unlike the previous studies of GI, our research advances the literature by considering the influence of GI on Multilatinas. Although researchers have investigated GI's influence on a firm's profitability in the context of multinationals in developed countries, the empirical evidence in developing regions in general, and in the Latin American context in particular, is very limited (De Oliveira, Serra, & Salgado, 2010; Fikru, 2014). Our study uses a sample of Multilatinas to study this phenomenon. Latin America offers distinctive and attractive conditions for testing the theoretical and empirical relationships among the variables included in the study. This focus also creates different understanding of Multilatinas' approaches to internationalization and environmental and social responsibility (Aguilera et al., 2017). Third, this research contributes by highlighting the importance of potential moderators that may impact the relationship between GI and FP (Grewatsch & Kleindienst, 2017), specifically, the moderating effect of R&D investment and EMS (ISO 14001). We respond to a significant dilemma Multilatinas face: whether they should invest effort in seeking legitimacy through international certification standards in response to institutional pressures or instead increase levels of investment in R&D to create a set of resources and capabilities to provide a solid infrastructure for continuous improvement and advanced organizational culture to maximize their profitability.

The structure of this paper is as follows. The next section provides a detailed explanation of the theoretical framework and hypothesis development. We then present the methodology, including the sample, data and statistical methods applied. Finally, we describe the results obtained and outline the debate generated by the most relevant findings, as well as the main conclusions and implications derived from the study.

2 | LITERATURE REVIEW AND DEVELOPMENT OF HYPOTHESES

2.1 | The NRBV of the firm

The NRBV (Hart, 1995) extends the resource-based view (RBV; Barney, 1991) to incorporate environmental considerations. The RBV understands competitive advantage as based in firms' ability to manage valuable, rare, inimitable and nonsubstitutable resources but does not factor in environmental impact (Hart, 1995). The NRBV, in turn, relates the firm's resources and capabilities to its natural environment.

Incorporating environmental considerations requires firms to adopt a long-term perspective. They cannot exhaust natural resources for profit but must adjust capabilities and management to ensure that the firm's success is derived from sustainable resources. This shift requires development of sustainable technologies and products that may generate competitive advantage. It also requires rethinking connections among the firm's green capabilities, environmental strategies and competitiveness (Hart, 1995; Hart & Dowell, 2011). Support from top management, expenditure in R&D and knowledge of eco-friendly technologies can combine to nurture the GI integral to such strategies and firms' potential to develop unique sustainable green capabilities.

To accommodate environmental constraints, Hart's NRBV framework cites three strategic capabilities: *pollution prevention*, *product stewardship* and *sustainable development* (Hart, 1995). Pollution prevention seeks new technologies or processes to reduce emissions and waste across all areas of production (Klassen & Whybark, 1999). Such innovative effort to obtain cleaner resources and greener capabilities also enables firms to redesign processes to optimize efficiency (Russo & Fouts, 1997). Christmann (2000) and Sharma and Vredenburg (1998) argue that combining efforts to reduce pollution with innovation capability can generate significant savings and improve competitiveness. GI can thus simultaneously improve productivity, reduce expenses and satisfy environmentally conscious customers, strengthening FP (Amores-Salvadó, Martín-de Castro, & Navas-López, 2014).

Product stewardship focuses on product design, seeking cleaner and more efficient use of physical resources by evaluating the product's full ‘life cycle’ or value chain (Hart, 1995) and maximizing recycling/reuse. Firms gain a green corporate image by developing new skills to innovate in sustainable products (Chen, 2008) and thus strengthen their legitimacy and corporate performance in environmental markets.

Beyond care for the environment, sustainable development can include economic and social issues (Hart & Dowell, 2011). Developing countries' sustainable development strategies are geared to less-developed markets and must combine economic gain with environmentally sound policy. Walker and Wan (2012) argue that pressure to improve companies' green image includes both environmental and social management.

Human resources are also a factor. Because greater organizational knowledge of the environment increases its ability to detect and implement innovative environmental opportunities (Lee & Min, 2015), companies should assess their employees' ecological knowledge, abilities, values and motivation to achieve sustainability. Educating and training the workforce in how to reduce environmental impact in waste and improve design of environmentally beneficial products can also lead to innovation in management oriented to sustainability (Hart, 2005). Such commitment to ethical ecological behaviour can energize the firm's culture and image, further motivating it to preserve its green reputation.

2.2 | Institutional theory

Institutional theory analyses how institutions pressure firms to adopt the same kinds of strategic actions to achieve legitimacy and social acceptance (DiMaggio & Powell, 1983; Scott, 2005). Various studies explore how institutional pressure in the international arena shapes proactiveness in environmental strategy. Analysing how national institutions influence multinationals to practice corporate social responsibility, Marano and Kostova (2016) find that the strongest pressure occurs when the company depends economically on the country or when the country is a leader in CSR. Aguilera-Caracuel, Hurtado-Torres, Aragón-Correa, and Rugman (2013) analyse how multinationals negotiate institutional differences (formal and informal) in the countries in which they operate to develop an approach that standardizes the firm's institutional approach to environmental impact to meet the pressures across these countries. Aguilera-Caracuel and Guerrero-Villegas (2018) find that multinationals undergoing geographical international diversification or operating in developing regions may intensify environmentally and/or socially conscious strategies to improve corporate image.

Institutional theory identifies three main institutional pressures: coercive, normative and mimetic (DiMaggio & Powell, 1983). Coercion is exerted by government laws and regulations (Prajogo, Tang, & Lai, 2012), which require compliance to ensure firms' legitimacy. Evidence shows that compulsory environmental policies are useful in fostering management of environmental impact and GI creation (Henriques & Sadorsky, 1996; Winter & May, 2001). Further, firms with proactive environmental strategies can increase their reputations by being first to implement even stricter regulations on emissions and operations (Duque-Grisales et al., 2020). Good environmental management can lead regulatory agencies to view these firms more favourably (Darnall, Jolley, & Handfield, 2008). Finally, proactive eco-friendly initiatives with the potential for more substantial environmental effects require greater commitment from the whole organization to comply with compulsory environmental measures, whether through green polices (Henriques & Sadorsky, 1996) or voluntary programs (Darnall, 2003).

Second, pressures within the sector can motivate firms to implement environmental management practices beyond required norms (Sharfman, Shaft, & Tihanyi, 2004). Specific sectors or industries exert normative pressure on firms to meet certain conditions or adopt professional practices or standards to achieve legitimacy (Oliver, 1997). This pressure is usually to emulate leading firms that model best practices in corporate environmental responsibility, values and beliefs, policies and performance. The community, professional associates and public opinion (e.g., customers and media) can also exert pressure, and these stakeholders are increasingly active as more information on firms' green record becomes publicly available (Arora & Gangopadhyay, 1995). To comply with such pressure, firms may innovate in eco-friendly goods and processes. Berrone et al. (2013) study the effect of normative pressure on organizations' perception of the desirability of environmental innovation.

Third, competitors generate mimetic pressure (Daddi, Testa, Frey, & Iraldo, 2016). Boiral (2007) argues that organizations may imitate competitors to gain professional legitimacy in uncertain business environments. Leaders with advanced GI in emerging markets companies exert substantial mimetic pressure, motivating companies to intensify their green management to keep up. Still, lack of commitment can limit strategic manoeuvres like establishing an EMS to the merely symbolic (Delmas & Burbano, 2011).

Ultimately, all three institutional pressures (regulatory, mimetic and normative) exerted on organizations by the diverse stakeholders mentioned above motivate CSR implementation oriented to sustainability.

2.3 | GI and FP

GI is one of the most significant issues influencing financial development, green sustainability and quality of life (Dangelico & Pujari, 2010). Among the multiple terms used (GIs, eco-innovation, sustainable innovation and environmental innovation), this study defines GI as *innovations that consist of new or modified processes, practices, systems and products which benefit the environment and contribute to environmental sustainability* (Oltra & Saint Jean, 2009, p. 567). This definition highlights GI's promotion of the firm's efforts, both operational and organizational, to reduce negative environmental impacts. Such efforts can take the form of new products or new processes that contribute to sustainability and environmental protection. Implementing GI represents a great challenge for Multilatinas because it often requires acquisition of new resources, capabilities and competencies that are not always available inside the firm (Das & Teng, 2000; Demirel & Kesidou, 2019) in order successfully to innovate in products and processes.

Previous studies have analysed the relation between GI and the firm's FP (e.g., Aguilera-Caracuel & Ortiz-de-Mandojana, 2013; Przychodzen & Przychodzen, 2015; Tariq et al., 2019), with inconclusive results. Based on a critical review, Grewatsch and Kleindienst (2017) show that 59% of studies find a positive relationship and 41% obtain insignificant or mixed results on the relationship between firms' green efforts and FP. Some studies find a positive relationship based on arguments that environmental innovations generated by appropriate environmental standards lower product costs or increase value (Porter & Van der Linde, 1995) because they allow companies to use their inputs more productively (e.g., Cainelli, Mazzanti, & Zoboli, 2011; González-Benito & González-Benito, 2005; Xie, Huo, & Zou, 2019). Other studies find a negative association between the two constructs, arguing that companies that invest in green initiatives incur higher costs that can reduce incentives to invest in such activities (Jaffe, Newell, & Stavins, 2005; Rennings, 2000; Rosenbusch, Brinckmann, & Bausch, 2011).

Based on the foregoing arguments, we propose that the relationship between GI and FP is negative in the case of Multilatinas for the following reasons. First, Multilatinas' context is highly conditioned by the institutional profile of the home country (Cuervo-Cazurra, 2008) because they operate in environments with abundance of natural resources. Because GI does not create a short-term competitive advantage reflected in performance improvement for the company (Sueyoshi & Goto, 2009), Multilatinas are not pressured enough by environmental regulations and institutions (Gammeltoft, Pradhan, & Goldstein, 2010) to motivate their managers to see the real need to adopt GI. In the context of Latin America, it is also important to highlight that effective environmental policies are often insufficient due to lack of funds, trained personnel, public infrastructure and political will (Fikru, 2014).

Second, as Multilatinas' managers have a shorter term vision, they expect immediate results. Adopting GI is seen more as an expenditure than as a strategic investment. When Multilatinas decide to pay attention to GI, they do not do so effectively, as GI compromises resources they need for their operations, sacrificing their cash flow and decreasing their profitability (Lee, Faff, & Langfield-Smith, 2009). Environmental issues are thus not a priority as these firms define their corporate strategy.

Third, compared with multinationals from developed countries, Multilatinas are smaller in size and have less cutting-edge technology and less-sophisticated resources (Duque-Grisales et al., 2020; González-Ruiz, Botero-Botero, & Duque-Grisales, 2018). Multilatinas' managers do not believe they can engage in GI because they associate innovation with 'obtaining patents', a process considered as very expensive and risky for the interests of the company (Scarpellini, Portillo-Tarragona, & Marin-Vinuesa, 2019). These managers also view environmental efforts as an additional cost burden for the firm (Aguilera-Caracuel & Ortiz-de-Mandojana, 2013) that diminishes FP.

Multilatinas' organizational culture is clearly reluctant to regard GI as a substantial and potential source of competitive advantage. It does not treat GI as an investment that could both reduce operational costs and differentiate the firm from its competitors. For all of these reasons, implementing GI neither improves Multilatinas' products and processes in the long-term nor helps to improve company image and reputation. The efforts dedicated to environmental matters thus become a cost and a burden for Multilatinas.

In sum, we argue that adopting GI requires resources and capabilities that are sometimes not available in Multilatinas. Implementing innovations takes a lot of time, and investments are too high. All of these factors related to GI decrease the real profitability of the company in the short term. Based the foregoing, and considering the lack of institutional support by Multilatinas' home countries for advanced environmental approaches, we formulate the following hypothesis:

H1. Green innovations are negatively related to Multilatinas' financial performance.

2.4 | GIs and EMS

Institutional pressures play a determining role in the environmental commitment of organizations and the implementation of standardized management systems (Kassinis & Vafeas, 2006; Sharma & Vredenburg, 1998). As a voluntary rather than a compulsory set of standards designed to improve the firm's environmental impact, EMSs foster systematic implementation of environmental management practices and procedures (Coglianese & Nash, 2001; Darnall et al., 2008; Testa et al., 2018). Effective EMS implements ongoing assessment of the production processes (behaviour, procedures and policies) that are less damaging to the environment. As an integral part of the organization's management system responsible for planning, implementing and managing its environmental policy (Albertini, 2013; Melnyk, Sroufe, & Calantone, 2003), EMS integrates interdependent elements—among them, the structure of the organization, responsibility sharing, and policies, processes and resources that the organization must possess to put its environmental policy into practice and achieve its objectives (Fortuński, 2008).

Adopting an EMS can improve a firm's environmental and organizational performance (Hillary, 2004). It enables compliance with local and international government regulations and industry standards (Zutshi & Sohal, 2004), meets customers and market demands (Waxin, Knuteson, & Bartholomew, 2019), improves corporate image (Bansal & Hunter, 2003) and increases institutional legitimacy (Boiral, 2007; King, Lenox, & Terlaak, 2005). These benefits have motivated a yearly increase in the number of Multilatinas that adopt EMS, particularly ISO 14001, in Latin America (De Camargo Fiorini, Chiappetta Jabbour, Lopes de Sousa Jabbour, Oliveira Stefanelli, & Fernando, 2018), facilitating inclusion of Multilatinas in international markets as they gain licenses to operate (Sena da Silva & De Medeiros, 2004).

Successful management and achievement of sustainable development are grounded in concrete objectives, planning, activities and metrics. Although the ISO 14001 standard does not stipulate specific goals for environmental efficiency, it is intended to contribute to construction of a worldwide-known groundwork for environmental measurement, assessment and auditing. ISO 14001 thus gives firms the instruments to evaluate and regulate the consequences of the environmental actions, goods and services they deliver (De Oliveira et al., 2010).

Obtaining this general global goal for EMS through certification within the ISO 14001 standard requires firms to determine what processes, policies and practices will reduce environmental impact in their specific context and how to integrate these routines into the organization (Von Oelreich, 2004). ISO 14001 is generally believed to provide benefits that are both internal (primarily greater financial productivity for Gavronski, Ferrer, and Paiva (2008)) and external (including entrance into new markets, compliance with regulations and government incentives, better eligibility for insurance, access to more sources of capital and more positive reputation). Because ISO 14001 affirms environmental and ethical integrity, certified organizations are usually viewed more favourably (González-Benito & González-Benito, 2005) and have better relations with employees and the public, producing competitive advantage in some sectors (Ferrón-Vílchez, 2016; Giménez Leal, Casadesús Fa, & Valls Pasola, 2003; González, Sarkis, & Adenso-Díaz, 2008).

Firms that implement ISO 14001 are better able to survive in national and international contexts due to increased legitimacy and greater business value (Parida & Wang, 2018). We can thus extend institutional theory to argue that Multilatinas seek legitimacy by responding to the pressures (mimetic, regulatory and coercive) in their institutional context. In response to coercive pressure, they will establish EMS to avoid government sanctions (Aguilera-Caracuel et al., 2013) and demonstrate environmental commitment to customers, regulatory agencies and other institutions (Nishitani, 2010). Second, mimetic pressures lead Multilatinas to search for and adopt best practices and standards in their institutional field (Delmas & Toffel, 2004; Kostova, Roth, & Dacin, 2008). ISO 14001 can be crucial in granting the legitimacy needed to satisfy the firm's markets (e.g., Beise & Rennings, 2005; Berrone et al., 2013). Third, Multilatinas will adopt the culture and professional standards of the industry (Albertini, 2013) due to latent normative pressure (Christmann & Taylor, 2001; Delmas, 2001). Having an EMS can grant Multilatinas the desired organizational legitimacy.

Beyond these reputational benefits from implementing an EMS, Bansal and Hunter (2003) show that ISO 14001 strengthens firms by intensifying the GI–FP relationship through commitment to organization-wide continuous improvement (Bansal & Hunter, 2003). ISO 14001 can generate greater operating efficiency and faster innovation by improving environmental strategies (Melnyk et al., 2003). Therefore, ISO 14001 provides Multilatinas with the structure through which to monitor, analyse and evaluate all internal operations to make environmental consciousness a thoroughgoing and integral aspect of the firm's way of thinking, doing and strategy. Benefits for Multilatinas include modifications and innovations in product systems to reduce the cost and improve the environmental impact of product life cycles, potentially leading to new product development (Hart, 1995). The stronger morale and lower environmental impact Multilatinas gain can increase productivity as well as innovation (Pun & Hui, 2001). Finally, EMS can improve the Multilatina's long-term FP. They increase compliance with and satisfaction of external stakeholders by organizing and systematizing how firms develop environmental innovations, while also improving the firm's legitimacy to external stakeholders (Bansal & Hunter, 2003) and its corporate image (Potoski & Prakash, 2005).

We thus argue that Multilatinas that adopt ISO 14001 can find opportunities for further GI because they comply with national and international regulations, gain legitimacy from different stakeholders, increase their level of transparency and reputation by imitating competitors' 'best environmental practices' and adopt environmental management practices widely accepted by the industry. In addition to the cost saving opportunities ISO 14001 implementation provides (Sroufe, 2003), we propose that it leads Multilatinas to generate strategic knowledge (Delmas, 2001) that allows the GI adopted to benefit from constant improvement of Multilatinas' internal processes and products, providing customer satisfaction and new access to markets (Darnall, Gallagher, & Andrews, 2001). For all of these reasons, we propose the following hypothesis:

H2. ISO 14001 adoption positively moderates the relationship between Multilatinas' green innovations and financial performance.

2.5 | GIs and R&D Investment

R&D investment plays a pivotal role in the firm's GI activities (Ketata, Sofka, & Grimpe, 2015; Lee & Min, 2015; Parthasarthy & Hammond, 2002) and is considered as one of the most essential factors in promoting economic growth and business value (Chan, Martin, & Kensinger, 1990; Ghisetti & Pontoni, 2015). R&D investment seeks to generate innovation that increases the company's sales. Such innovation can be achieved by developing new products, improving existing products and gaining effectiveness and efficiency in production processes (Scarpellini et al., 2019). Thus, higher levels of R&D investment can contribute to the adoption and implementation of GI, making clean technologies more beneficial, with favourable and significant impact on growth of the firm's productivity (Wakelin, 2001).

The NRBV suggests that companies should incorporate environmental issues into their strategic planning process (Hart, 1995), as such incorporation will favour firms' ability to handle uncertainties and help to develop valuable organizational capabilities (Hart, 1995). Managerial resources and capabilities are very important in the firm's ability to perform GI activities and play a pivotal role in increasing the level of resources allocated to GI activities (Kesidou & Demirel, 2012). Laursen and Salter (2006) argue that companies must obtain resources from the external environment in order to innovate. Triguero, Moreno-Mondéjar, and Davia (2013) hold that having sufficient access to external knowledge correlates with the likelihood of developing GI activities (Bigliardi, Bertolini, Doran, & Ryan, 2012), and higher levels of R&D investment could help the firm to acquire such resources.

Today's rapidly fluctuating technological environment makes innovation even more important than previously (Berry, 2014). The NRBV framework provides new insights into the innovations that companies can adopt to strengthen their competitive position (De Stefano, Montes-Sancho & Busch, 2016). Yet, from an NRBV perspective, EMMs may be at a disadvantage relative to their competitors from the developed world. First, EMMs may not have the innovative competencies that developed countries do to exploit disruptive new technologies (Fleury, Fleury, & Borini, 2013). Second, a significant gap in innovation capabilities separates EMMs from their established rivals, which are both far more experienced in innovation and more oriented towards it (Christensen, Hang, Chai, & Subramanian, 2009). In this line, Zhu, Lynch, and Jin (2011) argue that EMMs must implement innovative strategies to enhance their levels of competitiveness and must explore and exploit existing new knowledge to do so. From this point of view, higher R&D investment could enhance development of innovative strategies.

To react promptly to confront unplanned changes and to plan diverse alternatives to supply latent customer requirements, Multilatinas must restructure their ground-breaking strategies (DeSarbo, Di Benedetto, Song, & Sinha, 2005; Melander, 2018). Greater investment in R&D will ensure that Multilatinas have enough market knowledge to support technological opportunities (Danneels, 2007) and improve their performance by focusing on more valuable and differentiable products and better manufacturing processes (Kotabe, Srinivasan, & Aulakh, 2002). When Multilatinas invest in R&D, they can minimize the threat of technological obsolescence (Chesbrough & Garman, 2009) by developing their technological knowledge (Schoenmakers & Duysters, 2006) and identifying new technological trends (Laursen & Salter, 2006). In sum, we argue that investing in R&D enables better control and understanding of GI adoption to respond more effectively to the demanding environmental standards of stakeholders and different national institutional requirements.

Some Multilatinas are currently developing innovation networks and increasing R&D investments (Bianchi, Mingo, & Fernandez, 2019). As the level of R&D investment increases, Multilatinas' managers can make GI more effective by using their resources and capabilities efficiently, strengthening staff, improving processes, acquiring cutting-edge technology and meeting knowledge needs within the business. Multilatinas can thus improve their products and processes in the short term, while positioning themselves as companies committed to the environment. This proactive posture can be translated into financial benefits in the long term. Indeed, it also enables Multilatinas to exploit their significant expert knowledge even more fully (Caloghirou et al., 2004) and adopt better GI inside and outside the organization, making them more competitive and enabling them to overperform (Alam, Atif, Chien-Chi, & Soytaş, 2019). Greater R&D investment thus makes the positive impact of GI on FP long-lasting and more effective.

Based on these arguments, we can reasonably expect that success in pursuing GI to enhance FP will depend on the extent of R&D investment. In sum, R&D investment can help Multilatinas to develop a set of unique resources and capabilities to increase their level and intensity of GI, leading to improvement in FP. Therefore, we propose that R&D investment has a positive moderating effect on the relationship between GI and FP.

H3. R&D investment positively moderates the relationship between Multilatinas' green innovations and financial performance.

Figure 1 summarizes the research model developed in this study

3 | MATERIAL AND METHODS

3.1 | Data

This study used diverse criteria to establish the sample, which includes only Multilatinas in the MSCI Emerging Markets Index that earn an annual profit of over USD $1 billion. The MSCI Emerging Markets Index was designed to show large- and mid-cap securities performance in 26 emerging markets. Due to its risk and performance analytics, this index has become the most globally accepted authority for investors in emerging markets. The firms composing the Index are required to provide data on environmental, social and governance (ESG) strategies in the MSCI methodology. Second, due to data availability, this article only involves Multilatinas listed on the Latin American Stock Market (Bovespa Index and S&P MILA Pacific Alliance). This filter generated 111 companies from Brazil (C1), Mexico (C2), Colombia (C3), Chile (C4) and Peru (C5). Third, firms that provided information on financial and environmental factors to the Thomson Reuters' ASSET4 ESG database were selected. This database comprises financial, environmental, social, corporate governance and internationalization data on over 6,000 firms globally in all sectors and includes more than 400 measures clustered into over 70 indicators and drawn from over 75,000 information sources, all of which are juxtaposed (Schäfer, Beer, Zenker, & Fernandes, 2006). To facilitate statistical analysis of the contrasted information, all values were standardized and verified. The previous selection criteria generated a total sample of 430 observations from 86 firms, distributed across six sectors identified by their two-digit code in the North American Industry Classification System (NAICS): 26.74% Manufacturing (S31); 24.42% Retail Trade (S44); 17.44% Mining, Oil and Gas Extraction (S21); 16.28% Utilities (S22) and 15.12% other. Our sample period was 2013–2017. Part of this database has been used in previous studies (Duque-Grisales & Aguilera-Caracuel, 2019; Duque-Grisales et al., 2020).

3.2 | Variables

3.2.1 | Dependent variable

The dependent variable in this study is FP. Return on assets (ROA), a standard accounting measure of FP commonly used in the GI literature, serve as a proxy for the firm's FP (Aguilera-Caracuel & Ortiz-de-Mandojana, 2013; Xie et al., 2019). ROA is defined as ratio of net income to total assets (Lee et al., 2009).

3.2.2 | Independent variable

Our independent variable is GI. This study draws on previous research (Chen, 2008; Huang & Li, 2018) to measure GI, including green product innovation (Cheng & Shiu, 2012) and green process innovation (Dalhammar, 2016; Hellström, 2007).

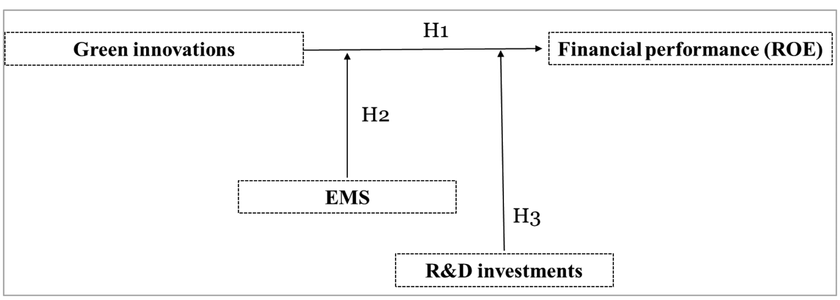

FIGURE 1 Research model

Following Duque-Grisales et al. (2020), we evaluate 12 indicators from the Thomson Reuters' ASSET4 database for this variable. GI is portrayed by the selected indicators as a whole measure. It represents a firm's efficiency level and capacity to decrease its use of materials, power or water. It also indicates the firm's capacity to obtain more ecologically productive results by refining its products and processes. These indicators further reflect the firm's commitment to and performance in decreasing its emissions to the natural environment from its manufacturing and functioning processes. A great variety of crucial cases previously analysed in international business use the same or very similar indicators to measure GI (e.g., Cheng and Shiu (2012) and Theyel (2000)). Table 1 presents a description of each of these indicators for GIs.

To decrease the number of items to a more manageable status, this paper used exploratory factor analysis using key component analysis and the Varimax rotation method with Kaiser Normalization in

TABLE 1 Indicators for green innovations

Indicator	Description
Renewable energy use	Does the company use renewable energy?
Product impact minimization	Does the company report on minimization of materials consumption, reuse of components or elimination of dirty components?
Water technologies	Does the company use water technologies?
New cleaner material	Does the company use new cleaner material or new input with lower environmental impact?
Life cycle products	Does the company report on specific products with a longer life cycle?
Environmental products	Does the company report on at least one product line or service that is designed to have positive effects on the environment or that is environmentally labelled and marketed?
Eco-design products	Does the company report on specific products that are designed for reuse, recycling or reduction of environmental impacts?
Noise reduction	Does the company develop new products that are marketed as reducing noise emissions?
Environmental product/service features	Does the company report on product features and applications or services that promote responsible, efficient, cost-effective and environmentally preferable use?
Renewable/clean energy products	Does the company develop products or technologies for use in clean, renewable energy (such as wind, solar, hydrothermal and geothermal or biomass power)?
Environmentally friendly technologies	Does the company make use of environmental-friendly technologies in its processes?
Waste recycled	Total recycled and reused wasted produced, in tonnes

SPSS (version 24.0). This method caused elimination of two factors with eigenvalues of over 1 and variances of over 84.895%. The KMO value is 0.975, with a Bartlett's test significance of 0.000. As the reliability analysis performed (Cronbach's α > 0.8) was satisfactory for one factor only, we discarded the second. The average variance extracted (AVE) took values above 0.5, consistent with acceptable criteria (Fornell & Larcker, 1981); items with low loadings (less than 0.5) were discarded. Table 2 displays the results.

Following Duque-Grisales et al. (2020), the results of the factor analyses suggest that Factor 1 is the most important, as it explains about 56.36% of the total variance. This factor is composed of attributes of both green product innovation and green process innovation. The green product innovations factor encompasses aspects of the company such as development of eco-design products, minimization of materials consumption, existence of environmental products and use of new cleaner material or new input with lower environmental impact. Green process innovation includes aspects such as use of environmentally friendly technologies, especially those related to renewable energy and water conservation in the company's production processes.

3.2.3 | Moderating variables

This study investigates the potential moderating role of R&D investment and ISO 14001 adoption in the relationship between GI and FP. We obtained the data analysed from the Thomson Reuters' ASSET4 ESG database.

- ISO 14001: The ISO 14001 variable is measured as a dummy variable. Concretely, this variable indicates the presence or absence of an implemented EMS like ISO 14001. ISO 14001 is an international environmental management standard that provides premise flexibility to the types of sustainable objectives firms are willing to set up. It requires the implementation of a series of inner organizational processes to manage environmental impacts in a systematized way (Arimura, Darnall, Ganguli, & Katayama, 2015).
- R&D investments: R&D investment is measured as a firm's annual R&D investment measured as percentage of its annual revenue (De Marchi, 2012). Our study does not use the firm's R&D expenditure to measure R&D investment directly because this value always correlates closely with firm size (Tsai, Hsieh, & Hultink, 2011).

3.2.4 | Control variables

As in previous research, this study includes several control variables—firm size, activity sector, R&D country, financial slack (FS) and geographic international diversification (GID). The information was obtained from Thomson Reuters' ASSET4 ESG database.

Activity sector: Compared with companies from environmentally sensitive industries, firms belonging to environmentally non-sensitive

TABLE 2 Rotated component Varimax matrix of factors influencing green innovation (GI)

Component	1	2	Eigenvalues	% variance	Cumulative %	Cronbach's alpha
Factor 1. Green innovations			1.913	66.365	66.365	0.937
Green product innovation						
Eco-design products	0.709					
Environmental products	0.832					
New cleaner material	0.773					
Product impact minimization	0.562					
Green process innovation						
Environmentally friendly technologies	0.782					
Renewable energy use	0.518					
Water technologies	0.509					
Factor 2. Green innovations			1.083	28.53	94.895	0.897
Renewable/clean energy products		0.872				
Waste recycled		0.502				
Life cycle products						
Noise reduction						
Products' ability to be recycled						

Note: Extraction method: principal component analysis. Rotation method: Varimax with Kaiser normalization. Rotation converged in 14 iterations.

sectors are generally believed to decrease GI levels (De Marchi, 2012). Two dichotomous variables (applied to four of the five activity sectors) were integrated in order to study the possible effect of industry type on the sample. Industry dummy controls were included for specific industry-level factors presented. This control variable can capture differences in environmental engagement and commitment among industries.

Firm size: Firm size has been widely used as an organizational control (Kesidou & Demirel, 2012). It is measured here as the Multilatina's logarithm of total sales. Because larger firms tend to develop and adopt more GI, they may perform better than small firms (Berrone et al., 2013).

R&D country: Higher levels of economic development at the country level are assumed to explain greater environmental responsibility of the different stakeholders. The analysis includes each country's R&D expenditure in order to establish the potential influence of home countries' economic conditions on the sample (Lee, 2011).

FS: FS is the level of liquid assets—such as cash the organization has not committed to any specific goal—that can be invested in a wide range of activities, such as environmental issues and GI (Kraatz & Zajac, 2001). Higher levels of slack financial resources can lead to higher levels of GI (Ghisetti & Rennings, 2014; Voss, Sirdeshmukh, & Voss, 2008). The following formula was used to calculate FS:

$$Slack_i = Current\ Assets / Current\ Liabilities. \quad (1)$$

GID: Taking into consideration that the firm's internationalization can influence its environmental and FP (Attig, Boubakri, El Ghoul, & Guedhami, 2016; Strike, Gao, & Bansal, 2006), the entropy index was used to measure the firm's GID. Following Aguilera-Caracuel, Guerrero-Villegas, Vidal-Salazar, and Delgado-Márquez (2015), GID was measured by distribution of sales worldwide using the entropy index, calculated as follows:

$$GID = \sum_i P_i x\, Ln(1/P_i) \quad (2)$$

where P_i is the sales percentage in a specific region i and $Ln\left(\frac{1}{P_i}\right)$ represents the weight given to a region. Both the number of regions in which the firm operates and the relative relevance of each region to the firm's total sales are considered by the ratio mentioned above (Hoskisson, Hitt, Johnson, & Moesel, 1993). To calculate this entropy index, we used the international market sales data provided by the Thomson Reuters geographic segment for each company. Thomson Reuters classifies foreign markets into six relatively homogeneous global regions: North America, Central America, Latin America, Europe, Asia and the Pacific and Africa and excludes the company's own market. These regions are consistent with the World Bank's (2018) classification of regions worldwide.

The correlation matrix and descriptive statistics for each of the study variables are presented in Table 3. The relatively low correlation coefficients indicate that our data do not suffer from collinearity among the independent variables.

4 | RESULTS

Static panel data regression models were estimated in this research, including control variables. Fixed and random effect models were also calculated. To monitor the data's unobserved heterogeneities, the Hausman test was applied to help determine whether fixed or random effects are more convenient. The results of this test show that the fixed effect estimators are not consistent and that random estimators

TABLE 3 Descriptive statistics and correlations

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. ROA	0.116	0.236	1											
2. GI	0.086	0.994	0.041	1										
3. Firm size	3.537	0.728	0.206	0.131	1									
4. R&D country	0.027	0.016	0.047	−0.081	0.150	1								
5. Slack	1.924	1.423	0.042*	−0.066*	0.314*	0.080	1							
6. GID	0.925	0.526	−0.225	0.078	0.099	0.151	0.168	1						
7. R&D investment	0.039	0.189	−0.137	0.011*	0.431	−0.085	0.228	0.100**	1					
8. EMS (ISO 14001)	0.700	0.459	−0.053	0.230**	0.185*	0.123	0.134*	0.078	−0.172	1				
9. Mining and oil and gas extraction	0.177	0.383	0.025**	−0.045*	−0.007	−0.150	0.336**	−0.019	−0.001	0.028	1			
10. Utilities	0.194	0.396	−0.129	−0.008	−0.157	0.126	0.071	−0.076	0.149*	0.053	−0.228	1		
11. Manufacturing	0.258	0.438	−0.174	−0.164*	0.045	0.008*	−0.033	0.085*	−0.072	0.144*	−0.274	−0.289	1	
12. Retail trade	0.210	0.408	0.171*	0.166	0.169	0.219	−0.192*	0.010	−0.037	−0.026	−0.239	−0.252	−0.304	1
13. Other sectors	0.048	0.215	0.056	0.036	−0.071	−0.166	−0.062	−0.184	−0.033	−0.180	−0.105	−0.110	−0.133	−0.116

Note: 430 observations. The table contains Pearson's correlation coefficients.

Abbreviations: EMS, Environmental Management System; GI, green innovation; GID, geographic international diversification; ROA, return on assets; R&D, research and development.

* $p < 0.05$.

** $p < 0.01$.

are more appropriate. Specifically, the results present a *p* value higher than 0.05 and a significance level of 5% for all models used in this study. Thus, the null hypothesis cannot be rejected, and a random effect model is the preferred model. Finally, multiple-moderated regression analyses were used to test the hypotheses, establishing the moderating effect as a multiplicative variable (Cohen, Cohen, West, & Aiken, 2013).

Table 4 shows the results of the random effects regression analyses for each model, including the control variables industry type, firm size, R&D country, FS and GI. The variance inflation factors (VIFs) range from 2.11 to 2.57, indicating that multicollinearity does not seem to be a problem in our models (Hair, Sarstedt, Ringle, & Mena, 2012). The model shows good fit, supported by a within-range R^2 value and the *F*-statistic.

As Table 4 shows, GI has a negative but insignificant effect on the firm's FP in Model 1 (β = −0.008). For Models 2 and 3, respectively, R&D investment and EMS were added as independent variables. The results showed no change, indicating that GI does not have a statistically significant effect on the firm's FP. H1 is thus rejected.

The results also reveal that, whereas level of R&D investment has a positive and significant impact on FP, EMSs do not lead to FP improvement in our sample firms. Further interpretation of these results is beyond the scope of this study.

Finally, Models 4 and 5 represent the full model, which includes the two moderating effects. Model 4 does not provide sufficient statistical support for H2. That is, a Multilatina's EMS (ISO 14001) does not moderate the relationship between GI and FP (Figure 2).

Model 5, in contrast, suggests that R&D investment positively moderates the relationship between GI and FP in Multilatinas (β = 0.137; $p < 0.05$). Figure 3 represents this behaviour, showing that the higher the level of R&D investment, the stronger the positive impact of GI on FP in our sample firms. Hence, H3 is accepted in our sample.

5 | DISCUSSION, LIMITATIONS AND FUTURE STUDIES

The present study addresses a central question in the field of GI from the perspective of the NRBV and institutional theory. The study aims to determine the relationship of GI to FP and the moderating effects of EMS (ISO 14001) and R&D investment in the GI–FP relationship. Our focus differs from that of the studies summarized in the literature review in that findings evaluating the importance of the GI–FP relationship cannot be generalized or applied to EMMs in general or to Multilatinas in particular. The different institutional conditions of Multilatinas in their home countries produce differences in GI activity levels and peculiarities in the frameworks of institutions, government and regulations. Our study therefore answers calls in the previous international business literature on EMMs (Multilatinas in particular).

The empirical data show no influence of GI on FP in Multilatinas. The lack of strong environmental legislation in this context provides little incentive to innovate environmentally. Firms that do innovate

TABLE 4 Results of random effects linear regression model

	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	0.0206 (0.167)	−0.133 (0.172)	0.042 (0.175)	0.037 (0.171)	−0.140 (0.171)
Control variables					
Mining, oil and gas extraction sector	−0.131 (0.105)	−0.161 (0.104)	−0.140 (0.106)	−0.136 (0.106)	−0.158 (0.103)
Utilities sector	−0.151 (0.099)	−0.167 (0.099)	−0.158 (0.101)	−0.153 (0.101)	−0.163 (0.099)*
Manufacturing sector	−0.193 (0.095)*	−0.196 (0.094)*	−0.206 (0.097)*	−0.199 (0.097)*	−0.199 (0.093)*
Retail trade sector	−0.040 (0.101)	−0.057 (0.101)	−0.042 (0.102)	−0.037 (0.099)	−0.053 (0.099)
C1	−0.026 (0.145)	−0.087 (0.124)	−0.028 (0.125)	−0.037 (0.125)	−0.075 (0.124)
C2	0.217 (0.161)	0.187 (0.158)	0.211 (0.161)	0.167 (0.145)	0.231 (0.079)
C3	0.006 (0.145)	−0.037 (0.145)	0.003 (0.146)	0.024 (0.146)	−0.029 (0.143)
C4	0.368 (0.175)*	0.297 (0.173)*	0.365 (0.176)*	0.362 (0.176)*	0.330 (0.093)***
Firm size	0.084 (0.031)**	0.141 (0.034)***	0.082 (0.031)**	0.084 (0.031)**	0.144 (0.037)***
R&D country	−1.093 (1.145)**	−1.046 (1.083)**	−1.272 (1.146)**	−1.274 (1.152)**	−0.940 (1.099)**
Slack	0.027 (0.011)*	0.033 (0.011)**	0.027 (0.011)*	0.027 (0.017)*	0.033 (0.011)**
GID	0.113 (0.039)**	0.122 (0.041)**	0.117 (0.039)**	0.121 (0.038)**	0.122 (0.040)**
R&D investment		0.232 (0.067)***			0.229 (0.067)***
EMS (ISO 14001)			0.039 (0.043)	0.039 (0.043)	
Independent variables					
Green innovations	−0.008 (0.016)	−0.008 (0.016)	−0.012 (0.0173)	−0.025 (0.028)	−0.816 (0.0168)
Moderate variables					
Green innovations × EMS				0.018 (0.043)	
Green innovations × R&D investment					0.631 (0.137)*
VIF	2.3345	2.2436	2.1135	2.5712	2.5104
R^2 value	0.1072	0.1276	0.1012	0.1241	0.2284
F-static	2.3243***	3.0839***	2.2067**	2.0780***	2.8979***

Note: The table includes coefficients of the regression model (estimators); standard deviations are included in parentheses.
Abbreviations: EMS, Environmental Management System; GID, geographic international diversification; R&D, research and development; VIF, variance inflation factor.
*Significant at 0.05.
**Significant at 0.01.
***Significant at 0.

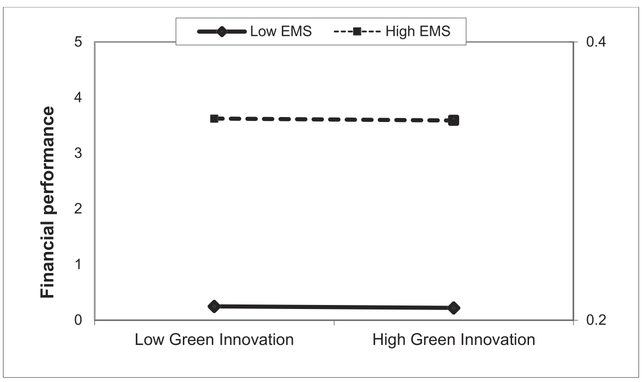

FIGURE 2 The moderating effect of ISO 14001 adoption on the relationship between Multilatinas' green innovations and financial performance

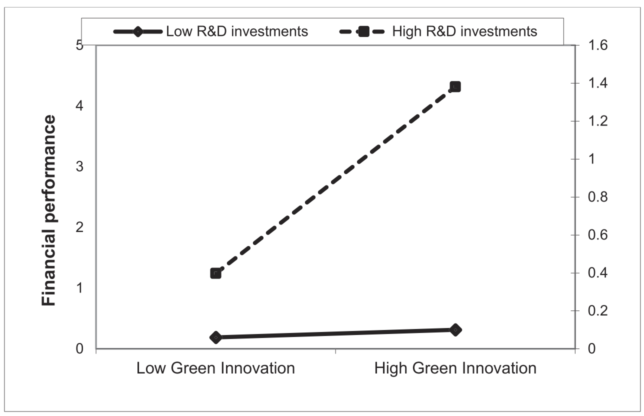

FIGURE 3 The moderating effect of research and development (R&D) investments on the relationship between Multilatinas' green innovations and financial performance

rarely prioritize GI, as lack of institutional support makes it difficult to publicize their accomplishments. According to the NRBV, firms need to fill the gap between the resources and capabilities required to adopt effective GI (Hart & Dowell, 2011). As Multilatinas tend to have few internal resources and capabilities for innovation, they are unwilling to undertake the additional expense of GI implementation and risk lower profits. Our results reinforce other findings that innovation initiatives impact the firm but do not provide assurance of higher FP (Jacobs, Singhal, & Subramanian, 2010; Ngwakwe, 2009; Saliba de Oliveira, Cruz Basso, Kimura, & Sobreiro, 2018). For Multilatinas, we can conclude that the GI–FP relationship depends on other variables.

Contrary to our expectations, we find no significant effect of EMS (ISO 14001) on the relationship between GI and FP. That is, ISO 14001 implementation in Multilatinas does not moderate the GI–FP relationship efficiently nor does it condition how GI improves FP in these organizations. This finding may be due to the fact that ISO 14001 focuses on the EMS process, not its effects (Bansal & Hunter, 2003; Delmas, 2001). In analysing quantity of ISO 14001 certifications granted in different countries, Delmas (2001) finds that variations could be explained by the institutional contexts affecting the perceived benefits and the cost of obtaining firm-level EMS certification. Whereas developed countries have strong institutional incentives motivating firms to obtain the certification, the context shaping EMMs' decisions is characterized by less-effective corporate governance, strong information asymmetry and weak or inadequate regulations and legal frameworks (Aguilera et al., 2017; Cuervo-Cazurra, 2016; Cuervo-Cazurra, Ciravegna, Melgarejo, & Lopez, 2018). Unless Multilatinas are subject to the same pressures as developed countries to gain legitimacy through institutions (Boiral & Henri, 2012), they will not undertake significant transformation of operations. Due to the flexibility involved in the ISO 14001, they may implement EMS with only minimal compliance and environmental commitment (González-Benito, Lannelongue, & Queiruga, 2011). Such a strategy is, in turn, less likely to yield significant product or process innovation. Although we can assume that certification requires the firm to gather information to support a coherent EMS, we cannot determine whether GIs have been initiated, and there is no guarantee that the certification generates environmental benefits in the firm (De Oliveira et al., 2010). A number of studies obtain similar results. ISO 14001 (and other similar EMS) and international certification do not guarantee better environmental management (e.g., GI) or necessarily improve financial and environmental performance (e.g., Ferrón-Vílchez, 2017; Peña-Vinces & Delgado-Márquez, 2013; Zeng, Zhang, Matsui, & Zhao, 2017).

Our conclusion is not surprising. Multilatinas tend to prefer token legitimacy and adopt EMS that achieve minimal compliance in response to pressure from stakeholders (customers, bureaucracy and regulatory agencies; Al-Twaijry, Brierley, & Gwilliam, 2003). Oriented to short-term profit rather than environmental benefit, they focus on the appearance of legitimacy rather than on deeper changes and do not evaluate longer term profitability (Aravind & Christmann, 2011). Beyond ensuring compliance with basic requirements and providing symbolic recognition, certification may not even lead to GI that improves products, processes or environmental impact significantly because ISO 14001 stresses process, not performance (Delmas, 2001; Ferrón-Vílchez, 2016). Such superficial GI is not committed to long-term support for environmental innovation and does not nurture an organizational cultural that values care for the environment (Bansal & Clelland, 2004); it merely 'greenwashes' (Delmas & Burbano, 2011).

This study's empirical results do, however, show that R&D investment moderates the relationship of GI to FP. Successful commitment to and adoption of GI initiatives with an eye to the long term increases Multilatinas' integration of GI throughout the organization and its actions. Such investment cultivates the organization's talent to promote increasingly efficient green technologies and greater employee skill to envision new eco-friendly technologies, processes and products (Tsai et al., 2011). Such commitment also promotes Multilatinas' acquisition of a knowledge base and capabilities to innovate and reduce environmental impact, enhancing customer satisfaction as well as reputation and brand image (Bhattacharya & Sen, 2003; Kammerer, 2009), which in turn improves sales. Striving to intensify GI improves Multilatinas' organizational skills, enabling them to be more proactive and to detect new international opportunities (Duque-Grisales et al., 2020).

In other words, when Multilatinas acquire the right business culture to facilitate commitment to change (Horbach et al., 2012) and to R&D investment as a solid infrastructure, they can develop a set of resources and capabilities that lead them to adopt a more proactive and robust environmental position (focusing on environmental innovation in both products and processes), with significant positive impact on FP in the long term. In this vein, King and Lenox (2002) argue that firms' investment in R&D activities leads to improved productivity and reduced environmental costs. Increasing R&D investment reverses the effect of GI on FP, creating value. These findings align with those of Lee and Min (2015), who conclude that GI is closely related to enterprises' investment in R&D.

This study has significant implications for managers and policymakers. From a managerial point of view, the research suggests that managers and CEOs should be careful when implementing EMS in a merely symbolic way (to comply with social norms or conform to environmental practices adopted by other companies). Token adoption can be perceived as greenwashing (Bowen & Aragon-Correa, 2014) and cause loss of confidence from their consumers, supply chain agents and other stakeholders, generating a negative impact on the company's reputation and low long-term brand positioning. Based on the foregoing, it is also important to consider the importance of integrating the EMS across all areas of the organization and its activities to ensure that employees meet consumers' and other stakeholders' needs and expectations. Furthermore, Multilatinas that adopt GI should invest resources in strengthening business culture by focusing on continuous improvement so that investments in R&D are effective and enable them to meet the environmental expectations of their various stakeholders. The results of this study may encourage managers to regard GI as an investment rather than as an expenditure, deploying efforts, actions and resources to enhance GI. Multilatinas will then achieve license to operate in external markets.

Finally, institutions and governments at all levels (local, national and international) should provide a variety of incentives, from tax breaks to subsidies, to reward Multilatinas that develop excellence in GI. The institutional context must promote clean production and environmental responsibility and publicize firms that achieve them, making it worthwhile for Multilatinas to become leaders in GI initiatives and helping them to enter foreign markets effectively. Firms and institutions must deepen their commitment to innovating in environmentally sound practice. The focus must not be on the certification but on the infrastructure needed to enable the firm to evaluate and redesign both processes and products for greater sustainability.

Our research has some limitations. Lack of access to data forced us to limit our sample of EMMs to those based in Latin American countries. This limitation prevents us from generalizing the results to other continents with emerging economies and constrains the study's comparative reach. Further, a sample size of 86 firms limits generalization from our results. Third, although GI is closely linked to a firm's overall R&D investment and although R&D investment is widely accepted in environmental management research (e.g., Alam et al., 2019; Lee & Min, 2015; Zhu, Zhu, Xu, & Xue, 2019), future studies should use the more precise measure of green R&D investment (which is related directly to GI). Finally, future studies should analyse other factors to complement our analysis of moderation by EMS and R&D investment. Such factors might include international approaches, flexibility in organizations, business environment and entrepreneurial orientation (both internal and external), which may also moderate the GI–FP relationship significantly and would enable fuller interpretation of our findings.

ACKNOWLEDGEMENTS

This research has been funded by the Spanish Ministry of Education and Science (Research Projects ECO2013-47009-P and ECO2016-75909-P and the Mobility Program 'José Castillejo' CAS18/00134), the Regional Government of Andalusia (Excellence Research Project P11-SEJ-7988), and the Business and Economics School of the University of Granada. We thank members of ISDE research group (SEJ-481, University of Granada) for their insightful recommendations and suggestions to improve this paper.

CONFLICT OF INTEREST

Eduardo Duque-Grisales, Javier Aguilera-Caracuel, Jaime Guerrero-Villegas and Encarnación García-Sánchez declare that there is no conflict of interest.

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How to cite this article: Duque-Grisales E, Aguilera-Caracuel J, Guerrero-Villegas J, García-Sánchez E. Does green innovation affect the financial performance of Multilatinas? The moderating role of ISO 14001 and R&D investment. *Bus Strat Env*. 2020;29:3286–3302. https://doi.org/10.1002/bse.2572