The Effect of CSR and Ownership Structure on Environmental Innovation: The Moderating of CEO Narcissism

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ABSTRACT

In the context of increasing global awareness of environmental sustainability and the growing pressure on corporations to adopt responsible business practices. This study examines the effects of CSR performance and ownership structure, specifically insider ownership and institutional ownership, on environmental innovation, while also considering the moderating effect of CEO narcissism in Indonesian listed companies. Using purposive sampling, this study focuses on firms listed on the Indonesia Stock Exchange between 2019 and 2022 that published sustainability reports. The results show that CSR performance has a significant positive effect on environmental innovation, indicating that higher CSR engagement leads to greater environmental innovation, while insider ownership and institutional ownership have no significant direct effects on environmental innovation. In terms of moderation, CEO narcissism does not significantly moderate the relationship between CSR and environmental innovation, but it significantly moderates the relationship between ownership structure (insider and institutional ownership) and environmental innovation. Environmental innovation is primarily driven by CSR performance, whereas the influence of ownership structure depends on CEO narcissism as a key moderating factor. This study contributes to the literature by integrating CSR, ownership structure, and CEO behavioral traits in explaining environmental innovation in an emerging market context.

Keywords: *CEO Narcissism, CSR Performance, Environmental Innovation, Insider Ownership, Institutional Ownership.*

INTRODUCTION

Companies now face growing pressure to pursue environmental innovation because of their historical contribution to environmental degradation (Francoeur et al., 2021). Environmental innovation refers to changes in products, production processes, and marketing practices that reduce environmental harm while varying in their degree of novelty (Hizarci-Payne et al., 2021). Accordingly, firms are increasingly expected to reduce their environmental impact and make substantive operational adjustments (Hao & He, 2022; Bonsu et al., 2024). By helping firms minimize environmental harm while meeting stakeholder expectations, environmental innovation has become an important determinant of business performance (Kapil & Kumar, 2023).

Although environmental innovation involves considerable risk and uncertainty, it can generate substantial strategic benefits for firms (Itan et al., 2023). Prior studies by Shui et al. (2022) suggest that insider ownership may encourage innovation because managerial owners often have stronger incentives to support long-term growth, even when innovation outcomes are uncertain. This argument is particularly relevant in the context of

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environmental innovation, where firms must balance short-term costs against longer-term sustainability benefits.

Environmental innovation can also improve environmental accountability and strengthen sustainability performance. Prior research by Hao and He (2022) shows that Corporate Social Responsibility (CSR) performance plays an important role in encouraging environmental innovation because it requires firms to address stakeholder concerns related to environmental and social issues. In parallel, institutional ownership can strengthen monitoring of management and influence corporate decisions in ways that protect long-term stakeholder interests (García-Sánchez et al., 2020; Li et al., 2023). Earlier evidence from Indonesia also shows that CSR outcomes are shaped by governance mechanisms, indicating that sustainability-oriented actions are more effective when supported by sound corporate governance (Wati & Malik, 2021). Recent evidence from Indonesian firms further suggests that CSR disclosure, governance mechanisms, and executive influence remain relevant in explaining how companies respond to social and environmental pressures, including environmental accountability and disclosure decisions (Asiah & Rahmawati, 2025; Huwaida et al., 2025).

Chief Executive Officers (CEOs) who prioritize environmental responsibility may stimulate environmental innovation by fostering a collective environmental identity within the firm. This process can encourage middle managers to participate more actively in corporate citizenship initiatives that support a more sustainable environment (Itan et al., 2025). In addition, capable and experienced CEOs can leverage corporate reputation as a strategic resource to improve firm performance (Basri & Arafah, 2020). Previous studies have also documented various links between CEO narcissism and CSR-related environmental initiatives (Al-Shammari et al., 2019; Dyck et al., 2019; Ahn et al., 2020). This argument is also consistent with recent Indonesian evidence showing that CEO influence remains important in shaping environmental disclosure decisions when environmental issues are closely linked to governance and stakeholder expectations (Wati et al., 2025; Asiah & Rahmawati, 2025).

Although various studies have examined the relationship between CSR, ownership structure, and environmental innovation, there are still limitations in integrating CEO behavioral factors, particularly narcissism, as a mechanism that explains these relationships in the context of emerging economies such as Indonesia. In addition, most prior research has mainly focused on the direct effects of governance variables on environmental innovation, with limited attention to how executives' psychological traits may simultaneously moderate these effects. Therefore, this study offers novelty by combining corporate governance dimensions and executive behavioral factors within a single analytical framework to provide a more comprehensive explanation of environmental innovation.

Based on the background, this study examines the effects of CSR performance and ownership structure, specifically insider ownership and institutional ownership, on environmental innovation, while also considering the moderating role of CEO narcissism in Indonesian listed companies. This study offers several contributions. First, it extends the literature on CEO narcissism and corporate strategic decision-making, particularly in environmentally oriented innovation, as narcissistic CEOs tend to seek recognition and may support green initiatives to enhance their public image. Second, it contributes to CSR and ownership structure research by positioning CEO narcissism as a moderating factor, emphasizing that environmental innovation is shaped not only by governance mechanisms but also by leadership traits, where green practices can function as tools for reputation building. The study provides practical implications for investors and stakeholders by highlighting the role of leadership psychology in driving corporate green innovation.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

The Effect of CSR Performance on Environmental Innovation

CSR and environmental innovation are closely linked as both aim to create sustainable value for firms and stakeholders (Zhou et al., 2020). CSR reflects corporate responsibility to reduce negative social and environmental impacts while promoting ethical practices. When integrated into strategy, CSR encourages the adoption of green technologies and supports innovation aligned with regulatory and societal expectations (Baba & Baba, 2021; Padilla-Lozano & Collazzo, 2021). It also strengthens stakeholder relationships, improves reputation, and builds trust, which further enhances firms' capacity to develop sustainable innovations.

Empirical evidence, particularly from China, shows that stronger CSR engagement is associated with higher levels of green innovation, including eco-friendly patents, indicating improved sustainability-oriented competitiveness (Hao & He, 2022). Firms with strong CSR commitment are also more competitive due to increased stakeholder support and market responsiveness to sustainability demands (Freeman & Reed, 1983; Sharma & Vredenburg, 1998). Therefore, CSR performance has a significant positive impact on environmental innovation. However, this effect may weaken when CSR is treated as mere compliance, as it can become a financial burden that reduces resources for innovation and limits investment in green R&D (Ullah et al., 2022; Alshirah & Alshira'h, 2024).

H1: CSR performance has a significant positive impact on environmental innovation.

The Effect of Insider Ownership on Environmental Innovation

Insider ownership and environmental innovation are closely related because managerial shareholding creates financial incentives that may influence firms' sustainability decisions (Zhou et al., 2020; Yuan et al., 2021; Xu et al., 2023b). As shareholders, managers may either support or limit environmental innovation depending on whether they prioritize long-term value creation or short-term financial returns (Seaborn et al., 2020; Kind et al., 2023). On the positive side, insider ownership can strengthen commitment to sustainability, as managers with equity stakes tend to support green investments that enhance firm reputation and align with stakeholder expectations (Baba & Baba, 2021; Padilla-Lozano & Collazzo, 2021; Yang et al., 2021).

Prior studies by García-Sánchez et al. (2020), Ullah et al. (2022), and Wasiuzzaman et al. (2023) also show that managerial ownership is associated with greater support for environmental innovation, as it encourages long-term competitiveness through eco-friendly practices and stronger stakeholder trust. Insider ownership further strengthens managers' attachment to the firm, promoting investment in sustainable products and processes as part of long-term growth strategies (Javeed et al., 2022; Li et al., 2023; Bonsu et al., 2024). Therefore, insider ownership has a significant positive impact on environmental innovation (Sharma & Vredenburg, 1998; Deegan & Blomquist, 2006; Kraus et al., 2020).

H2: Insider ownership has a significant positive impact on environmental innovation.

The Effect of Institutional Ownership and Environmental Innovation

Institutional ownership is closely linked to environmental innovation because institutional investors generally have a stronger long-term orientation toward sustainability (Xu et al., 2023b). As major shareholders, they can influence corporate policies and encourage firms to adopt environmentally friendly practices in response to increasing global sustainability pressures. Institutional investors also demand higher levels of transparency and sustainability reporting, which drives firms to invest in green technology and improve environmental disclosure practices (Javeed et al., 2022). These mechanisms strengthen corporate reputation and competitiveness in sustainability-oriented markets (Li et al., 2023).

Empirical evidence by Yuan et al. (2021), Ullah et al. (2022), and Ali et al. (2024) shows that firms with strong institutional ownership are more likely to invest in eco-friendly technologies and develop sustainable products and processes aligned with long-term investor expectations. This also reflects efforts to maintain investor trust and prepare for stricter environmental regulations, while supporting long-term competitiveness through innovation (García-Sánchez et al., 2020; Javeed et al., 2022). In developing markets, institutional ownership further improves governance quality and environmental disclosure, encouraging firms to prioritize long-term sustainability over short-term profits (Hong & Linh, 2023; Nawaz et al., 2023). Institutional ownership provides monitoring and pressure that foster green innovation and enhance both profitability and reputation (Wati & Malik, 2021). Therefore, institutional ownership has a significant positive impact on environmental innovation.

H3: Institutional ownership has a significant positive impact on environmental innovation.

CEO Narcissism as a Moderator Variable

Narcissistic CEOs are often driven by a strong desire for recognition and personal reputation, which can make them more likely to support initiatives that improve their public image. In this context, CEO narcissism may strengthen the relationship between CSR performance and environmental innovation because narcissistic CEOs can view eco-friendly initiatives as opportunities to present themselves as progressive and visionary leaders. Prior research by Xu et al. (2023a) suggests that narcissistic CEOs often use CSR as a strategic platform for signaling environmental responsibility, thereby enhancing both corporate and personal reputation in markets that increasingly value sustainability. CSR can therefore become a channel through which CEOs demonstrate commitment to social and environmental issues while simultaneously enhancing their own visibility.

In the relationship between insider ownership and environmental innovation, a narcissistic CEO who holds company shares has stronger incentives to enhance firm value. Insider ownership motivates such CEOs to support sustainability strategies, as environmental innovation can increase share prices and personal financial returns. Their risk-taking tendency encourages investments in green initiatives that enhance both reputation and competitive advantage, while reinforcing their image as visionary leaders (Xu et al., 2023a). Furthermore, narcissistic CEOs may moderate the link between institutional ownership and environmental innovation. Institutional investors often demand sustainability and transparency, and narcissistic leaders tend to respond to these expectations to maintain a positive image among key stakeholders (García-Sánchez et al., 2020; Javeed et al., 2021). Their desire for recognition makes them more responsive to sustainability-oriented pressures, increasing the likelihood of adopting green innovation and eco-friendly practices (Javeed et al., 2022).

H4: CEO narcissism moderates the effect of CSR performance on environmental innovation.
H5: CEO narcissism moderates the effect of insider ownership on environmental innovation.
H6: CEO narcissism moderates the effect of institutional ownership on environmental innovation.

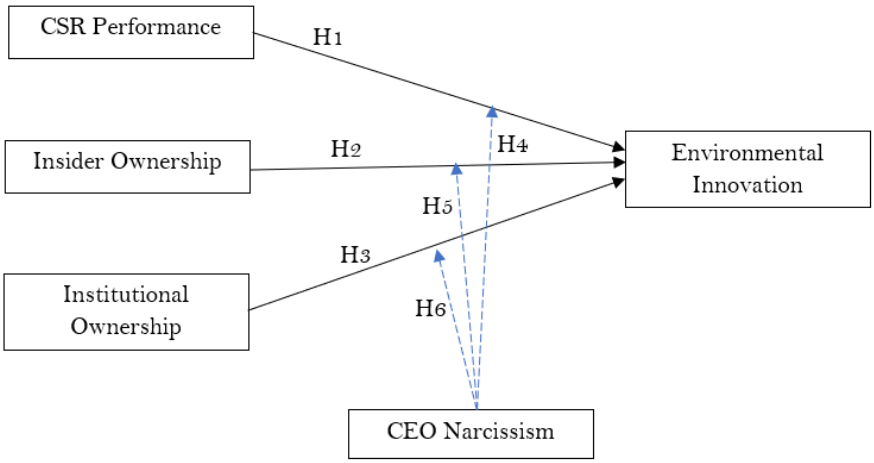

Figure 1. Research Framework

Figure 1 illustrates the conceptual model examining the direct and moderating relationships among the variables. CSR performance, insider ownership, and institutional ownership are proposed to have direct effects on environmental innovation (H1–H3). In addition, CEO narcissism acts as a moderating variable, influencing the strength of these relationships through interaction effects (H4–H6). Specifically, it moderates the links between CSR performance, insider ownership, and institutional ownership with environmental innovation, indicating that the impact of these predictors may vary depending on the level of CEO narcissism.

RESEARCH METHODS

In order to investigate the causal links between CSR performance, ownership structure, CEO narcissism, and environmental innovation using numerical and statistical data, this study takes a quantitative research strategy. Because it allows for the testing of hypotheses, the measurement of variable relationships, and the generalization of results across companies listed on the Indonesia Stock Exchange (IDX), a quantitative design is suitable. Secondary data from annual reports and sustainability reports of companies listed on the IDX were used in this study. To ensure authenticity and dependability, these data can be accessed via the official IDX website as well as the websites of the individual companies. All businesses listed on the IDX make up the study's population, and purposive sampling is used to choose the sample (Sugiyono, 2010). Companies listed between 2019 and 2022 that regularly released sustainability reports are included in the sampling criteria. This time frame was selected to record the dynamics of CSR implementation both before and after the COVID-19 outbreak.

The variables in this study consist of one dependent variable, several independent variables, one moderating variable, and control variables. Environmental innovation is the dependent variable and is measured using GRI 200 environmental indicators. CSR performance is an independent variable measured using GRI 200, 300, and 400 indicators covering economic, environmental, and social dimensions. Insider ownership is calculated based on the proportion of shares owned by directors and commissioners relative to total outstanding shares, while institutional ownership is measured based on the institutional shareholding proportion. The moderating variable, CEO narcissism, is proxied using CEO photo prominence in annual reports with a scoring scale of 1–5. Control variables include firm size (log total assets), firm age (years since listing), and leverage (total liabilities divided by total assets). Document analysis is used to gather data, with a focus on sustainability and financial reports. The Global Reporting Initiative (GRI) framework, which offers defined metrics for sustainability reporting, is used to monitor CSR performance and environmental innovation in order to guarantee consistency and comparability.

Regression analysis with interaction terms is used to examine the effects of CSR performance and ownership structure on environmental innovation, as well as the moderating role of CEO narcissism, using SPSS for statistical analysis and hypothesis testing. The study applies descriptive statistics, followed by classical assumption tests, including normality, multicollinearity, autocorrelation, and heteroscedasticity tests, to ensure data reliability. Model evaluation is conducted using Adjusted R-squared and the F-statistic (probability value) to assess explanatory power and overall model significance, while t-tests are used to test individual hypotheses. This approach provides a structured and robust framework for analyzing the relationships among CSR, ownership structure, CEO narcissism, and environmental innovation.

RESULTS

This study describes the analytical approach that looks at how ownership structure and CSR performance affect environmental innovation, with CEO narcissism acting as a moderating variable, before presenting the findings. Based on the listed Indonesian companies with sustainability reports from 2019 to 2022, the study was conducted. The empirical results and tests of the suggested hypotheses are presented in the section that follows.

Table 1. Descriptive Statistics

Variable	Mean	Standard Deviation	Min	Max
Environmental Innovation	0.385	0.244	0.000	1.000
CSR Performance	0.323	0.184	0.023	0.964
Insider Ownership	0.153	0.296	0.000	2.875
Institutional Ownership	0.535	0.403	0.000	2.627
Firm Size	4.268	0.890	2.000	5.000
Firm Age	30.230	2.754	14.024	35.228
Leverage	17.245	10.602	-2.000	41.000
CEO Narcissism	0.574	0.476	2.750	6.602

With values ranging from 0 to 1, Table 1 shows the environmental innovation mean value is 0.385 with a standard deviation of 0.244, demonstrating significant variation between enterprises. A maximum value of 1 denotes a comparatively high level of environmental innovation, while a minimum value of 0 implies that some businesses did not disclose or execute environmental innovation. With values ranging from 0.023 to 0.964, CSR performance has a mean of 0.323 and a standard deviation of 0.184, indicating significant variations in businesses' CSR commitment.

With values ranging from 0 to 2.875, insider ownership has a mean of 0.153 and a standard deviation of 0.296, showing significant variation between organizations. With values ranging from 0 to 2.627, institutional ownership has a mean of 0.535 and a standard deviation of 0.403, indicating comparatively high yet dispersed ownership levels. Firm age has a mean of 30.230 with a standard deviation of 2.754, and firm size has a mean of 4.268 with a standard deviation of 0.890, indicating that the majority of enterprises are somewhat mature with modest variation in both size and age.

Leverage ranges from -2.000 to 41.000, with a mean of 17.245 and a standard deviation of 10.602, demonstrating significant variety in businesses' debt structures. CEO narcissism has a mean of 0.574 and a standard deviation of 0.476, indicating that different companies have different leadership personality traits. The descriptive statistics support the empirical testing of the suggested correlations by showing significant variation among the sampled enterprises with regard to environmental innovation, ownership structure, financial features, and CEO narcissism.

As Table 2 illustrates, a number of diagnostic tests were carried out to evaluate the robustness of the data. First, the results of the normality test showed that the data were regularly distributed, with a probability value of 0.83. Second, since every correlation value is less than 0.90, the multicollinearity test indicates that there is no multicollinearity issue. Third, the autocorrelation test shows that there is no autocorrelation issue. Fourth,

the heteroscedasticity test suggests that heteroscedasticity is not a serious concern in the model.

Table 2. Robustness Test Results

Test	Result	Conclusion
Normality test	Probability = 0.83	Data are normally distributed
Multicollinearity test	Correlation < 0.90	No multicollinearity problem
Autocorrelation test	-	No autocorrelation problem
Heteroscedasticity test	-	No heteroscedasticity problem
Adjusted R-squared	0.78 (78%)	The model has good explanatory power
F-statistic (Prob)	0.00	The model is statistically significant

The regression model explains 78% of the variation in the dependent variable after taking the number of predictors into account, according to the adjusted R-squared value of 78%. This implies a good fit between the model and the data. Furthermore, the regression model is statistically significant generally because the Prob (F-statistic) value of 0.00, which is less than 0.05, shows that the independent variables collectively explain the variation in environmental innovation.

Table 3. Hypothesis Test

Paths	Coefficient	Std. Error	t-statistic	Prob	Conclusion
CSR Performance -> Environmental Innovation	1.258	0.028	43.817	0.000	H1 Supported
Insider Ownership -> Environmental Innovation	0.017	0.024	0.710	0.477	H2 Not Supported
Institutional Ownership -> Environmental Innovation	0.014	0.018	0.778	0.436	H3 Not Supported

The results of the hypothesis test regarding the connection between ownership structure, environmental innovation, and CSR performance are shown in Table 3. With a high coefficient value of 1.258 and a t-statistic of 43.817 with a probability value of 0.000, the results demonstrate that CSR performance has a strong and statistically significant positive impact on environmental innovation. This finding demonstrates that companies that do better in terms of corporate social responsibility are more likely to engage in environmental innovation. As a result, Hypothesis 1 is validated, suggesting that CSR is essential for promoting environmentally responsible innovation in businesses.

In contrast, insider ownership does not have a significant effect on environmental innovation, as shown by a very small coefficient value of 0.017, a t-statistic of 0.710, and a probability value of 0.477, which is above the significance threshold. Similarly, institutional ownership also shows no significant effect on environmental innovation, with a coefficient of 0.014, a t-statistic of 0.778, and a probability value of 0.436. These results indicate that both ownership structures fail to provide sufficient influence in encouraging firms to adopt environmental innovation practices. Therefore, Hypothesis 2 and Hypothesis 3 are not supported.

Insider ownership and institutional ownership do not have statistically significant benefits on environmental innovation; only CSR performance does, as Table 3 illustrates. This implies that company behavior focused on sustainability is more strongly influenced by CSR involvement than by ownership structure. The results show that governance systems by themselves might not be enough to promote environmental innovation unless they are coupled with a firm's strong commitment to corporate social responsibility.

The moderation test results that look at how CEO narcissism affects CSR performance, ownership structure, and environmental innovation are shown in Table 4. With a coefficient of -0.002, a t-statistic of -0.375, and a probability value of 0.707, the findings demonstrate that the indirect impact of CSR performance on environmental innovation through CEO narcissism is not significant. This suggests that the relationship between CSR performance and environmental innovation is not substantially impacted by CEO

narcissism. As a result, Hypothesis 4 is refuted, indicating that CEO narcissistic characteristics do not influence CSR-driven environmental innovation.

Table 4. Moderation Test

Paths	Coefficient	Std. Error	t-statistic	Prob	Conclusion
CSR Performance * CEO Narcissism-> Environmental Innovation	-0.002	0.005	-0.375	0.707	H4 Not Supported
Insider Ownership * CEO Narcissism-> Environmental Innovation	-0.035	0.013	-2.697	0.007	H5 Supported
Institutional Ownership* CEO Narcissism-> Environmental Innovation	-0.035	0.013	-2.705	0.007	H6 Supported

With a coefficient of -0.035, a t-statistic of -2.697, and a probability value of 0.007, insider ownership, on the other hand, exhibits a strong moderating influence through CEO narcissism. With a probability value of 0.007, a t-statistic of -2.705, and a coefficient of -0.035, institutional ownership likewise exhibits a strong moderating influence. These results show that CEO narcissism has a substantial impact on environmental innovation through interactions with institutional and insider ownership. Consequently, Hypotheses 5 and 6 are validated.

These findings imply that CEO narcissism has a greater influence on how ownership structure affects environmental innovation than it does on CSR-based programs. While CSR performance operates independently of CEO personality traits, governance-related mechanisms such as ownership structure are more sensitive to leadership characteristics. This emphasizes how crucial it is to take top executives' actions into account when examining how corporate governance affects environmental innovation.

DISCUSSION

The findings indicate that CSR performance has a positive and significant effect on environmental innovation, suggesting that firms with stronger CSR commitments are more likely to adopt eco-friendly innovations. This result is consistent with prior studies by Chu et al. (2023), Kapil and Kumar (2023), and Bonsu et al. (2024) showing that CSR engagement promotes environmentally sustainable practices. It also aligns with Zhou et al. (2022), who emphasize that CSR drives innovation in products, processes, and technologies supporting sustainability. In the Indonesian context, this relationship is strengthened by governance quality and stakeholder accountability (Wati & Malik, 2021). CSR functions as a strategic driver of proactive environmental initiatives, including emission reduction, waste management, and renewable energy adoption (Zhou et al., 2024).

In contrast, insider ownership shows a negative but not significant effect on environmental innovation. This indicates that insider ownership alone does not effectively promote sustainability-oriented innovation. This finding is consistent with Seaborn et al. (2020) and Gao et al. (2023), who highlight that insider-controlled firms often prioritize short-term financial performance over long-term environmental investment. Similarly, Qu and Pan (2023) and Liu et al. (2024) suggest that misalignment between managerial priorities and sustainability goals can hinder environmental innovation. This result also supports Shui et al. (2022) and Hao et al. (2023), who emphasize that insider-dominated firms may lack the external perspectives and long-term orientation needed for green innovation. Moreover, this finding contrasts with the argument that ownership concentration improves firm outcomes, as studies such as Xie et al. (2022) show that strong insider control may instead reduce incentives for sustainable investment. Compared to state ownership, which is often more supportive of green innovation, insider ownership appears less effective in driving environmental initiatives (Roud & Thurner, 2018).

Similarly, institutional ownership exhibits a negative and nonsignificant effect on environmental innovation. This suggests that institutional investors do not necessarily play a decisive role in encouraging green innovation. This finding is consistent with Andriosopoulos et al. (2022) and Ellimäki et al. (2024), who find that institutional ownership does not significantly influence environmental innovation or market valuation of green initiatives. It also aligns with Shui et al. (2022), who argue that institutional investors may prioritize short-term returns over long-term research and innovation. However, this finding partially contrasts with Zhao et al. (2023), who suggest that certain types of institutional investors, particularly dedicated ones, may encourage green innovation, while transient investors have no significant effect. Additional explanations are supported by Cao and Chen (2019), Javeed et al. (2022), and Liu et al. (2024), who emphasize that differing interests between investors and management, as well as limited environmental expertise, may weaken the role of institutional ownership in sustainability initiatives. Furthermore, external factors such as regulation and resource efficiency may play a more dominant role than ownership structure (Roud & Thurner, 2018).

Regarding moderating effects, CEO narcissism shows a negative and nonsignificant moderation in the relationship between CSR and environmental innovation. This finding contrasts with Xu et al. (2023a), which suggests that narcissistic CEOs often seek visibility through CSR-related activities, but in this case, such tendencies do not significantly influence the CSR–innovation link. However, CEO narcissism demonstrates a significant moderating effect on both insider and institutional ownership relationships with environmental innovation. This finding is consistent with García-Sánchez et al. (2020) and Xu et al. (2023b), who suggest that narcissistic CEOs may leverage environmental innovation to enhance personal reputation and firm image. It also aligns with Javeed et al. (2021) and Javeed et al. (2022), indicating that CEO characteristics can shape how ownership structures influence strategic decisions. These results highlight that behavioral traits of top executives act as important boundary conditions in explaining variations in environmental innovation outcomes.

Among control variables, firm size and firm age show positive and significant effects, while leverage shows a negative and non-significant effect on environmental innovation. These findings are consistent with Tang (2022) and Pareek et al. (2023), who argue that larger and older firms are more likely to engage in sustainability initiatives due to greater resources and stakeholder pressure. Meanwhile, the insignificant role of leverage aligns with Jouber (2021) and Alshirah and Alshira'h (2024), suggesting that highly leveraged firms may face constraints in allocating resources for environmental innovation.

CONCLUSION

The findings indicate that CSR performance plays an important role in encouraging environmental innovation, while ownership structures alone are not sufficient unless supported by leadership characteristics. CEO narcissism provides a behavioral lens that helps explain how executive traits influence the effectiveness of governance mechanisms in driving sustainability strategies. This study contributes an integrated framework that combines CSR, ownership structure, and CEO behavioral traits in explaining environmental innovation. Unlike prior studies that tend to examine these factors separately, the findings highlight that environmental innovation is shaped not only by structural governance factors but also by psychological characteristics of top executives. This enriches the literature on corporate sustainability by linking governance mechanisms with behavioral agency perspectives.

The results suggest that firms should align ownership structures with leadership characteristics to enhance sustainability outcomes. CEOs with narcissistic traits may be more responsive to external recognition and visibility, which can be leveraged to support green initiatives. Therefore, effective sustainability policies should consider both governance arrangements and executive behavior to strengthen environmental innovation and corporate competitiveness. This study has several limitations. It relies on secondary data, which may not fully capture dynamic corporate conditions. CEO narcissism is

measured using proxy indicators from annual reports, which may not fully reflect actual psychological traits. In addition, other important factors such as organizational culture, regulatory pressure, and industry dynamics are not included in the model. Future research is encouraged to incorporate additional contextual variables, such as organizational culture and regulatory environments, to provide a more comprehensive explanation of environmental innovation. Qualitative approaches, such as executive interviews, could also offer deeper insights into leadership behavior. Furthermore, longitudinal and cross-country studies are recommended to improve the generalizability of the findings.

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