RCC
Revista Contemporânea de Contabilidade

Environmental innovation and managerial initiatives for carbon reduction: the moderating effect of CEO power

Inovação ambiental e iniciativas gerenciais de redução de carbono: o efeito moderador do poder do CEO

La innovación ambiental y las iniciativas de gestión de la reducción del carbono: el efecto moderador del poder del CEO

Victor Daniel Vasconcelos*
Doutorando em Controladoria e Contabilidade (USP), Ribeirão Preto/SP, Brasil
victordaniel@usp.br
https://orcid.org/0000-0002-1756-6241

Maísa de Souza Ribeiro
Doutora em Controladoria e Contabilidade (USP)
Professora Titular do Departamento de Contabilidade da FEARP (USP)
maisorib@usp.br
https://orcid.org/0000-0003-1165-1813

Primary contact address for correspondence *
Av. Bandeirantes, 3900, Monte Alegre, CEP: 14040-900 - Ribeirão Preto/SP, Brasil

Abstract
Drawing on legitimacy and stakeholder theories, this paper investigates how environmental innovation affects managerial initiatives for carbon reduction and whether Chief Executive Officer (CEO) power moderates this relationship. Based on a sample of 331 Latin American firms from 2010-2020, an index of managerial initiatives for carbon reduction is the dependent variable. Feasible Generalized Least Squares (FGLS) regression results indicate that environmental innovation positively influences managerial initiatives for carbon reduction. The results also report that CEO power positively moderates this relationship. Further, the presence of a corporate social responsibility (CSR) committee and firm size positively influence managerial initiatives for carbon reduction, and leverage has a negative relationship with initiatives for carbon reduction. The research reinforces the importance of environmental innovation in combating climate change and global warming.
Keywords: Environmental Innovation; Carbon Reduction; CEO Power; Legitimacy Theory; Stakeholder Theory

Resumo
Baseado nas teorias da legitimidade e *stakeholders*, este artigo investiga como a inovação ambiental afeta as iniciativas gerenciais para a redução de carbono e se o poder do *Chief Executive Officer* (CEO) modera esta relação. Foram analisadas observações de 331 empresas latino-americanas e como variável dependente utilizou-se um índice de iniciativas gerenciais para redução de carbono. Os resultados da regressão *Feasible Generalized Least Squares* (FGLS) indicam que a inovação ambiental influencia positivamente as iniciativas gerenciais para a redução de carbono. Os resultados também mostram que o poder do CEO modera positivamente esta relação. Além disso, o comitê de responsabilidade social corporativa e o tamanho da empresa influenciam positivamente as iniciativas gerenciais para redução de carbono e a alavancagem tem uma relação negativa com estas iniciativas. A pesquisa reforça a importância da inovação ambiental no combate às mudanças climáticas e ao aquecimento global.
Palavras-chave: Inovação Ambiental; Redução de carbono; Poder do CEO; Teoria da Legitimidade; Teoria dos Skakeholders

Resumen
A partir de las teorías de la legitimidad y los *stakeholders*, este artículo investiga cómo la innovación ambiental afecta a las iniciativas de la gestión para la reducción de carbono y si el poder del CEO modera esta relación. Sobre la base de una muestra de 331 empresas latinoamericanas entre 2010 y 2020, la variable dependiente es un índice de iniciativas directivas para la reducción del carbono. Los resultados de la regresión por *Feasible Generalized Least Squares* (FGLS) indican que la innovación ambiental influye

positivamente en las iniciativas gerenciales para la reducción de carbono. Los resultados también indican que el poder del CEO modera positivamente esta relación. Además, la presencia de un comité de responsabilidad social corporativa (RSC) y el tamaño de la empresa influyen positivamente en las iniciativas de la gestión para la reducción del carbono, y el apalancamiento tiene una relación negativa con las iniciativas para la reducción del carbono. La investigación refuerza la importancia de la innovación ambiental en la lucha contra el calentamiento global.
Palabras claves: Innovación Ambiental; Reducción de carbono; Poder del CEO; Teoría de la Legitimidad; Teoría de los Stakeholders.

1 Introduction

Firms are increasingly aware that they must follow environmentally friendly practices due to environmental problems, such as climate change. Climate change is a significant threat to the planet, with stakeholders demonstrating concerns about organizations' commitment to climate change issues (Albitar et al., 2023). Accordingly, carbon management is becoming popular among firms worldwide (Jiang et al., 2021), with them adopting policies and procedures for reducing greenhouse gas (GHG) emissions (Mahmoudian et al., 2021). Managerial initiatives for carbon reduction are strategic plans, processes, policies, and actions used to deal with the adverse consequences of climate change (Haque & Ntim, 2020), i. e., it refers to the actions of firms to reduce carbon emissions (Datt et al., 2018), due to pressure to implement strategies that reduce carbon emissions (Gössling et al., 2023). These initiatives are essential to corporate performance because high levels of carbon performance send a positive message to the market, demonstrating that the firm has good carbon management (Ganda, 2021). Therefore, more consumers are interested in products that minimize environmental damage (S. Long & Liao, 2021). A solution found by firms to minimize the impacts of their activities is environmental innovation.

Environmental innovation refers to new or modified products, processes, techniques, and systems that prevent or reduce environmental damage (Kemp & Pontoglio, 2011). Accordingly, eco-innovation produces products that reduce carbon emissions and add value to the business (Mahmood et al., 2022). This innovation can be developed by firms or non-profit organizations of a social, technological, institutional, or organizational nature (Rennings, 2000). Environmental innovation is associated with a range of benefits, including superior economic performance (Andries & Stephan, 2019; Farza et al., 2021; X. Long et al., 2017), improved public image (Liao, 2018b), and reduced stock price crash risk (Zaman et al., 2021). Jiakui et al. (2023) suggest that eco-innovation can boost green production by reducing transaction costs and improving risk management. Moreover, environmental innovation projects are more likely to be undertaken by more environmentally concerned Chief Executive Officers (CEOs) (Aibar-Guzmán & Frías-Aceituno, 2021; Y. Wang et al., 2021).

CEO is responsible for policy formulation and corporate decision-making (Javeed et al., 2021). In this regard, CEOs with comprehensive knowledge of the firm's activities tend to allocate resources efficiently to create more value, including social value (F. Li et al., 2016; Rashid et al., 2020). Power refers to the ability of individual actors to exercise their will (Finkelstein, 1992). In other words, power is an individual's relative ability to change others' states (Keltner et al., 2003). CEO power refers to the CEO's ability to overcome opposing situations with other directors and existing uncertainties by influencing the firm's major decisions (Pucheta-Martínez & Gallego-Álvarez, 2021), even if opposed by other executives (Adams et al., 2005). Maswadi and Amran (2023) argue that CEO power can be a resource monitoring mechanism. Powerful CEOs can change sustainability investment by influencing corporate decisions (Francoeur et al., 2021; Sheikh, 2019). Moreover, firms with powerful CEOs can reduce corporate social irresponsibility (Jain & Zaman, 2020).

Previous studies demonstrate the influence of environmental innovation on carbon emission reduction (Cheng et al., 2021; Jiakui et al., 2023; Konadu et al., 2022; Luan et al., 2019; Meirun et al., 2021; Töbelmann & Wendler, 2020; L. Wang et al., 2020; Y.-J. Zhang et al., (2017) and the impact of CEO power on sustainability performance (Breuer et al., 2022; Fabrizi et al., 2014; Francoeur et al., 2021; Jiraporn & Chintrakarn, 2013; Jizi et al., 2014; Y. Li et al., 2018; Pucheta-Martínez & Gallego-Álvarez, 2021; Walls & Berrone, 2017; Y. Zhang et al., 2022). However, no studies address the influence of environmental innovation on managerial carbon reduction initiatives and the moderating role of CEO power in this relationship. Thus, this study seeks to fill this gap by showing this relationship in Latin America.

Based on the discussion above, this research aims to examine the influence of environmental innovation on managerial carbon reduction initiatives and to analyze the moderating role in this relationship. Theoretically, the study is based on legitimacy and stakeholder theories. Legitimacy and stakeholder theories emphasize the external pressures from society (Luo & Tang, 2021). These theories focus mainly on the non-financial benefits of sustainability activities (Hussain et al., 2023). However, Le and Ferasso (2022) argue that firms that take care of stakeholders' interests and ensure the legitimacy of their activities tend to have a competitive advantage. Further, legitimacy and stakeholder theories suggest that sustainable firms seek to maintain a positive image and meet stakeholder expectations (Moussa et al., 2022).

This paper has several contributions. First, Latin America is a vulnerable region rich in biodiversity and an example of the threat posed by climate change (WWF, 2021). This region has four times the size of Western and Eastern Europe combined with one of the most valuable ecosystems on the planet (Gallego-Álvarez et al., 2018). Further, Latin America has particular characteristics in corporate governance, such as the predominance of family-owned companies, low stakeholder orientation, and principal-principal conflict, which refers to the conflict of interests between different shareholder groups (Husted & Sousa-Filho, 2019). Thus, the study contributes by addressing the issues of carbon reduction initiatives, environmental innovation, and CEO power in the Latin American context. Second, the study quantitatively examines the relationship between environmental innovation and managerial initiatives for carbon reduction and the moderating role of CEO power in this relationship. Finally, the use of the metrics of managerial initiatives for carbon reduction (Haque & Ntim, 2020), environmental innovation (Konadu et al., 2022), and CEO power (Aibar-Guzmán & Frías-Aceituno, 2021; García-Sánchez et al., 2021) from the Refinitiv database.

The remainder of this paper is structured as follows. The second section discusses the literature review. Next, we discuss our data and methodology. The fourth section presents the empirical analyses of the study, and section 5 discusses the results. Finally, the last section summarizes the conclusion, theoretical and practical implications, limitations, and future research.

2 Theories and Hypotheses

This study uses legitimacy and stakeholder theories to explain the relationship between environmental innovation and carbon reduction and the moderating effect of CEO power on this relationship. Legitimacy refers to a generalized assumption or perception that an organization's actions are desirable or appropriate in a system of socially constructed norms and values (Suchman, 1995). According to legitimacy theory, a social contract exists between the firm and society, with managers adopting strategies to meet society's expectations (Deegan et al., 2002). Z. Wang et al. (2023) suggest that a legitimacy gap exists when firms fail to meet society's expectations. In this regard, firms need to maintain a good state of legitimacy, allowed by society to continue to exist (Fernando & Lawrence, 2014).

Legitimacy theory argues that firms, to exist legally, strive to operate within the norms and expectations of society (Lu & Taylor, 2018), i.e., firms must do more than comply with laws and regulations(Luo & Tang, 2014). Accordingly, the firm's activities must be by society's values (Nkundabanyanga et al., 2021), demonstrating a value system shared by the community (Luo & Tang, 2021). Moreover, pressure from stakeholders, especially media coverage, can influence the firm's legitimacy, leading the firm to adopt strategies (Velte et al., 2020).

Stakeholders are individuals or groups who affect or are affected by the organization (Freeman, 1984). They argue that organizations usually classify stakeholders according to their goals. For example, they can categorize stakeholders as primary or secondary (Marcon Nora et al., 2023). According to stakeholder theory, organizations must act responsibly to avoid pressure from stakeholders and achieve a better or "good" society (A. Russo & Perrini, 2010). Since the business context and the value creation process have developed the stakeholder theory, researchers commonly use this theory in the study of firms (Freeman et al., 2020). At this point, stakeholder theory seeks to understand the gap between academic theory and practical reality (Ramoglou et al., 2023).

The literature has used stakeholder theory to connect responsible environmental management and climate change topics (Jabbour et al., 2020). Stakeholders can exert social pressure by forcing firms to implement eco-innovations to meet sustainability goals (Liao, 2018b). These innovations help reduce carbon emissions by benefiting stakeholders and enabling long-term sustainable development (Luo & Tang, 2021). In this regard, stakeholders demand substantive climate change strategies (Velte, 2021). Therefore, environmentally friendly firms convince their stakeholders that they are acting in good faith (Datt et al., 2019), improving the interaction with stakeholders (Bananuka et al., 2021).

2.1 Environmental innovation and managerial initiatives for carbon reduction

The challenges posed by human-induced climate change drive environmental innovation attractive to the public as a strategy to reduce carbon emissions (Nylund et al., 2021). Eco-innovation enhances corporate reputation (Farza et al., 2021), reduces environmental risks, and improves public image (Liao, 2018b). In this line, environmental innovation helps firms improve their environmental and financial performance (D. Li et al., 2018). This innovation is easily associated with environmental aspects such as environmental relief and emission reduction because innovations such as solar and wind energy, new biofuels, or more efficient vehicles can reduce CO2 emissions (Töbelmann & Wendler, 2020).

Environmental innovation enables economic growth at the lowest possible cost to the environment (Meirun et al., 2021). In other words, this innovation can drive sustainable economic growth (Luan et al., 2019). Y.-J. Zhang et al. (2017) suggest that eco-innovation can reduce carbon emissions by minimizing the environmental impact. Since eco-innovation conserves energy and improves the efficiency of products and processes, it tends to reduce carbon emissions (Razzaq et al., 2023). Although it does not generate

immediate financial gains, environmental innovation is crucial for controlling emissions (Konadu et al., 2022). Accordingly, ecological innovation can foster more sustainable energy sources that reduce CO2 emissions (L. Wang et al., 2020). Thus, environment-related innovation mitigates CO2 emissions by adopting clean technologies in all carbon-intensive sectors and introducing environmentally friendly rules (Iqbal et al., 2021), increasing environmental sustainability (Khan et al., 2020).

Using the nonparametric data envelopment analysis and directional distance function (DEA-DFF) model for a sample of 28 Chinese provinces between 2011 and 2021, Jiakui et al. (2023) found that green innovation positively influences total green factor productivity. L. Wang et al. (2020) reported that ecological innovation reduces carbon emissions in G7 countries from 1990 to 2017. Z. Khan et al. (2020) examined the determinants of consumption-based emissions of the G7 economies (United States, Japan, Germany, United Kingdom, France, Italy, and Canada) from 1990 to 2017. The results showed that environmental innovation improves environmental sustainability. From a dataset of China's industrial sectors for the period 2000 - 2010, Luan et al. (2019) concluded that investment in research and development reduces carbon intensity. Meirun et al. (2021) documented a negative relationship between green technology innovation and long-term carbon emissions from 1990 to 2018 in Indonesia. Using a sample of 669 small and medium-sized enterprises in the manufacturing sector in the United Arab Emirates, Singh et al. (2020) found that green innovation positively influences environmental performance.

Konadu et al. (2022) examined the association between gender diversity and carbon emissions and the moderating role of environmental innovation in this relationship from a sample of companies listed in the Standards and Poor (S&P) 500 index over 2002-2018. The results suggest that carbon-intensive firms must persistently invest in environmental innovation to reduce carbon emissions significantly. Y.-J. Zhang et al. (2017) concluded that environmental innovation significantly impacted the reducing carbon emissions in China during 2000-2013. Based on a sample of 219 Turkish firms from 2011-2016, Yurdakul and Kazan (2020) found that environmental innovation has a positive direct effect on pollution prevention, resource-saving, and recycling and a positive indirect effect on cost reduction. Jiao et al.(2020) reported that green technology reduces carbon intensity in 17 Chinese industries from 2000 to 2015. Kraus et al. (2020) investigated the influence of green innovation on environmental performance in 297 Malaysian companies. They found that green innovation positively influences environmental performance. Töbelmann and Wendler (2020) examined the relationship between environmental innovation and carbon dioxide emissions in 27 European Union countries from 1992 to 2014. They revealed that environmental innovation contributes to reduced carbon dioxide emissions. Similarly, using a quarterly dataset from 1991Q1 to 2017Q4 for China, Cheng et al. (2021) concluded that environmental innovation negatively influences CO_2 emissions.

In summary, environmental innovation can enhance corporate legitimacy by improving the public image, ensuring that the firm meets society's expectations. In addition, eco-innovation improves interaction with stakeholders, allowing firms to take concrete action to reduce carbon. Therefore, based on the legitimacy and stakeholder theories, the following hypothesis is proposed:

Hypothesis 1: Environmental innovation is positively associated with managerial initiatives for carbon reduction

2.2 The moderating effect of CEO power on the environmental innovation– managerial initiatives for carbon reduction nexus

CEO power influences corporate decision-making because the CEO plays a central role in corporate governance (Javeed & Lefen, 2019; Pucheta-Martínez & Gallego-Álvarez, 2021). Firms with powerful CEOs have operational efficiency (Zhao et al., 2023). These CEOs can quickly change the firm's strategy by supporting uncertainty and facilitating decision-making processes (Jia et al., 2022). The greater the CEO's power, the greater his influence on the firm's investment decisions (Shahbaz, 2019). Powerful CEOs also can minimize the possibility of personal managerial use by monitoring the firm's decision-making (J. Lu et al., 2021). Further, these CEOs have a crucial role in addressing climate change (Elsalih et al., 2020).

Powerful CEOs use their power to improve environmental performance due to shareholder action for sustainable development (Walls & Berrone, 2017). According to Fabrizi et al. (2014), powerful CEOs engage in sustainable activities to satisfy stakeholders and for a reputation issue. Since powerful CEOs have greater societal scrutiny, they tend to engage more in CSR activities (Jizi et al., 2014). Accordingly, powerful CEOs can invest in sustainability to enhance their reputation (Gössling et al., 2023). Therefore, powerful CEOs, such as CEOs who are at the same time chairman of the board, are more likely to be proactively involved in environmental issues and realize the importance of carbon initiatives (Elsalih et al., 2020).

Increasingly, shareholders pressure CEOs to lead firms to be more environmentally responsible. However, only powerful CEOs can effectively align stakeholder interests to make the firm greener (Walls & Berrone, 2017). Hussain et al. (2023) argue that firms with powerful CEOs tend to commit to the community and develop positive relationships with their stakeholders. Similarly, Y. Li et al. (2018) argue that more powerful CEOs can increase stakeholder trust. Thus, firms with powerful CEOs can make large investments, such as sustainability investments, with less difficulty (Francoeur et al., 2021).

CEOs may consider corporate social performance as a business strategy that aligns their interests with those of stakeholders (Jouber, 2019). Powerful CEOs may prefer a quiet life with investments in sustainability to satisfy stakeholders (Francoeur et al., 2021). Accordingly, these CEOS may engage in environmental issues as a commitment to stakeholders (Pucheta-Martínez & Gallego-Álvarez, 2021).

Powerful CEOs are less constrained by the board of directors when making decisions, such as investing in eco-innovation (Aibar-Guzmán & Frías-Aceituno, 2021). Since powerful CEOs tend to focus more on the potential benefits of environmental innovation than on its cost and risk, they are more likely to allocate resources to eco-innovation (Y. Zhang et al., 2022). Further, firms with powerful CEOs can more quickly adopt innovative solutions (Hassan et al., 2023). Therefore, a more substantial power can enthuse CEOs to allocate resources to research and development projects, improving eco-innovation (Gössling et al., 2023).

Walls and Berrone (2017) analyzed the relationship between formal and informal CEO power and corporate environmental impact reduction, using a sample of 267 firms from 2001 to 2007. The results revealed that CEO power reduces corporate environmental impact. Using a large sample of 32995 observations in 40 countries between 2007 and 2017, Breuer et al. (2022) concluded that more powerful CEOs have higher CSR engagement. Y. Zhang et al. (2022) found that CEO power positively influences environmental innovation in 1616 Chinese companies during 2008-2018. Using a sample of 350 UK firms, Y. Li et al. (2018) reported that the effect of ESG disclosure on firm value is more pronounced when the CEO power is higher. Based on a sample of 597 US firms from 2005 to 2009, Fabrizi et al. (2014) reported that CEO power positively influences CSR engagement.

Using a sample of US commercial banks, Jizi et al. (2014) found that powerful CEOs positively influence CSR engagement. From a sample of 1,370 companies collected from the Kinder, Lydenberg, and Domini (KLD) database during 1995-2007, Jiraporn and Chintrakarn (2013) reported a positive relationship between CEO power and CSR engagement. Pucheta-Martínez and Gallego-Álvarez (2021) documented that CEO power positively influences environmental innovation in 4863 international companies from 2002 to 2017. Finally, Francoeur et al. (2021) concluded that powerful CEOs positively influence environmental performance in 5222 US companies from 2007 to 2017.

Since powerful CEOs act to satisfy stakeholders to enhance their reputation, they tend to have a greater concern for eco-innovation activities. Thus, CEO power can strengthen the relationship between environmental innovation and managerial initiatives for carbon reduction. Based on the above discussion, we propose the following hypothesis:

Hypothesis 2: CEO Power positively moderates the relationship between environmental innovation and managerial initiatives for carbon reduction

3 Data and Methodology

This section includes a description of the sample and variables. Moreover, we explain the multivariate analysis approaches.

3.1 Sample and data selection

Our sample consists of 2,137 firm-year observations from 331 firms in Argentina, Brazil, Chile, Colombia, Mexico, and Peru between 2010 and 2020. These countries belong to the Morgan Stanley Capital International (MSCI) Emerging Markets Latin America Index, representing large and mid-caps in 6 Emerging Markets (EM) countries in Latin America. This index has 102 constituents and covers approximately 85% of each country's free float-adjusted market capitalization (MSCI, 2021).

The sample is unbalanced because full data is unavailable for all firms and years. Refinitiv database provides social and environmental information from more than 7000 companies worldwide and economic information covering 88000 companies operating in more than 120 countries (Uyar et al., 2021). This database covers more than 80% of different capital markets around the world (Paolone et al., 2022; Refinitiv, 2022b). Table 1 illustrates the sector classification used in this analysis based on the Global Industry Classification Standard (GICS).

As is evident from the data in Table 1, the sample comprised eleven activity sectors. Companies belonging to the financial sector represent 363 observations (16.9%), followed by the materials, utilities, and consumer staples sectors at 341 (15.9%), 320 (14.9%), and 308 (14.4%) observations, respectively. Information technology was the sector with the lowest representation, with 35 observations (1.6%). Concerning countries, Brazil is the country with the most observations, with 910 (42.5%), followed by Mexico and Chile with 397 (18,5%) and 321 (15.0%) observations, respectively.

Table 1
Sample distribution by sector of activity and countries

	Argentina	Brazil	Chile	Colombia	México	Peru	Total
Communication Services	13	30	10	4	25	0	82
Consumer Discretionary	14	145	21	3	38	0	221
Consumer Staples	28	101	44	16	90	29	308
Energy	16	43	11	12	2	0	84
Financials	31	115	56	65	68	28	363
Health Care	3	47	0	0	8	0	58
Industrials	24	95	43	9	69	13	253
Information Technology	5	24	6	0	0	0	35
Materials	20	118	36	20	81	66	341
Real State	12	35	10	0	11	4	72
Utilities	36	157	84	21	5	17	320
Total	202	910	321	150	397	157	2137

3.2 Measures

3.2.1 Dependent variable

Managerial initiatives for carbon reduction is the dependent variable, in line with previous studies (Haque & Ntim, 2020). This variable is calculated as the ratio of the aggregate of 14 managerial initiatives for carbon reduction to the total number of management initiatives for carbon reduction, with the highest value of the variable indicating greater activism of the firm related to climate (Haque & Ntim, 2020). If the firm has a managerial initiative for carbon reduction, it will take the value 1; otherwise, the value is zero. Table 2 depicts the 14 management initiatives for carbon reduction.

Table 2
Managerial initiatives for carbon reduction

Indicator	Description
Emissions trading	Does the company report on its participation in any emissions trading initiative?
Waste reduction initiatives	Does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total waste?
Policy water efficiency	Does the company have a policy to improve its water efficiency?
Renewable energy use	Does the company make use of renewable energy?
Green buildings	Does the company report about environmentally friendly or green sites or offices?
Land environmental impact reduction	Does the company report on initiatives to reduce the environmental impact on land owned, leased or managed for production activities or extractive use?
Toxic chemicals reduction	Does the company report on initiatives to reduce, reuse, substitute or phase out toxic chemicals or substances?
Policy sustainable packaging	Does the company have a policy to improve its use of sustainable packaging?
ISO 14000 or EMS	Does the company claim to have an ISO 14000 or EMS certification?
Environmental Partnerships	Does the company report on partnerships or initiatives with specialized NGOs, industry organizations, governmental or supra-governmental organizations, which are focused on improving environmental issues?
Biodiversity Impact Reduction	Does the company report on its impact on biodiversity or on activities to reduce its impact on the native ecosystems and species, as well as the biodiversity of protected and sensitive areas?
Environmental Project Financing	Does the company claim to evaluate projects on the basis of environmental or biodiversity risks as well?
Policy Energy Efficiency	Does the company have a policy to improve its energy efficiency?
Climate Change Commercial Risks Opportunities	Is the company aware that climate change can represent commercial risks and/or opportunities?
Water Technologies	Does the company develop products or technologies that are used for water treatment, purification or that improve water use efficiency?

3.2.2 Independent and moderating variables

This study uses environmental innovation score retrieved from the Refinitiv database. The environmental innovation score reflects a company's capacity to reduce its customers' environmental costs and burdens, creating new market opportunities through new environmental technologies and processes or eco-designed products (Refinitiv, 2022a). In other words, this score measures the extent of firms' investment in sustainability-related projects (Wedari et al., 2023). In contrast to other CSR measures that rely solely upon voluntarily disclosed information, the eco-innovation score considers objective data, such as spending

on research and development leading to green product innovation (Meles et al., 2023). The environmental innovation score developed by Refinitiv includes using technologies for renewable energy, reports on eco-designed products, and recycling initiatives (Gómez-Bolaños et al., 2022). Previous studies have used this score as a proxy for environmental innovation (Fiorillo et al., 2022; Meles et al., 2023; S. Russo et al., 2022; Wedari et al., 2023). Furthermore, eco-innovation ranges from 0 to 100, with values close to 100 indicating excellent transparency and performance (Meles et al., 2023). See the variables description in Table 3.

Table 3
Variables description

Variable name	Variable name	Model name	Proxy
Dependent	Managerial initiatives for carbon reduction	CARB	Managerial initiatives for carbon reduction items/ total number of items (14)
Independent	Environmental innovation performance	EIP	Environmental innovation score from Refinitiv database
Moderator	CEO power	CEOPOWER	CEO power items/total number of items (3)
Control	CSR sustainable committee	CSR	Dummy variable equals 1 if the company has CSR sustainable committee, and otherwise 0
Control	Board size	BSIZE	Total number of board members
Control	Profitability	ROA	Income after taxes for the fiscal period/Total assets
Control	Leverage	LEV	Total debt/total assets
Control	Firm size	FSIZE	Natural logarithm of total assets

CEO power reflects the CEO's ability to influence corporate decisions (Pathan, 2009). Following (Aibar-Guzmán & Frías-Aceituno, 2021; Garcia-Sanchez et al., 2020), we calculate CEO power as an indicator that reflects three dimensions related to CEO power: (i) the CEO is a member of the board of directors, (ii) the CEO exercise as chairman of the board of directors, and (iii) the percentage of executive directors on the board of directors is higher than average). A value of 1 is assigned for each indicator of CEO power that the company has and 0 otherwise. Thus, CEO power is the ratio of the firm's CEO power score to the total number of items, which in this case is 3.

3.2.3 Control variables

We include control variables at the board and firm level that can affect the managerial initiatives for carbon reduction. At the board level, we included the CSR committee and board size. CSR committee is a dummy variable that equals 1 if the firm has a CSR committee, and otherwise 0. The CSR committee has members with experience and knowledge in sustainability, which allows greater stakeholder confidence in the firm's activities (Martínez-Ferrero et al., 2021). Thus, we expect a positive relationship between the CSR committee and managerial initiatives for carbon reduction. Board size is the total number of board members. A larger number of directors can include experts in environmental issues, helping to overcome the uncertainty often involved in implementing sustainable initiatives (García Martín & Herrero, 2020). In addition, more proficient directors deal efficiently with issues such as biodiversity and pollution (Aksoy et al., 2020). Thus, we expect a positive relationship between board size and managerial initiatives for carbon reduction.

At the firm level, we include profitability, leverage, and firm size. Profitability is the ratio between income after taxes for the fiscal period and total assets. Since profitable firms are more subject to external pressure from stakeholders, they tend to reduce carbon emissions (Kyaw, 2022). Thus, we expect a positive relationship between profitability and managerial initiatives for carbon reduction. Leverage is the ratio between total debt and total assets. Leveraged firms have more obligations to their creditors, which decreases the flexibility to use their money for sustainable activities (Alam et al., 2022). Thus, we expect a negative relationship between leverage and managerial initiatives for carbon reduction. Finally, firm size is the natural logarithm of total assets. Large firms have more resources to invest in social and environmental activities and receive higher pressure to perform better environmentally (Chen & Hamilton, 2020). Thus, we expect a positive relationship between firm size and managerial initiatives for carbon reduction.

3.3 Empirical models

Regression analysis makes the time-varying association between the dependent and independent variables and the sample structure (Uyar et al., 2021). We perform statistical tests to determine the appropriate econometric method. The Breusch-Pagan Lagrange multiplier test is applied to verify heteroscedasticity, and the result presented statistical significance ($p<0.01$), rejecting the null hypothesis, which indicates heteroscedasticity. We perform the Wooldridge test to check for first-order autocorrelation in the panel data. The results report statistical significance ($p<0.01$), which proves the existence of first-order

autocorrelation. Thus, to deal with the problems of autocorrelation and heteroscedasticity, we used Feasible Generalized Least Squares (FGLS).

FGLS provides reliable estimates in the presence of autocorrelation and heteroscedasticity (Reed & Ye, 2011). This method is more reliable than Ordinary Least Square for dealing with autocorrelation and heteroscedasticity (Rao & Griliches, 1969). The FGLS estimator is an ordinary least squares estimator applied to a regression that eliminates autocorrelation and heteroscedasticity (Symeou et al., 2019). All variables were subjected to winsorization by winsorizing the lower and upper 1% tails, replacing the extreme values with winsorized or trimmed values at both ends. The winsorization step alleviates the large asymmetry in the distribution of these variables (Uyar et al., 2021). Thus, to verify the influence of environmental innovation on managerial initiatives for carbon reduction and the moderating effect of CEO power on this relationship, the following models are estimated:

$$CARB_{i,t} = \beta_0 + \beta_1 EIP_{i,t} + \beta_2 CEOPOWER_{i,t} + \beta_3 CSR_{i,t} + \beta_4 BSIZE_{i,t} + \beta_5 ROA_{i,t} + \beta_6 LEV_{i,t} + \beta_7 FSIZE_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$CARB_{i,t} = \beta_0 + \beta_1 EIP_{i,t} + \beta_2 CEOPOWER_{i,t} + \beta_3 EIP_{i,t} * \beta_2 CEOPOWER_{i,t} + \beta_4 CSR_{i,t} + \beta_5 BSIZE_{i,t} + \beta_6 ROA_{i,t} + \beta_7 LEV_{i,t} + \beta_8 FSIZE_{i,t} + \varepsilon_{i,t} \quad (2)$$

where, CARB is the managerial initiatives for carbon reduction. EIP is the environmental innovation performance. CEOPOWER is the CEO power in the firm. CSR is the CSR sustainable committee. BSIZE is the board size. ROA is the firm profitability. LEV is the firm leverage. FSIZE is the firm size. The subscripts i and t refer to firm i and year t. All continuous variables are winsorized at the 1st and 99th percentiles. Moreover, β_0 is the intercept and $\beta_1 \ldots \beta_n$ are the regression coefficients and ε_{it} is the remainder error term.

4 Results

This section provides the summary statistics, correlation, and regression analysis results. Furthermore, we present the results of the robustness tests.

4.1 Descriptive statistics

Table 4 reports the results for the descriptive statistics. This table consists of indicators: observation, mean, standard deviation, minimum and maximum. The mean value of CARB is 0.320, similar to Haque and Ntim (2020). They reported a mean value of 0.367 for management carbon reduction initiatives in 494 European companies from 2002 to 2016. Moreover, the CARB values range from 0 to 0.733 with a standard deviation of 0.209.

Table 4
Descriptive statics

Variables	N	Mean	SD	Minimum	Maximum
CARB	2137	0.320	0.209	0	0.733
EIP	2137	21.22	30.55	0	95.66
CEOPOWER	2137	0.238	0.256	0	0.666
CSR	2137	0.551	0.497	0	1
BSIZE	2137	10.43	3.939	4	23
ROA	2137	0.748	0.721	-0.160	0.365
LEV	2137	0.282	0.167	0	0.775
FSIZE	2137	20.91	1.939	14.23	25.62

Note: Note: This table presents the summary statistics. The sample consists of 331 Latin America firms from 2010-2020. All continuous variables have been winsorized at the 1st and 99th percentiles.

The average environmental innovation score is 21.22, lower than the studies of Burkhardt et al. (2020), Rahman et al. (2021), and Ellimäki et al. (2023), that obtained average scores of 77.44, 67.78, and 33,61. In addition, the eco-innovation score ranges from 0 to 95, with a standard deviation of 30.55. The average CEO power is 0.238, which is lower than Aibar-Guzmán and Frías-Aceituno (2021), which revealed an average of 1.915 in 70 countries from 2002-2017. Moreover, CEO power ranges from 0 to 0.666 with a standard deviation of 0.256.

4.2 Correlation matrix

Table 5 presents the correlation matrix. We use the correlation matrix in our study in order to measure the strength and direction of the linear relationship between our dependent variable and the independent and control variables. The results indicated that managerial initiatives for carbon reduction had a significant positive correlation with environmental innovation performance, CSR committee, board size, leverage, and firm size. Furthermore, we addressed the multicollinearity issue by investigating the Variance

Inflation Factors (VIFs) of the independent variables of the proposed models. Thus, the VIF values of the proposed models ranged from 1.02 to 1.27, indicating that the study does not present a multicollinearity problem since the VIF did not exceed 10.

Table 5
Correlation matrix and variance inflation factor (VIF)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	VIF
(1) CARB	1.00								
(2) EIP	0.46*	1.00							1.17
(3) CEOPOWER	0.02	0.03	1.00						1.02
(4) CSR	0.57*	0.33*	0.01	1.000					1.17
(5) BSIZE	0.19*	0.11*	0.08*	0.13*	1.000				1.07
(6) ROA	0.03	-0.04*	0.02	0.02	0.06*	1.000			1.05
(7) LEV	0.17*	0.10*	0.05*	0.12*	0.04*	-0.10*	1.000		1.18
(8) FSIZE	0.41*	0.24*	0.07*	0.22*	0.20*	-0.11*	0.46*	1.000	1.27

Note: This table presents a correlation matrix among dependent, independent and control variables. The sample consists of 331 Latin America firms from 2010-2020. All continuous variables have been winsorized at the 1st and 99th percentiles. .* denotes significance of 0.05.

4.3 Multivariate analysis

Table 6 presents the results of the FGLS regression. The study used the stages routine in the STATA 16 program. Hypothesis 1 argues that environmental innovation increases the likelihood of adopting management carbon reduction initiatives. Model (1) in Table 6 shows that the coefficient of eco-innovation is positive and significant (coefficient: 0.001; p-value <0.005). The results indicate that environmental innovation positively influences managerial carbon reduction initiatives. This supports Hypothesis 1.

Hypothesis 2 predicts that CEO power positively moderates the relationship between eco-innovation and carbon reduction initiatives. As Model (2) in Table 6 reports, the coefficient of the interaction term between eco-innovation and CEO power is positive and significant (coefficient: 0.001; p-value <0.005). This evidence suggests that CEO power strengthens the relationship between environmental innovation and managerial carbon reduction initiatives. Thus provides support for Hypothesis 2.

Table 6
Results

Dependent variable: Managerial initiatives for carbon reduction				
Feasible Generalized Least Squares				
	Model 1		Model 2	
	Coefficient	p-value	Coefficient	p-value
EIP	0.001	0.000***	0.001	0.000***
CEOPOWER	-0.012	0.176	-0.015	0.154
EIP*CEOPOWER			0.001	0.000***
CSR	0.124	0.000***	0.136	0.000***
BSIZE	0.001	0.068*	0.001	0.310
ROA	0.500	0.051*	0.038	0.117
LEV	-0.066	0.000***	-0.094	0.000***
FSIZE	0.027	0.000***	0.029	0.000***
Constant	-0.347	0.000***	-0.357	0.000***
Observations	2047		2047	
Firms	307		307	
Wald chi2	3083.79	0.000***	2714.53	0.000***
Period	11		11	

Note: The table shows the results of the Feasible Generalized Least Squares models for the sample consisting of 331 Latin America firms from 2010-2020. All continuous variables have been winsorized at the 1st and 99th percentiles. ***, **, * indicate significance at the level of 1%, 5%, and 10%.

Regarding the control variables, firms with a CSR committee tend to adopt carbon reduction initiatives. Similarly, larger firms are more likely to engage in activities that reduce carbon emissions. On the other hand, leveraged firms are less inclined to develop low-carbon-oriented policies.

4.4 Robustness analysis

Based on the studies by Daniel-Vasconcelos et al. (2022), Gallén and Peraita (2018), Naeem et al. (2023), and Wen et al. (2023), we employ the Panel-Corrected Standard Error (PCSE) estimator as an alternative method. Since FGLS may overestimate the significance of the coefficients (Beck & Katz, 1995), the performance of PCSE may be better than the FGLS estimator in samples where the number of periods is equal to or greater than the number of cross sections (Hossain, 2016). Wen et al. (2023) suggest that PCSE,

like FGLS, is an efficient method for overcoming heteroscedasticity among panel data and simultaneous intergroup correlation. The PCSE estimator is based on OLS estimation and can, in certain specifications, generate the same coefficients and standard errors as the OLS estimator (Afonso et al., 2021). Thus, we used PCSE for robustness analysis. Table 7 shows the results.

Table 7
Results

Dependent variable: Managerial initiatives for carbon reduction				
Panel-Corrected Standard Error				
	Model 1		Model 2	
	Coefficient	p-value	Coefficient	p-value
EIP	0.001	0.000***	0.001	0.000***
CEOPOWER	-0.016	0.251	-0.018	0.279
EIP*CEOPOWER			0.001	0.000***
CSR	0.124	0.000***	0.136	0.000***
BSIZE	0.001	0.303	0.005	0.485
ROA	0.067	0.071*	0.051	0.182
LEV	-0.053	0.029**	-0.062	0.014**
FSIZE	0.025	0.000***	0.028	0.000***
Constant	-0.322	0.000***	-0.359	0.000***
Observations	2073		2073	
Firms	331		331	
R-squared	0.206	0.000***	0.144	0.000***
Period	11		11	

Note: The table shows the results of the Panel-Corrected Standard Error for the sample consisting of 331 Latin America firms from 2010-2020. All continuous variables have been winsorized at the 1st and 99th percentiles. ***, **, * indicate significance at the level of 1%, 5%, and 10%.

Models 1 and 2 in Table 7 show similar results, indicating that environmental innovation positively influences the adoption of carbon reduction initiatives. The results suggest that CEO power strengthens the relationship between eco-innovation and carbon-oriented policies. In addition, the presence of a CSR committee and firm size encourages adopting carbon reduction practices. On the other hand, leverage leads firms to be less environmentally friendly.

5 Discussion

This research evidences that environmental innovation favors the adoption of carbon reduction initiatives. The results reveal that environmental innovation can improve the firm's public image by legitimizing its activities. Moreover, environmental innovation can meet stakeholders' demands by improving the firm's communication with stakeholders, which supports legitimacy and stakeholder theories.

The findings are in line with Cheng et al. (2021), Jiakui et al. (2023), Konadu et al. (2022), Luan et al. (2019), Meirun et al. (2021), Töbelmann and Wendler (2020), L. Wang et al. (2020) and Y.-J. Zhang et al. (2017). Jiakui et al. (2023) suggest that eco-innovation can boost green production by reducing transaction costs and improving risk management. Since environmental innovation is crucial for shifting the industrial structure towards more sustainable energy sources, this innovation can reduce carbon emissions (L. Wang et al., 2020). Luan et al. (2019) conclude that increased research and development activities are beneficial for reducing carbon intensity. The results demonstrate that greenhouse gas reduction may depend on innovative technologies such as carbon storage and bioenergy (Erla Jonsdottir et al., 2023). Therefore, green innovation is a crucial resource for firms to improve their environmental performance by gaining goodwill from stakeholders (Singh et al., 2020).

Yurdakul and Kazan (2020) suggest that eco-innovation reduces air pollution. Accordingly, eco-innovation can be a solution to eradicate carbon emissions in a planned way (Meirun et al., 2021). Razzaq et al. (2023) argue that green technology innovation reduces carbon emissions by improving the efficiency of products and processes. Similarly, Erla Jonsdottir et al. (2023) document that technologies such as carbon capture can help reduce greenhouse gases. Green innovation improves sustainability performance by reducing carbon emissions (Kraus et al., 2020). Y.-J. Zhang et al. (2017) argue that improving eco-innovation capacity is crucial for reducing carbon emissions.

The results indicate that CEO power positively moderates the relationship between eco-innovation and carbon reduction initiatives. In other words, environmental innovation, through CEO power, influences carbon performance. The results are consistent with stakeholder theory. Powerful CEOs are more likely to have better dialogue with stakeholders to safeguard their reputation.

The power of the CEO can act as a catalyst that turns shareholder activism into a crucial driver of corporate greening (Walls & Berrone, 2017). Sheikh (2019) argues that powerful CEOs may overinvest in CSR to enhance their reputations. A more substantial power can enthuse CEOs to allocate resources to research and development projects, improving eco-innovation (Y. Zhang et al., 2022). Breuer et al. (2022)

conclude that powerful CEOs tend to engage more in CSR. CEOs' primary goal is to simultaneously satisfy multiple stakeholders' objectives (Harper & Sun, 2019).

Fabrizi et al. (2014) suggest that powerful CEOs tend to feel less pressure from the market, which allows them to concern themselves with issues beyond shareholders' financial interests. Since more powerful CEOs tend to be attracted to the potential rewards of eco-innovation, they are more likely to overlook the risks and uncertainties of environmental innovation (Y. Zhang et al., 2022). Jizi et al. (2014) suggest powerful CEOs engage in CSR activities because of greater societal exposure. In addition, powerful CEOs can better manage the interests of investors and the board of directors (Yuan et al., 2023)

Regarding the control variables at the board level, the presence of a CSR committee positively influences the adoption of carbon reduction management initiatives, indicating that companies with a CSR committee effectively manage relationships with stakeholders, demonstrating a commitment to sustainability issues (Kılıç et al., 2021). Orazalin and Mahmood (2021) found that the CSR committee positively influences environmental performance from a sample of 3023 annual observations of European companies between 2009 and 2016.

Regarding the control variables at the firm level, leverage negatively influences managerial initiatives for carbon reduction, indicating that more indebted companies have less cash flow to invest in environmental activities (Jouber, 2021). Firm size positively influences managerial initiatives for carbon reduction, suggesting that larger firms invest more in environmental initiatives because they have more stakeholders(Pareek et al., 2021). Table 8 summarizes the acceptance or rejection of all hypotheses.

Table 8
Acceptance or rejection of the hypotheses

	Hypothesis	Level of support
1	Hypothesis 1: Environmental innovation is positively associated with managerial initiatives for carbon reduction	Accepted
2	Hypothesis 2: CEO Power positively moderates the relationship between environmental innovation and managerial initiatives for carbon reduction	Accepted

In summary, the empirical results indicate that environmental innovation positively influences managerial initiatives for carbon reduction, supporting hypothesis 1. The results are in line with legitimacy and stakeholder theories, suggesting that environmentally innovative firms seek to become legitimate in society and meet stakeholders' needs by engaging in carbon reduction initiatives. The empirical results also indicate that CEO power positively moderates the environmental innovation - initiatives for carbon reduction link.

6 Conclusions

Based on a sample of 331 Latin American firms from 2010 to 2020, this study examines the effect of eco-innovation on managerial carbon reduction initiatives and the moderating role of CEO power in this relationship. The results show that environmental innovation positively affects the adoption of carbon reduction initiatives, and the evidence also indicates that CEO power strengthens this relationship.

The study has important practical implications. First, most studies involving environmental issues are conducted in developed countries, so there is a lack of studies on this issue in regions characterized by developing countries, such as Latin America. In the context of Latin America, where there is an increase in the frequency and intensity of climate change (Azócar et al., 2021), with countries still dependent on fossil fuels for energy generation (Montalbano & Nenci, 2019) and with energy consumption increasing mainly due to the growth of the middle class and urban population (Vural, 2021), there is a need for the adoption of carbon reduction initiatives. Thus, environmental policies such as carbon reduction initiatives must be re-examined in Latin America. Second, the study has implications for policymakers and investors by demonstrating the need for mechanisms encouraging environmental innovation from Latin American firms because more environmentally innovative firms influence the engagement of carbon reduction initiatives. This evidence suggests that powerful CEOs are essential in environmental policy-making in firms. Finally, the study's results may motivate managers to adopt environmental innovation policies because these policies influence carbon reduction initiatives. Thus, environmental innovation is crucial for companies to improve their carbon performance (Konadu et al., 2022).

The study also has important theoretical implications. Our results align with legitimacy theory, which states that environmentally innovative firms invest in environmental issues to become legitimate in society and have a good reputation, maintaining their legitimacy status. The results also align with stakeholder theory, suggesting that engaging in environmental innovation allows firms to serve stakeholder interests by encouraging carbon reduction managerial initiatives.

The study has limitations. First, some firms do not disclose environmental information, such as carbon reduction management initiatives and environmental innovation. Second, the study has only a

quantitative approach. Finally, the study is focused only on Latin American countries. Future research could use other databases, such as Bloomberg, to verify environmental information, and, finally, future studies could study the reality of other countries with different institutional characteristics.

References

Adams, R. B., Almeida, H., & Ferreira, D. (2005). Powerful CEOs and their impact on corporate performance. *The Review of Financial Studies, 18*(4), 1403–1432. https://doi.org/10.1093/rfs/hhi030

Afonso, T. L., Marques, A. C., & Fuinhas, J. A. (2021). Does energy efficiency and trade openness matter for energy transition? Empirical evidence for countries in the Organization for Economic Co-operation and Development. *Environment, Development and Sustainability,* 1–21. https://doi.org/10.1007/s10668-021-01228-z

Aibar-Guzmán, B., & Frías-Aceituno, J.-V. (2021). Is It Necessary to Centralize Power in the CEO to Ensure Environmental Innovation? *Administrative Sciences, 11*(1), 27. https://doi.org/10.3390/admsci11010027

Aksoy, M., Yilmaz, M. K., Tatoglu, E., & Başar, M. (2020). Antecedents of corporate sustainability performance in Turkey: The effects of ownership structure and board attributes on non-financial companies. *Journal of Cleaner Production,* 124284. https://doi.org/10.1016/j.jclepro.2020.124284

Alam, M. S., Safiullah, M., & Islam, M. S. (2022). Cash-rich firms and carbon emissions. *International Review of Financial Analysis*, 81, 102106. https://doi.org/10.1016/j.irfa.2022.102106

Albitar, K., Al-Shaer, H., & Liu, Y. S. (2023). Corporate commitment to climate change: The effect of eco-innovation and climate governance. *Research Policy, 52*(2), 104697. https://doi.org/10.1016/j.respol.2022.104697

Andries, P., & Stephan, U. (2019). Environmental innovation and firm performance: How firm size and motives matter. *Sustainability (Switzerland), 11*(13). https://doi.org/10.3390/su11133585

Azócar, G., Billi, M., Calvo, R., Huneeus, N., Lagos, M., Sapiains, R., & Urquiza, A. (2021). Climate change perception, vulnerability, and readiness: inter-country variability and emerging patterns in Latin America. *Journal of Environmental Studies and Sciences, 11*(1), 23–36. https://doi.org/10.1007/s13412-020-00639-0

Bananuka, J., Bakalikwira, L., Nuwagaba, P., & Tumwebaze, Z. (2021). Institutional pressures, environmental management practices, firm characteristics and environmental performance. *Accounting Research Journal, 34*(6). https://doi.org/10.1108/ARJ-06-2020-0143

Beck, N., & Katz, J. N. (1995). What to do (and not to do) with time-series cross-section data. *American Political Science Review, 89*(3), 634–647. https://doi.org/10.2307/2082979

Breuer, W., Hass, M., & Rosenbach, D. J. (2022). The impact of CEO power and institutional discretion on CSR investment. *Review of Financial Economics, 40*(1), 20–43. https://doi.org/10.1002/rfe.1131

Burkhardt, K., Nguyen, P., & Poincelot, E. (2020). Agents of change: Women in top management and corporate environmental performance. *Corporate Social Responsibility and Environmental Management*, September 2019, 1–14. https://doi.org/10.1002/csr.1907

Chen, Z., & Hamilton, T. (2020). What is driving corporate social and environmental responsibility in China? An evaluation of legacy effects, organizational characteristics, and transnational pressures. *Geoforum, 110*, 116–124. https://doi.org/10.1016/j.geoforum.2020.02.004

Cheng, G., Zhao, C., Iqbal, N., Gülmez, Ö., Işik, H., & Kirikkaleli, D. (2021). Does energy productivity and public-private investment in energy achieve carbon neutrality target of China? *Journal of Environmental Management, 298*, 113464. https://doi.org/10.1016/j.jenvman.2021.113464

Daniel-Vasconcelos, V., Ribeiro, M. de S., & Crisóstomo, V. L. (2022). Does gender diversity moderate the relationship between CSR committees and Sustainable Development Goals disclosure? Evidence from Latin American companies. *RAUSP Management Journal, 57*(4), 434–456. https://doi.org/10.1108/RAUSP-02-2022-0063

Datt, R. R., Luo, L., & Tang, Q. (2019). Corporate voluntary carbon disclosure strategy and carbon performance in the USA. *Accounting Research Journal, 17*(3). https://doi.org/10.2308/jiar-52221

Datt, R. R., Luo, L., Tang, Q., & Mallik, G. (2018). An international study of determinants of voluntary carbon assurance. *Journal of International Accounting Research, 17*(3), 1–20. https://doi.org/10.2308/jiar-52221

Deegan, C., Rankin, M., & Tobin, J. (2002). An examination of the corporate social and environmental disclosures of BHP from 1983-1997: A test of legitimacy theory. *Accounting, Auditing & Accountability Journal*. 10.1108/09513570210435861

Ellimäki, P., Aguilera, R. V, Hurtado-Torres, N. E., & Aragón-Correa, J. A. (2023). The link between foreign institutional owners and multinational enterprises' environmental outcomes. *Journal of International Business Studies*. https://doi.org/10.1057/s41267-022-00580-0

Elsalih, O., Sertoglu, K., & Besim, M. (2020). Environmental performance, comparative advantage of crude oil and the role of institutional quality. *Environmental Science and Pollution Research, 27*(3), 3489–3496. https://doi.org/10.1007/s11356-019-06838-9

Erla Jonsdottir, G., Mitchell, J., Olaf Sigurjonsson, T., & Rahnema Alavi, A. (2023). Responsible ownership fostering green tech innovation. *Sustainable Energy Technologies and Assessments*, 55, 102923. https://doi.org/10.1016/j.seta.2022.102923

Fabrizi, M., Mallin, C., & Michelon, G. (2014). The Role of CEO's Personal Incentives in Driving Corporate Social Responsibility. *Journal of Business Ethics, 124*(2), 311–326. https://doi.org/10.1007/s10551-013-1864-2

Farza, K., Ftiti, Z., Hlioui, Z., Louhichi, W., & Omri, A. (2021). Does it pay to go green? The environmental innovation effect on corporate financial performance. *Journal of Environmental Management*, 300, 113695. https://doi.org/10.1016/j.jenvman.2021.113695

Fernando, S., & Lawrence, S. (2014). A theoretical framework for CSR practices: Integrating legitimacy theory, stakeholder theory and institutional theory. *Journal of Theoretical Accounting Research, 10*(1), 149–178.

Finkelstein, S. (1992). Power in Top Management Teams: Dimensions, Measurement, and Validation. *Academy of Management Journal, 35*(3), 505–538. https://doi.org/10.5465/256485

Fiorillo, P., Meles, A., Mustilli, M., & Salerno, D. (2022). How does the financial market influence firms' Green innovation? The role of equity analysts. *Journal of International Financial Management & Accounting,* n/a(n/a). https://doi.org/10.1111/jifm.12152

Francoeur, C., Lakhal, F., Gaaya, S., & Ben Saad, I. (2021). How do powerful CEOs influence corporate environmental performance? *Economic Modelling,* 94, 121–129. https://doi.org/10.1016/j.econmod.2020.09.024

Freeman, R. E. (1984). *Stakeholder management: framework and philosophy*. Pitman, Mansfield, MA.

Freeman, R. E., Phillips, R., & Sisodia, R. (2020). Tensions in Stakeholder Theory. *Business and Society*, 59(2), 213–231. https://doi.org/10.1177/0007650318773750

Gallego-Álvarez, I., García-Rubio, R., & Martínez-Ferrero, J. (2018). Environmental performance concerns in Latin America: Determinant factors and multivariate analysis . *Revista de Contabilidad-Spanish Accounting Review, 21*(2), 206–221. https://doi.org/10.1016/j.rcsar.2018.05.003

Gallén, M. L., & Peraita, C. (2018). The effects of national culture on corporate social responsibility disclosure: a cross-country comparison. *Applied Economics, 50*(27), 2967–2979. https://doi.org/10.1080/00036846.2017.1412082

Ganda, F. (2021). The influence of carbon performance on the financial debt of listed companies in an emerging economy: Does company size matter? *Business Strategy & Development.* https://doi.org/10.1002/bsd2.182

Garcia-Sanchez, I.-M., Raimo, N., & Vitolla, F. (2020). CEO power and integrated reporting. *Meditari Accountancy Research*. https://doi.org/10.1108/MEDAR-11-2019-0604

García-Sánchez, I.-M., Raimo, N., & Vitolla, F. (2021). Are Environmentally Innovative Companies Inclined towards Integrated Environmental Disclosure Policies? *Administrative Sciences, 11*(1), 29. https://doi.org/10.3390/admsci11010029

García-Sánchez, I., Gallego-Álvarez, I., & Zafra-Gómez, J. (2021). Do independent, female and specialist directors promote eco-innovation and eco-design in agri-food firms? *Business Strategy and the Environment, 30*(2), 1136–1152. https://doi.org/10.1002/bse.2676

García Martín, C. J., & Herrero, B. (2020). Do board characteristics affect environmental performance? A study of EU firms. *Corporate Social Responsibility and Environmental Management, 27*(1), 74–94. https://doi.org/10.1002/csr.1775

Giannarakis, G., Konteos, G., Sariannidis, N., & Chaitidis, G. (2017). The relation between voluntary carbon disclosure and environmental performance: The case of S&P 500. *International Journal of Law and Management.* https://doi.org/10.1108/IJLMA-05-2016-0049

Gómez-Bolaños, E., Ellimäki, P., Hurtado-Torres, N. E., & Delgado-Márquez, B. L. (2022). Internationalization and environmental innovation in the energy sector: Exploring the differences between multinational enterprises from emerging and developed countries. *Energy Policy*, 163, 112867. https://doi.org/10.1016/j.enpol.2022.112867

Gössling, S., Balas, M., Mayer, M., & Sun, Y.-Y. (2023). A review of tourism and climate change mitigation: The scales, scopes, stakeholders and strategies of carbon management. *Tourism Management*, 95, 104681. https://doi.org/10.1016/j.tourman.2022.104681

Haque, F., & Ntim, C. G. (2020). Executive Compensation, Sustainable Compensation Policy, Carbon Performance and Market Value. *British Journal of Management, 31*(3), 525–546. https://doi.org/10.1111/1467-8551.12395

Harper, J., & Sun, L. (2019). CEO power and corporate social responsibility. *American Journal of Business, 34*(2), 93–115. https://doi.org/10.1108/AJB-10-2018-0058

Hassan, M. K., Houston, R., Karim, M. S., & Sabit, A. (2023). CEO duality and firm performance during the 2020 coronavirus outbreak. *The Journal of Economic Asymmetries, 27*, e00278. https://doi.org/10.1016/j.jeca.2022.e00278

Hossain, S. (2016). Foreign direct investment (FDI) and corruption: Is it a major hindrance for encouraging inward FDI? *African Journal of Business Management, 10*(10), 256. https://doi.org/10.5897/AJBM2016.8032

Hussain, M. J., Tian, G., Ashraf, A., Khan, M. K., & Ying, L. (2023). Chief executive officer ability and corporate environmental sustainability information disclosure. *Business Ethics, the Environment & Responsibility, 32*(1), 24–39. https://doi.org/10.1111/beer.12485

Husted, B. W., & Sousa-Filho, J. M. de. (2019). Board structure and environmental, social, and governance disclosure in Latin America. *Journal of Business Research, 102*, 220–227. https://doi.org/10.1016/j.jbusres.2018.01.017

Iqbal, N., Abbasi, K. R., Shinwari, R., Guangcai, W., Ahmad, M., & Tang, K. (2021). Does exports diversification and environmental innovation achieve carbon neutrality target of OECD economies? *Journal of Environmental Management, 291*, 112648. https://doi.org/10.1016/j.jenvman.2021.112648

Jabbour, A. B. L. de S., Jabbour, C. J. C., Sarkis, J., Latan, H., Roubaud, D., Godinho Filho, M., & Queiroz, M. (2020). Fostering low-carbon production and logistics systems: framework and empirical evidence. International *Journal of Production Research,* 1–20. https://doi.org/10.1080/00207543.2020.1834639

Jain, T., & Zaman, R. (2020). When boards matter: The case of corporate social irresponsibility. *British Journal of Management, 31*(2), 365–386. https://doi.org/10.1111/1467-8551.12376

Javeed, S. A., Latief, R., Jiang, T., San Ong, T., & Tang, Y. (2021). How environmental regulations and corporate social responsibility affect the firm innovation with the moderating role of Chief executive officer (CEO) power and ownership concentration? *Journal of Cleaner Production*, 308, 127212. https://doi.org/10.1016/j.jclepro.2021.127212

Javeed, S. A., & Lefen, L. (2019). An analysis of corporate social responsibility and firm performance with moderating effects of CEO power and ownership structure: A case study of the manufacturing sector of Pakistan. *Sustainability (Switzerland), 11*(1). https://doi.org/10.3390/su11010248

Jia, X., Liao, S., Van der Heijden, B., & Li, W. (2022). Power and responsibility: How different sources of CEO power affect firms' corporate social responsibility practices. *Business Ethics, the Environment & Responsibility, 31*(3), 682–701. https://doi.org/10.1111/beer.12438

Jiakui, C., Abbas, J., Najam, H., Liu, J., & Abbas, J. (2023). Green technological innovation, green finance, and financial development and their role in green total factor productivity: Empirical insights from China. *Journal of Cleaner Production*, 382, 135131. https://doi.org/10.1016/j.jclepro.2022.135131

Jiang, Y., Luo, L., Xu, J., & Shao, X. (2021). The value relevance of corporate voluntary carbon disclosure: Evidence from the United States and BRIC countries. *Journal of Contemporary Accounting & Economics, 17*(3), 100279. https://doi.org/10.1016/j.jcae.2021.100279

Jiao, J., Chen, C., & Bai, Y. (2020). Is green technology vertical spillovers more significant in mitigating carbon intensity? Evidence from Chinese industries. *Journal of Cleaner Production, 257*, 120354. https://doi.org/10.1016/j.jclepro.2020.120354

Jiraporn, P., & Chintrakarn, P. (2013). How do powerful CEOs view corporate social responsibility (CSR)? An empirical note. *Economics Letters, 119*(3), 344–347. https://doi.org/10.1016/j.econlet.2013.03.026

Jizi, M. I., Salama, A., Dixon, R., & Stratling, R. (2014). Corporate Governance and Corporate Social Responsibility Disclosure: Evidence from the US Banking Sector. *Journal of Business Ethics*, 125(4), 601–615. https://doi.org/10.1007/s10551-013-1929-2

Jouber, H. (2019). How does CEO pay slice influence corporate social responsibility? US–Canadian versus Spanish–French listed firms. *Corporate Social Responsibility and Environmental Management, 26*(2), 502–517. https://doi.org/10.1002/csr.1728

Jouber, H. (2021). Is the effect of board diversity on CSR diverse? New insights from one-tier vs two-tier corporate board models. *Corporate Governance: The International Journal of Business in Society.* https://doi.org/10.1108/CG-07-2020-0277

Keltner, D., Gruenfeld, D. H., & Anderson, C. (2003). Power, approach, and inhibition. In Psychological Review (Vol. 110, pp. 265–284). *American Psychological Association*. https://doi.org/10.1037/0033-295X.110.2.265

Kemp, R., & Pontoglio, S. (2011). The innovation effects of environmental policy instruments—A typical case of the blind men and the elephant? *Ecological Economics, 72*, 28–36. https://doi.org/10.1016/j.ecolecon.2011.09.014

Khan, Z., Ali, S., Umar, M., Kirikkaleli, D., & Jiao, Z. (2020). Consumption-based carbon emissions and International trade in G7 countries: The role of Environmental innovation and Renewable energy. *Science of The Total Environment*, 730, 138945. https://doi.org/10.1016/j.scitotenv.2020.138945

Kılıç, M., Uyar, A., Kuzey, C., & Karaman, A. S. (2021). Drivers and consequences of sustainability committee existence? Evidence from the hospitality and tourism industry. *International Journal of Hospitality Management, 92*, 102753. https://doi.org/10.1016/j.ijhm.2020.102753

Konadu, R., Ahinful, G. S., Boakye, D. J., & Elbardan, H. (2022). Board gender diversity, environmental innovation and corporate carbon emissions. *Technological Forecasting and Social Change, 174*, 121279. https://doi.org/10.1016/j.techfore.2021.121279

Kraus, S., Rehman, S. U., & García, F. J. S. (2020). Corporate social responsibility and environmental performance: The mediating role of environmental strategy and green innovation. *Technological Forecasting and Social Change, 160*, 120262. https://doi.org/10.1016/j.techfore.2020.120262

Kyaw, K. (2022). Effect of policy uncertainty on environmental innovation. *Journal of Cleaner Production, 363*, 132645. https://doi.org/10.1016/j.jclepro.2022.132645

Le, T. T., & Ferasso, M. (2022). How green investment drives sustainable business performance for food manufacturing small- and medium-sized enterprises? Evidence from an emerging economy. *Corporate Social Responsibility and Environmental Management, 29*(4), 1034–1049. https://doi.org/10.1002/csr.2252

Li, D., Huang, M., Ren, S., Chen, X., & Ning, L. (2018). Environmental legitimacy, green innovation, and corporate carbon disclosure: Evidence from CDP China 100. *Journal of Business Ethics, 150*(4), 1089–1104. https://doi.org/10.1007/s10551-016-3187-6

Li, F., Li, T., & Minor, D. (2016). CEO power, corporate social responsibility, and firm value: a test of agency theory. *International Journal of Managerial Finance, 12*(5), 611–628. https://doi.org/10.1108/IJMF-05-2015-0116

Li, Y., Gong, M., Zhang, X.-Y., & Koh, L. (2018). The impact of environmental, social, and governance disclosure on firm value: The role of CEO power. *The British Accounting Review, 50*(1), 60–75.

Liao, Z. (2018a). Corporate culture, environmental innovation and financial performance. *Business Strategy and the Environment, 27*(8), 1368–1375. https://doi.org/10.1002/bse.2186

Liao, Z. (2018b). Environmental policy instruments, environmental innovation and the reputation of enterprises. *Journal of Cleaner Production, 171*, 1111–1117. https://doi.org/10.1016/j.jclepro.2017.10.126

Long, S., & Liao, Z. (2021). Would consumers pay for environmental innovation? The moderating role of corporate environmental violations. *Environmental Science and Pollution Research*, 1–10. https://doi.org/10.1007/s11356-021-12811-2

Long, X., Chen, Y., Du, J., Oh, K., Han, I., & Yan, J. (2017). The effect of environmental innovation behavior on economic and environmental performance of 182 Chinese firms. *Journal of Cleaner Production*, 166, 1274–1282. https://doi.org/10.1016/j.jclepro.2017.08.070

Lu, J., Javeed, S. A., Latief, R., Jiang, T., & Ong, T. S. (2021). The Moderating Role of Corporate Social Responsibility in the Association of Internal Corporate Governance and Profitability; Evidence from Pakistan. *International Journal of Environmental Research and Public Health, 18*(11), 5830. https://doi.org/10.3390/ijerph18115830

Lu, L. W., & Taylor, M. E. (2018). A study of the relationships among environmental performance, environmental disclosure, and financial performance. *Asian Review of Accounting*. https://doi.org/10.1108/ARA-01-2016-0010

Luan, B., Huang, J., & Zou, H. (2019). Domestic R&D, technology acquisition, technology assimilation and China's industrial carbon intensity: Evidence from a dynamic panel threshold model. *Science of The Total Environment, 693*, 133436. https://doi.org/10.1016/j.scitotenv.2019.07.242

Luo, L., & Tang, Q. (2014). Does voluntary carbon disclosure reflect underlying carbon performance? *Journal of Contemporary Accounting & Economics, 10*(3), 191–205. https://doi.org/10.1016/j.jcae.2014.08.003

Luo, L., & Tang, Q. (2021). Corporate governance and carbon performance: role of carbon strategy and awareness of climate risk. *Accounting & Finance, 61*(2), 2891–2934. https://doi.org/10.1111/acfi.12687

Mahmood, N., Zhao, Y., Lou, Q., & Geng, J. (2022). Role of environmental regulations and eco-innovation in energy structure transition for green growth: Evidence from OECD. *Technological Forecasting and Social Change, 183*, 121890. https://doi.org/10.1016/j.techfore.2022.121890

Mahmoudian, F., Lu, J., Yu, D., Nazari, J. A., & Herremans, I. M. (2021). Inter-and intra-organizational stakeholder arrangements in carbon management accounting. *The British Accounting Review, 53(*1), 100933. https://doi.org/10.1016/j.bar.2020.100933

Marcon Nora, G. A., Alberton, A., & Ayala, D. H. F. (2023). Stakeholder theory and actor-network theory: The stakeholder engagement in energy transitions. *Business Strategy and the Environment, 32*(1), 673–685. https://doi.org/10.1002/bse.3168

Martínez-Ferrero, J., Lozano, M. B., & Vivas, M. (2021). The impact of board cultural diversity on a firm's commitment toward the sustainability issues of emerging countries: The mediating effect of a CSR committee. *Corporate Social Responsibility and Environmental Management, 28*(2), 675–685. https://doi.org/10.1002/csr.2080

Maswadi, L., & Amran, A. (2023). Does board capital enhance corporate social responsibility disclosure quality? The role of CEO power. *Corporate Social Responsibility and Environmental Management, 30*(1), 209–225. https://doi.org/10.1002/csr.2349

Meirun, T., Mihardjo, L. W. W., Haseeb, M., Khan, S. A. R., & Jermsittiparsert, K. (2021). The dynamics effect of green technology innovation on economic growth and CO2 emission in Singapore: new evidence from bootstrap ARDL approach. *Environmental Science and Pollution Research, 28*(4), 4184–4194. https://doi.org/10.1007/s11356-020-10760-w

Meles, A., Salerno, D., Sampagnaro, G., Verdoliva, V., & Zhang, J. (2023). The influence of green innovation on default risk: Evidence from Europe. *International Review of Economics & Finance, 84*, 692–710. https://doi.org/10.1016/j.iref.2022.11.036

Montalbano, P., & Nenci, S. (2019). Energy efficiency, productivity and exporting: Firm-level evidence in Latin America. *Energy Economics, 79*, 97–110. https://doi.org/10.1016/j.eneco.2018.03.033

Moussa, T., Kotb, A., & Helfaya, A. (2022). An Empirical Investigation of U.K. Environmental Targets Disclosure: The Role of Environmental Governance and Performance. *European Accounting Review, 31*(4), 937–971. https://doi.org/10.1080/09638180.2021.1890173

MSCI. (2021). *MSCI Emerging Markets Latin America Index* (USD).

Naeem, M. A., Appiah, M., Karim, S., & Yarovaya, L. (2023). What abates environmental efficiency in African economies? Exploring the influence of infrastructure, industrialization, and innovation. *Technological Forecasting and Social Change, 186*, 122172. https://doi.org/10.1016/j.techfore.2022.122172

Nkundabanyanga, S. K., Muramuzi, B., & Alinda, K. (2021). Environmental management accounting, board role performance, company characteristics and environmental performance disclosure. *Journal of Accounting & Organizational Change.* https://doi.org/10.1108/JAOC-03-2020-0035

Nylund, P. A., Brem, A., & Agarwal, N. (2021). Enabling technologies mitigating climate change: The role of dominant designs in environmental innovation ecosystems. *Technovation,* 102271. https://doi.org/10.1016/j.technovation.2021.102271

Orazalin, N., & Mahmood, M. (2021). Toward sustainable development: Board characteristics, country governance quality, and environmental performance. *Business Strategy and the Environment, 30*(8), 3569–3588. https://doi.org/10.1002/bse.2820

Paolone, F., Pozzoli, M., Cucari, N., & Bianco, R. (2022). Longer board tenure and audit committee tenure. How do they impact environmental performance? A European study. *Corporate Social Responsibility and Environmental Management*, n/a(n/a). https://doi.org/10.1002/csr.2359

Pareek, R., Sahu, T. N., & Gupta, A. (2021). Gender diversity and corporate sustainability performance: empirical evidence from India. *Vilakshan-XIMB Journal of Management.* https://doi.org/10.1108/XJM-10-2020-0183

Pathan, S. (2009). Strong boards, CEO power and bank risk-taking. *Journal of Banking & Finance, 33*(7), 1340–1350. https://doi.org/10.1016/j.jbankfin.2009.02.001

Pucheta-Martínez, M. C., & Gallego-Álvarez, I. (2021). The Role of CEO Power on CSR Reporting: The Moderating Effect of Linking CEO Compensation to Shareholder Return. *Sustainability, 13*(6), 3197. https://doi.org/10.3390/su13063197

Rahman, M., Rodríguez-Serrano, M. Á., & Faroque, A. R. (2021). Corporate environmentalism and brand value: A natural resource-based perspective. *Journal of Marketing Theory and Practice*, 1–17. https://doi.org/10.1080/10696679.2021.1872387

Ramoglou, S., Zyglidopoulos, S., & Papadopoulou, F. (2023). Is There Opportunity Without Stakeholders? A Stakeholder Theory Critique and Development of Opportunity-Actualization. *Entrepreneurship Theory and Practice, 47*(1), 113–141. https://doi.org/10.1177/10422587211043354

Rao, P., & Griliches, Z. (1969). Small-sample properties of several two-stage regression methods in the context of auto-correlated errors. *Journal of the American Statistical Association, 64*(325), 253–272. https://doi.org/10.1080/01621459.1969.10500968

Rashid, A., Shams, S., Bose, S., & Khan, H. (2020). CEO power and corporate social responsibility (CSR) disclosure: does stakeholder influence matter? *Managerial Auditing Journal.* https://doi.org/10.1108/MAJ-11-2019-2463

Razzaq, A., Sharif, A., Afshan, S., & Li, C. J. (2023). Do climate technologies and recycling asymmetrically mitigate consumption-based carbon emissions in the United States? New insights from Quantile ARDL. *Technological Forecasting and Social Change, 186,* 122138. https://doi.org/10.1016/j.techfore.2022.122138

Reed, W. R., & Ye, H. (2011). Which panel data estimator should I use*? Applied Economics, 43*(8), 985–1000. https://doi.org/10.1080/00036840802600087

Refinitiv. (2022a). *Environmental, Social and Governance (ESG) Scores from Refinitiv*. https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

Refinitiv. (2022b). *Environmental, Social and Governance Scores from Refinitiv.* https://www.refinitiv.com/en/sustainable-finance/esg-scores

Rennings, K. (2000). Redefining innovation—eco-innovation research and the contribution from ecological economics. *Ecological Economics, 32*(2), 319–332. https://doi.org/10.1016/S0921-8009(99)00112-3

Russo, A., & Perrini, F. (2010). Investigating stakeholder theory and social capital: CSR in large firms and SMEs. *Journal of Business Ethics, 91*(2), 207–221. https://doi.org/10.1007/s10551-009-0079-z

Russo, S., Schimperna, F., Lombardi, R., & Ruggiero, P. (2022). Sustainability performance and social media: an explorative analysis. *Meditari Accountancy Research, 30*(4), 1118–1140. https://doi.org/10.1108/MEDAR-03-2021-1227

Shahbaz, S. (2019). An examination of the dimensions of CEO power and corporate social responsibility. *Review of Accounting and Finance, 18*(2), 221–244. https://doi.org/10.1108/RAF-01-2018-0034

Sheikh, S. (2019). An examination of the dimensions of CEO power and corporate social responsibility. *Review of Accounting and Finance*. https://doi.org/10.1108/RAF-01-2018-0034

Singh, S. K., Giudice, M. Del, Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technological Forecasting and Social Change, 150*, 119762. https://doi.org/10.1016/j.techfore.2019.119762

Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review, 20*(3), 571–610. https://doi.org/10.5465/amr.1995.9508080331

Symeou, P. C., Zyglidopoulos, S., & Gardberg, N. A. (2019). Corporate environmental performance: Revisiting the role of organizational slack. *Journal of Business Research, 96*, 169–182. https://doi.org/10.1016/j.jbusres.2018.11.019

Töbelmann, D., & Wendler, T. (2020). The impact of environmental innovation on carbon dioxide emissions. *Journal of Cleaner Production, 244*, 118787. https://doi.org/10.1016/j.jclepro.2019.118787

Uyar, A., Kuzey, C., Kilic, M., & Karaman, A. S. (2021). Board structure, financial performance, corporate social responsibility performance, CSR committee, and CEO duality: Disentangling the connection in healthcare. *Corporate Social Responsibility and Environmental Management*. https://doi.org/10.1002/csr.2141

Velte, P. (2021). Environmental performance, carbon performance and earnings management: Empirical evidence for the European capital market. *Corporate Social Responsibility and Environmental Management, 28*(1), 42–53. https://doi.org/10.1002/csr.2030

Velte, P., Stawinoga, M., & Lueg, R. (2020). Carbon performance and disclosure: A systematic review of governance-related determinants and financial consequences. *Journal of Cleaner Production, 254*, 120063. https://doi.org/10.1016/j.jclepro.2020.120063

Vural, G. (2021). Analyzing the impacts of economic growth, pollution, technological innovation and trade on renewable energy production in selected Latin American countries. *Renewable Energy, 171*, 210–216. https://doi.org/10.1016/j.renene.2021.02.072

Walls, J. L., & Berrone, P. (2017). The power of one to make a difference: How informal and formal CEO power affect environmental sustainability. *Journal of Business Ethics, 145*(2), 293–308. https://doi.org/10.1007/s10551-015-2902-z

Wang, L., Chang, H.-L., Rizvi, S. K. A., & Sari, A. (2020). Are eco-innovation and export diversification mutually exclusive to control carbon emissions in G-7 countries? *Journal of Environmental Management, 270*, 110829. https://doi.org/10.1016/j.jenvman.2020.110829

Wang, Y., Shen, T., Chen, Y., & Carmeli, A. (2021). CEO environmentally responsible leadership and firm environmental innovation: A socio-psychological perspective. *Journal of Business Research, 126*, 327–340. https://doi.org/10.1016/j.jbusres.2021.01.004

Wang, Z., Doren, C., Cai, S., & Ren, S. (2023). Enterprise level responses to environmental institutional pressure: Focus on legitimization strategies. *Journal of Cleaner Production, 382*, 135148. https://doi.org/10.1016/j.jclepro.2022.135148

Wedari, L. K., Moradi-Motlagh, A., & Jubb, C. (2023). The moderating effect of innovation on the relationship between environmental and financial performance: Evidence from high emitters in Australia. *Business Strategy and the Environment, 32(*1), 654–672. https://doi.org/10.1002/bse.3167

Wen, J., Zhao, X.-X., Fu, Q., & Chang, C.-P. (2023). The impact of extreme weather events on green innovation: Which ones bring to the most harm? *Technological Forecasting and Social Change, 188*, 122322. https://doi.org/10.1016/j.techfore.2023.122322

WWF. (2021). *Latin America and Caribbean NDCs: Recomendations for Decision-Makers*.

Yuan, Y., Hu, M., & Cheng, C. (2023). CEO succession and corporate innovation: A managerial myopic perspective. The North American *Journal of Economics and Finance, 64*, 101863. https://doi.org/10.1016/j.najef.2022.101863

Yurdakul, M., & Kazan, H. (2020). Effects of eco-innovation on economic and environmental performance: Evidence from Turkey's manufacturing companies. *Sustainability, 12*(8), 3167. https://doi.org/10.3390/su12083167

Zaman, R., Atawnah, N., Haseeb, M., Nadeem, M., & Irfan, S. (2021). Does corporate eco-innovation affect stock price crash risk? *The British Accounting Review,* 101031. https://doi.org/10.1016/j.bar.2021.101031

Zhang, Y.-J., Peng, Y.-L., Ma, C.-Q., & Shen, B. (2017). Can environmental innovation facilitate carbon emissions reduction? Evidence from China. *Energy Policy, 100,* 18–28. https://doi.org/10.1016/j.enpol.2016.10.005

Zhang, Y., Li, J., Deng, Y., & Zheng, Y. (2022). Avoid or approach: How CEO power affects corporate environmental innovation. *Journal of Innovation & Knowledge,* 7(4), 100250. https://doi.org/10.1016/j.jik.2022.100250

Zhao, Y., Elahi, E., Khalid, Z., Sun, X., & Sun, F. (2023). Environmental, Social and Governance Performance: Analysis of CEO Power and Corporate Risk. *Sustainability, 15*(2). https://doi.org/10.3390/su15021471

NOTES

ACKNOWLEDGMENT
We acknowledge CAPES (Coordination for the Improvement of Higher Education Personnel) for the doctoral scholarship.

AUTHORSHIP CONTRIBUTION
Conception and elaboration of the manuscript: V. Daniel-Vasconcelos, M. S . Ribeiro
Data collection: V. Daniel-Vasconcelos
Data analysis: V. Daniel-Vasconcelos, M. S . Ribeiro
Discussion of the results: V. Daniel-Vasconcelos, M. S . Ribeiro
Review and approval: V. Daniel-Vasconcelos, M. S . Brook

DATASET
The dataset that supports the results of this study is not publicly available.

FINANCING
This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001

CONSENT TO USE IMAGE
Does not apply.

APPROVAL OF THE RESEARCH ETHICS COMMITTEE
Does not apply.

CONFLICT OF INTERESTS
Does not apply.

PUBLISHER
Federal University of Santa Catarina. Accounting Sciences Course and Postgraduate Program in Accounting. Publication on the UFSC Journal Portal. The ideas expressed in this article are the responsibility of their authors, and do not necessarily represent the opinion of the editors or the university.

EDITORS
José Alonso Borba, Denize Demarche Minatti Ferreira, Carlos Eduardo Facin Lavarda.

HISTORIC
Received on: 08/11/2021 - Peer reviewed on: 13/12/2022 - Reformulated on: 01/02/2023 - Recommended for publication on: 15/02/2023 - Published on: 22/05/2023

** A preprint version of the paper was presented at the VII South American Conference on Environmental Accounting, 2021.*