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CEO integrity and firm SDGs disclosure: the mediation role of firm's reputation and the moderating role of country SDG performance

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Abstract

Purpose – Building on upper-echelon and institutional theories, this study aims to investigate the relationship between CEO integrity and corporate sustainable development goals (SDGs) disclosures. It focuses on the mediating role of business reputation and the moderating influence of country-level competitiveness (HC-C).

Design/methodology/approach – The study is based on a comprehensive data set of 3,588 firm-year observations from Fortune-listed businesses from 2016 to 2023. It uses a multilevel generalized linear mixed-effects model with Heckman's two-step adjustments to control endogeneity.

Findings – The study yields a significant finding: CEO integrity is a key driver of enhanced SDG disclosures, with business reputation playing a crucial mediating role. Moreover, home country competitiveness (HC-C) strengthens the relationship between CEO integrity and corporate SDG disclosures, suggesting practical implications for firms operating in different contexts in different countries.

Practical implications – The research offers valuable insights into how firm reputation intervenes in the relationship between CEO integrity and SDG disclosure. It also provides a deeper understanding of how country-level competitiveness augments this relationship, empowering firms to make informed decisions when operating in different countries.

Originality/value – This study significantly contributes to the Upper echelon theory, which states that senior executives' traits strongly influence organizational outcomes, making CEO integrity especially important. It also contributes to the institutional theory by arguing that legal frameworks and social norms shape firms' strategic choices.

Keywords Upper-echelon theory, Institutional theory, CEO integrity, SDG disclosures, Firm reputation, Country-level competitiveness

Paper type Research paper

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1. Introduction

Corporations worldwide prioritize sustainability due to the increased demand for ethical governance and honest corporate reporting. Sustainable development goals (SDGs), one of the UN's most important sustainability programs, influence global business (Ramos *et al.*, 2022). Businesses share their alignment with SDGs to demonstrate their sustainability efforts. Internal and external factors determine how frequently firms disseminate this information. Corporate ethics have been influenced by transparency, notably in sustainability reporting. 17 United Nations (UN) SDGs were set in 2015 to reduce poverty, promote responsible consumerism and balance economic progress and environmental sustainability by 2030 (Rosamartina *et al.*, 2022). These goals assist companies in aligning operations, strategies and disclosures with global sustainability standards. SDG disclosures may demonstrate sustainable efforts to stakeholders (Rao *et al.*, 2022). Evidence suggests that SDG disclosures boost stakeholder trust and firm reputation (Ramos *et al.*, 2022; Rosamartina *et al.*, 2022). This research shows how leadership attributes, corporate reputation and external institutional variables affect SDG disclosures, unlike previous studies that treated them as static or driven only by legal or market forces. By adding firm reputation as a mediating variable and country-level competitiveness as a moderator, the research builds on previous research but distinctively links microlevel leadership attributes to macro-level institutional contexts, filling gaps in understanding SDG disclosure practices' multifaceted determinants.

CEO integrity and SDG investments are understudied but vital to company strategy (Pham and Tran, 2020). As a company's most powerful figure, the CEO's decisions affect sustainability. SDG investments can be expensive and take time to pay off, but CEOs with strong morals are more likely to support them. CEOs often hesitate to invest in sustainable projects due to financial pressure. However, an ethical and socially responsible CEO knows that investing in SDGs pays off in reputation, customer loyalty and risk mitigation (Pham and Tran, 2020). These CEOs know that sustainable practices can fuel innovation and open new markets, establishing their companies as forward-thinking in a rapidly changing global environment. Integrity-driven CEOs also promote sustainable company cultures (Connelly *et al.*, 2016; Gala and Kashmiri, 2022). They can motivate stakeholders and employees to support the company's mission, thereby creating a shared purpose. This commitment boosts staff engagement and attracts ethical customers. Morality can also help manage stakeholder expectations (Connelly *et al.*, 2016; Pham and Tran, 2020). A responsible CEO can use SDG investments to gain a competitive edge as consumers and investors demand accountability and transparency. In an age where sustainability is vital, such executives position their firms to succeed by prioritizing long-term value creation over short-term gains (Gala and Kashmiri, 2022). Thus, CEO integrity and SDG relationships are critical for firms operating around the globe.

The corporate role is vital in SDGs accomplishments, and research needs to explore the role of the CEO in SDGs (Liu and Lu, 2021). However, the relationship between CEO integrity and SDG disclosures relates to factors like firms' reputation and the country-level role of SDGs. Firm repute may intervene in the relationship between CEO integrity and SDG disclosures (Connelly *et al.*, 2016). When a CEO makes ethical decisions and is socially responsible, the firm's reputation improves (Zhang *et al.*, 2021). Positive reputations foster transparent and comprehensive SDG disclosures. Since ethical CEOs promote transparency, their companies are more likely to report fairly. This builds stakeholder trust, encouraging corporations to reveal sustainability activities and support the SDGs. A good reputation attracts customers and investors and encourages the company to report ethically (Liu and Lu, 2021; Zhang *et al.*, 2021).

In addition, a good reputation can boost SDG disclosures. Integrity and financial performance may improve when stakeholders support and engage with trusted organizations (Liu and Lu, 2021). Therefore, the relationship between CEO honesty, corporate reputation and SDG disclosures is important. Integrity improves reputation, which drives sustainability, openness and responsibility, benefiting the firm and society.

Another important aspect is the environment in which these firms operate. Firms in competitive nations must follow stringent laws and ethics. Due to rising expectations, companies practice sustainability and declare SDG contributions. Ethical CEOs promote sustainability because it aligns with their values and meets the needs of a more selective market. Competitive nations foster business practices that are essential to success. Businesses are encouraged to innovate and adopt sustainable methods to improve SDGs disclosures. Strong competition encourages firms, governments and civil society to interact, boosting sustainability reporting, transparency and accountability. In countries with lower competitive performance, firms may have fewer ethics incentives, lowering CEO integrity's impact on SDG disclosures. Therefore, competitive pressure may serve as a moderator in the context of our study.

Thus, we explore the impact of CEO integrity on SDG disclosures, with a mediating role of firm reputation and a moderating role of country-level competitiveness. The research gap allows us to determine the precise role, intervention and interaction of these variables to promote research on this area, which needs considerable attention from researchers, policymakers and other stakeholders to advance the global SDG agenda. The results show that CEO integrity and corporate reputation are major mediators of SDG disclosures. The research also finds that CEO integrity has a greater influence on SDG disclosures in more competitive institutional environments due to country-level competition. In organizations with strong institutional structures and stakeholder expectations, ethical leadership promotes transparency, accountability and global sustainability objectives.

The study advances the literature by exploring corporate sustainability research's theoretical and empirical limits. It supports upper-echelon theory by showing how CEO integrity affects sustainability and institutional theory by showing how external competition affects organizational behavior. The new way of providing weighted scores to SDGs instead of binary categories allows for more detailed business sustainability analysis. These findings enhance our knowledge of ethical leadership and institutional contexts' strategic value and provide the groundwork for corporate governance and sustainability studies. Specifically, our research makes several contributions to the existing SDG literature. First, it measures firm-level SDG scores by assigning a value that creates novelty in the existing literature. So far, empirics have used a dummy approach to assign scores, leaving the intensity of efforts unaddressed. Relying on earlier research, we assign value to each SDG according to the practical effort, which is a novelty in existing literature. Second, we show the relevance of upper-echelon attributes (CEO integrity) in determining the level of SDG disclosures. Our results show that the CEO role is vital in promoting SDG at firm levels. Third, firms' repute is explored as an intervening variable, as highly ranked firms often follow a track to enact their identity globally. These firms prefer their reputations over financial gains, or maybe their repute adds to their financial rewards. Fourth, country-level competitiveness is used as a moderating variable. The firms abide by the rules and norms in their society. Therefore, country-level competitiveness sets a tone of ethical behavior influencing firms' strategic choices.

The rest of the paper is organized as follows: Section 2 discusses the paper's theoretical framework and effectively integrates upper-echelon and institutional theories, providing a robust conceptual basis for the hypotheses. Section 3 describes methodological outlines, a

comprehensive and rigorous approach using a large data set and advanced statistical techniques, while Section 4 offers the results. Section 5 compares the findings to the literature and explores theoretical and practical implications, offering actionable insights for managers, policymakers and researchers.

2. Literature review

2.1 Theoretical framework

Upper echelons theory states that senior executives' traits strongly influence organizational outcomes, making CEO integrity particularly important (Adhariani *et al.*, 2024; Khan *et al.*, 2023; Bhaskar *et al.*, 2023). A CEO with integrity fosters a culture of ethics and responsibility, which helps firms achieve SDGs. This ethical leadership sets the tone for the firm and influences decision-making, encouraging staff to work toward sustainability goals. Integrity-focused CEOs describe their environmental efforts more honestly. Transparency builds trust among employees, investors and customers, boosting the firm's reputation (Wangrow *et al.*, 2015; Pham and Tran, 2020; Khan *et al.*, 2024). An ethical CEO may also promote teamwork and sustainability by instilling a feeling of purpose. A solid moral foundation can also assist the organization in handling regulatory and stakeholder expectations, making it a sustainability leader. In an increasingly sustainability-conscious market, CEO integrity drives SDGs and affects the firm's policies and long-term profitability.

Second, institutional theory argues that legal frameworks and social norms shape companies. CEO integrity significantly affects firm-level SDG disclosures (Fan *et al.*, 2021; Zhang *et al.*, 2022). Competitive countries have stricter laws and higher sustainability requirements for firms. A CEO with integrity is more likely to follow these norms, promoting SDG reporting openness and accountability (Mousa *et al.*, 2023). This association with institutional forces boosts the firm's reputation and assures legal and ethical compliance, placing it as a worldwide sustainability leader (Bhuiyan *et al.*, 2023). Hence, the study integrates the upper echelons and institutional theories to explore the impact of CEO integrity on SDG disclosures.

2.2 Hypotheses development

2.2.1 CEO integrity and firm sustainability disclosures. CEO integrity raises a company's SDG investment as these leaders perceive them as strategic options rather than responsibilities. Strong ethical CEOs focus on long-term value development over short-term financial benefits (Ongsakul *et al.*, 2021). This dedication is crucial when investing in SDGs, which may entail large initial investments with delayed returns. A trustworthy CEO knows that investing in SDGs boosts the company's brand and meets stakeholders' growing expectations, including consumers, investors and regulators. Ethical CEOs taking measured risks in these areas fosters a sustainable and responsible company culture. These leaders also pledge transparency in SDG investment financial reporting (Bao *et al.*, 2024; Ongsakul *et al.*, 2021). They know they must disclose their sustainability efforts to show their true impact. Building stakeholder trust requires ethical disclosure. Ethical CEOs comply with regulations and demonstrate accountability by giving accurate and complete SDG investment information, reinforcing their sustainability commitment (Gala and Kashmiri, 2022; Ongsakul *et al.*, 2021; Pham and Tran, 2020). Lack of integrity can lead to financial reporting manipulation, damaging the organization's credibility. Unethical CEOs may falsely portray their sustainability efforts, endangering reputation and stakeholder trust. Long-term legal and investor confidence issues can result from such activities. Integrity-driven CEOs prioritize stakeholder engagement because genuine collaboration can boost corporate social responsibility (CSR), including SDG investments (Ongsakul *et al.*, 2021).

In conclusion, CEO integrity influences a firm's SDG investment, urging CEOs to consider these activities as ethical strategic decisions. Ethical CEOs enhance sustainable credibility by advocating transparent financial reporting. However, the literature provides no evidence to support this view. This approach benefits the corporation and helps achieve societal and environmental goals, producing a more sustainable future. Therefore, we propose a positive impact of CEO integrity on SDG:

H1. CEO integrity positively influences the quality of firm SDG disclosures.

2.2.2 Firm reputation as a mediator. Intangible assets like corporate reputation impact sustainability reporting. Strong-reputation corporations are more transparent and socially responsible under stakeholder scrutiny. Firms with strong reputations demonstrate integrity and sustainability to stakeholders (Pham and Tran, 2020; Rosamartina *et al.*, 2022; Zhang *et al.*, 2021). Reputed companies are more likely to disclose SDGs to maintain or strengthen their image with investors, customers and regulators (Liu and Lu, 2021). The literature ties CEO integrity to firm reputation. CEO ethics shape and maintain a firm's reputation. Stakeholders value ethical CEOs' transparency, accountability and responsibility. Positive feedback strengthens the firm's reputation, encouraging more thorough and accurate SDG disclosures (Ongsakul *et al.*, 2021). Reputed firms are also more conscious of public environmental needs and disclose sustainability more openly. It suggests reputation mediates CEO integrity and SDG disclosures (Maaloul *et al.*, 2023; Minor and Morgan, 2011; Pham and Tran, 2020; Rehman *et al.*, 2020). Ethical CEOs urge the business to report extensively on sustainability to improve its image. Integrity-driven CEOs promote transparency and responsibility, boosting company image (Liu and Lu, 2021). This study's content analysis suggests that high-reputation organizations disclose more SDGs (Mahesar *et al.*, 2023):

H2. Firm reputation positively mediates the relationship between CEO integrity and the quality of SDG disclosures.

2.2.3 Home country competitiveness as a moderator. We proposed that the relationship between CEO integrity and firm-level SDG disclosures is moderated by home country competitiveness. In competitive nations, stakeholders want more transparency and responsibility from corporations' sustainability activities (Carney *et al.*, 2017). A CEO with good integrity is more likely to respond to these challenges by making robust SDG disclosures, realizing that ethical actions improve the firm's brand and align with the competitive situation. Competitive environments have stricter regulations and societal values that value business responsibility (Sadaf *et al.*, 2018; Vendrell-Herrero *et al.*, 2022). Integrity becomes a strategic and ethical imperative in this ecosystem. CEOs are encouraged to fulfill or surpass these criteria, making SDG reporting transparency essential to their leadership. Corporations may face less regulatory monitoring and public expectations in less competitive countries. In such situations, SDG disclosure pressure may decrease (Sadaf *et al.*, 2018), limiting CEO integrity's impact on reporting. CEOs may promote ethical leadership (Vendrell-Herrero *et al.*, 2022), but without external accountability, they may be less motivated to disclose comprehensive SDGs. However, firms with greater market power may impede the pressure exerted by country-level competitiveness. Further, we do not have empirical evidence to support this view. Thus, we propose the moderating role of home country competitiveness.

H3. Country competitiveness positively moderates the relationship between CEO integrity and the quality of SDG disclosures, which is stronger in countries with higher SDG performance.

3. Data and methodology

3.1 Data

Our sample selection process is a precise endeavor, primarily based on the Fortune World Most Admired (FWMA) list, a reputable source for our data. The data collection method involves three steps. First, we manually collected firm names, industries and headquarters nations from Fortune-listed FWMA firms from March 2016 to March 2024. We then used the 2016–2024 annual surveys, finalizing the list by preserving only active public companies as of March 2024. The second stage involved personally collecting Fortune website data on each firm's global reputation and financial soundness rankings, from 1 to 17. From 2016 to 2024, Bloomberg provides annual data on sales revenue, return on assets (ROA), return on equity (ROE), chief executive officer (CEO) perks, the percentage of independent directors on the board, total assets, net income, expenses, debt to equity ratio and other financial data for Tobin's Q ratio and employee numbers.

Our comprehensive data set provides a rich information source for our analysis. We check CEO duality using company financial reports after removing missing data. The process led us to 3,588 firm-year observations from 833 Fortune-classified corporations in 30 industries from 2016 to 2024. This data set is unbalanced. We then manually collect the institution's annual score and each country's auditing and reporting norms from the World Economic Forum's Global Competitive Reports. Since 2006, Global Competitveness Report (GCR) has evaluated 125 economies' competitiveness annually. Global Competitveness Report (GCR) examines each country's public and commercial institutions using 22 indicators. Executives who participated in the Global Competitveness Report's (GCR's) yearly survey on those components of the institution in each country determined the score. Each institution pillar feature was scored on a seven-point Likert scale, 1 for lowest and 17 for highest. A weighted score of institution pillar aspects determines the overall institution score.

3.2 Methodology

3.2.1 CEO integrity. Our analysis relies on CEO integrity literature, a relatively new but important field. CEO integrity is not just crucial; it is a cornerstone of effective corporate decision-making. Most attempts to quantify CEO integrity use employee surveys (Engelbrecht *et al.*, 2017). This method has two major drawbacks. First, employees' assessments of their bosses make the data less objective. Second, cross-sectional surveys are common. This cross-sectional data cannot reflect changes in CEO integrity over time, such as a CEO transition or awareness and attitude. The ethical leadership idea states that CEOs with integrity have strong morals. CEOs like this are likely to capture and filter the ethical aspects of a decision-making situation, process them carefully and base their corporate judgments on ethics. These CEOs also serve their organization well. Opportunistic CEOs with low integrity would act differently, and their opportunistic actions cost shareholders. The asset utilization ratio (annual sales divided by total assets) and expenditure efficiency ratio (annual sales divided by expenses) measure agency costs (Wan *et al.*, 2020). The first ratio measures the firm's asset deployment, and the second examines cost control, including excessive perquisite usage and other direct agency expenditures. Using corporate assets to create sales efficiently is shown by the asset utilization ratio (sales-to-asset ratio). This ratio measures "the loss in revenues attributable to inefficient asset utilization, which can result

from poor investment decisions or management's shirking (e.g. exerting too little effort to help generate revenue)" (Wan *et al.*, 2020). Lower asset utilization ratios indicate poor investment selections (Henry, 2010). Thus, asset utilization ratios imply managerial quality or efficiency. Management efficiency is also shown by expenditure efficiency.

Agency cost metrics can be applied to proxy CEO integrity (Pham and Tran, 2020). This research has defined managerial integrity as managers' capacity and integrity, fidelity and moral courage to do things for their firm, which may impact management efficiency. Internal and external control elements might affect management efficiency and the CEO's ability and integrity. Agency theorists believe the board's main job in corporate governance is to monitor managerial decision-making and performance (Gala and Kashmiri, 2022). An effective board monitors management to meet the company's best interests (Pham and Tran, 2020). More outside/independent directors are less likely than insiders to cooperate with management to expropriate residual claims, making them stronger supervisors (Gala and Kashmiri, 2022). Thus, board independence (BI) – the proportion of independent directors – may improve managerial decisions and efficiency. At country-level governance, Pham and Tran (2020) propose that a culture of compliance with norms and regulations minimizes legal liability for illegal behavior and enhances [legal] responsibility (Gala and Kashmiri, 2022). An effective external control system, such as comprehensive auditing and reporting standards, can improve compliance, reduce opportunistic behavior and improve management efficiency. Thus, the auditing and reporting standards of a firm's operating country influence management efficiency. Management efficiency depends on the CEO's ability and integrity, internal governance (e.g. BI) and external control.

Given that CEO competency is constant, CEO integrity, BI and auditing and reporting standards in a firm's home nation may affect managerial efficiency simultaneously. These three components interact to determine management efficiency when other aspects remain constant. Thus, CEO integrity, BI and a nation's auditing and reporting standards affect management efficiency:

$$M - E_{i,t} = f\,CEO - Integrity_{i,t} * B - independence_{i,t} * Strength\ of\ auditing\ \&\ reporting\ standard_{i,t} \quad (1)$$

Equation (1), $M - E_{i,t}$ Represents managerial efficiency of a firm i in year t. CEO integrity is also dependent on managerial efficiency. We use the following equation to estimate CEO integrity.

$$CEO - Integrity_{i,t} = r\left({}^{M - E_{i,t}}\Big/_{B - independence_{i,t} * Strength\ of\ auditing\ \&\ reporting\ standard_{i,t}}\right) \quad (2)$$

We evaluate corporate governance (BI) and external control (a nation's auditing and reporting rules) using (Ain *et al.*, 2021) agency cost indicators to proxy for CEO integrity. We also created a second proxy for CEO integrity components and the preceding metrics. Executive perks are often cited in the literature as exemplifying the agency problem. Perks are nonmonetary rewards given to managers, such as an executive jet, chauffeur-driven car, shiny office or luxury paid vacation. CEO benefits can help managers use company money (Ain *et al.*, 2021). Managers can do so since outsiders cannot see perks, and shareholders undervalue them. A visionary CEO who helps the firm make a high income is entitled to an acceptable level of nonmonetary pay.

However, CEO perks should represent a legitimate proportion of the firm's profit. An opportunistic CEO demands disproportionate incentives compared to the firm's net

profitability. In contrast, a moral CEO would not use business funds for luxury. Thus, a firm's net income to CEO perks ratio may indicate CEO integrity. The high net income-to-CEO-perk ratio indicates a high-integrity CEO who helps the firm produce high net income while modestly collecting benefits. A low-integrity CEO has a low net income ratio per CEO perks, indicating that he/she says his/her benefits are excessive compared to the firm's net profit.

In this study, we measure CEO integrity with three indicators. Sales-to-asset ratio divided by BI and a nation's auditing and reporting rules yield CEO integrity 1. CEO integrity 2 is calculated by dividing revenues by operating expenses, BI and a nation's auditing and reporting regulations. Firm net income to CEO perks measures CEO integrity 3.

3.3 Measurement of quality of sustainable development goals reporting

We use a content analysis approach to manually score SDGs score. For this purpose, sustainability reports are used. Our content analysis involves creating an index or checklist of significant disclosure items. We then examine the reports to assess whether the companies have disclosed these items and, if so, the extent and quality of the information provided (Rao *et al.*, 2022). Content analysis involves using a checklist of necessary disclosure items and examining the reports to assess if companies have disclosed these items. It also evaluates the extent to which the items have been covered comprehensively. Since there is no internationally recognized framework for scoring SDGs reporting, we follow specific criteria to assign value to each score. We conducted content analysis for each SDG to assign value. To calculate the SDG quantity, sentences that pertain to the categories included in our disclosure index (refer to Table 1) were found and assigned scores accordingly. The process was executed manually on 10,214 reports, consisting of 6,714 annual and 3,500 sustainability reports.

In the content analysis approach, information was extracted from 10,214 reports. For prototype testing, 514 reports were used to address the SDG scoring biases. After matching the 514 reports, we found no difference in SDG scoring except for a minor negligible error, including typos and the repetition of reports twice. The goal was to identify any inconsistencies in scoring and assess whether any bias was present in the overall sample. Upon thorough analysis and comparison with the original scoring, the study determined no notable discrepancies in scoring biases. The decision to bring in a specialist to collect and analyze data was a strategic choice, motivated by the importance of obtaining accurate and dependable findings. By entrusting this task to a skilled expert, the researchers aimed to reduce the risk of subjective biases or errors that may occur from internal assessment

Table 1. Six-point scale for SDG reporting

Score	Description
0	No SDGs disclosure
1	General disclosure-1–2 sentences
2	Brief qualitative description – 3–5 sentences with no quantitative description
3	Detailed qualitative explanation – more than 5 sentences with no quantitative description
4	Quantitative disclosure with a brief description – 1–5 sentences with a quantitative description
5	Quantitative disclosure with detailed explanation – more than 5 sentences with a quantitative description

Source: Authors' own work

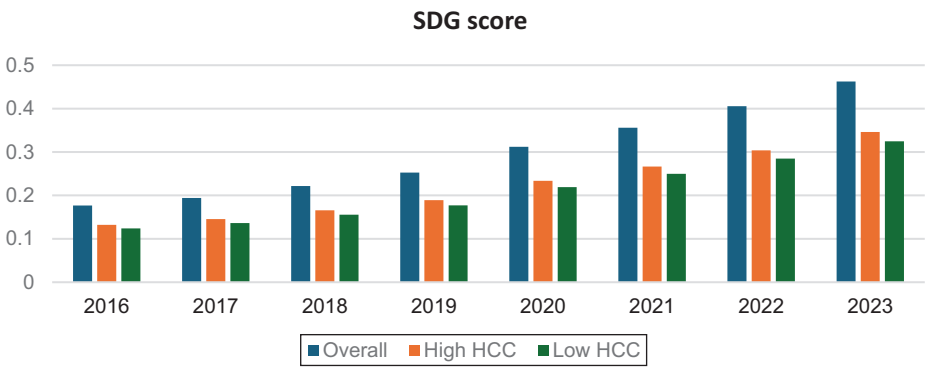
processes. After careful examination and comparison with the original scoring, the study concluded that there was no significant difference in scoring biases. Once the scoring bias was addressed, the member performed content analysis on the remaining 9,700 reports. In Figure 1, we provided SDG scores for three panels (overall, high HCC and low HCC). Our SDG score underlined important aspects of firms' reporting. The results show an increasing trend in SDG scores. The trend is also higher for highly competitive countries, as observed.

3.4 Firm reputation

The FWMA Companies and other rankings recognize companies for their ethical behavior, financial stability and global standing, which reinforce their sustainability practices (Carmeli and Tishler, 2005). Stakeholder perceptions and choices, including investment and customer loyalty, are influenced by corporate reputation, which is vital for stakeholder trust. Companies with good reputations attract investors and consumers who value ethics and openness (Lange *et al.*, 2011). To minimize reputational harm, organizations with excellent reputations are more inclined to disclose their sustainability (Larrinaga and Bebbington, 2021). This research uses industry rankings and external reputation evaluations like the FWMA list to examine organizations' ethical governance, financial soundness and sustainability policies. These rankings quantify how well a business is considered by its stakeholders, enabling examination of how corporate reputation affects SDG disclosure quality and scope. This study examines how a company's reputation affects its transparency and ethical governance, notably in sustainability reporting.

3.5 Control variables

This research uses control variables to examine the impact of CEO integrity and business reputation on SDG disclosures by accounting for other relevant aspects. Firm size, calculated as the natural logarithm of total assets, is controlled since larger businesses face greater stakeholder demand for openness and have more resources for sustainability reporting (Schaltegger *et al.*, 2022). Financial leverage – the ratio of total debt to total assets – is included because enterprises with larger leverage may prioritize financial stability above nonfinancial reporting (Jensen and Meckling, 2019). The natural logarithm of the firm's years is added since older businesses may have more developed reporting methods and greater governance expertise (Schaltegger *et al.*,



Source: Authors' own work

Figure 1. SDG score of sample firms

2022). Due to increasing worldwide sustainability criteria, international trade enterprises must limit their export ratio (Pham and Tran, 2020). Innovative firms are more likely to disclose sustainability efforts, so the environmental innovation index (EII) is included (Ramzan *et al.*, 2023; Rao and Kumar, 2024). Profitable enterprises are more inclined to invest in sustainability; hence, ROA is regulated (Schaltegger *et al.*, 2022). SD-sales, a sales deviation metric, captures business performance variability that may affect sustainability reporting consistency. Heckman's two-step adjustment uses Mill's ratio to account for sample selection bias, assuring robust findings (Gaur and Kesavan, 2015; Patel *et al.*, 2015). Corporate social responsibility scores are another control since companies with better [corporate social responsibility (CSR) records report more on sustainability. CEO duality – whether the CEO is the board chair – may impact sustainability reporting decision-making and supervision (Patel *et al.*, 2015). Given its significance in openness and accountability, BI is regulated. More frequent board meetings help the board manage sustainability (Kovermann and Velte, 2019). To account for macroeconomic variables affecting company behavior, GDP growth in the firm's native nation is regulated. The C-SDG score measures the home country's SDGs performance and external pressures on firms to meet national sustainability standards (Pham and Tran, 2020). Finally, host market size – the firm's operational market—is considered since more prominent marketplaces may attract more players.

3.6 Preliminary analysis

The descriptive statistics and correlation matrix highlight the linkages of the important variables in this study. As shown in Table 2 below, SDGs disclosures had a mean of 21.23 and a standard deviation of 2.58, suggesting reasonable reporting across enterprises. CEO integrity 1 (CEOI1) has a mean of −0.02 and a standard deviation of 0.57, indicating good Sales to asset ratio divided by BI across organizations. CEO integrity 2 has a mean of 0.69 and a standard deviation of 0.43, indicating good ethical leadership across organizations. CEO integrity 3 has a mean of 27.0 and a standard deviation of 9.32, indicating good firm net income to CEO perks across organizations.

Firm reputation (FR) correlates positively with SDG disclosures ($r = 0.42$, $p < 0.01$), emphasizing its significance in sustainability reporting (mean = 0.67). Home Country Competitiveness (HC-C) correlates with SDGD ($r = 0.39$, $p < 0.01$) and CEO integrity ($r = 0.28$, $p < 0.01$), showing that enterprises in competitive home countries exhibit stronger leadership integrity and SDG disclosures. Other notable relationships include firm size and financial leverage. SDG disclosures correlate with business size ($r = 0.27$, $p < 0.01$), indicating that larger enterprises participate in full sustainability reporting. Financial leverage adversely correlates with a business reputation ($r = -0.08$, $p < 0.05$), suggesting that greater debt levels may hinder reputation maintenance owing to financial constraints restricting sustainability activities. The EII positively correlates with SDG disclosures ($r = 0.41$, $p < 0.01$), indicating that firms with more environmental innovations disclose more comprehensive sustainability information, highlighting the role of innovation in corporate responsibility.

ROA is positively connected with SDGD ($r = 0.19$, $p < 0.01$) and company reputation ($r = 0.22$, $p < 0.01$), indicating that financially successful enterprises prioritize sustainability and have better reputations. Sales variation (SDS) is inversely connected with SDG disclosures ($r = -0.08$, $p < 0.05$), suggesting less consistency in sustainability reporting among enterprises with fluctuating sales. Mill's ratio, which controls for sample selection bias, positively correlates with SDGD ($r = 0.17$, $p < 0.01$), indicating that correcting selection bias enhances observed associations. We used the Two-step Heckman approach to calculate the Mills ratio for each top management team (TMT) composition construct (see Appendix 1). Strong governance procedures enhance sustainability transparency, as BI and board meeting

Table 2. Descriptive statistics and correlation matrix

Variable	Mean	SD	SDGD	CEOI1	CEOI2	CEOI3	FR	HC-C	CSDGS	FS	FL
SDGD	21.23	2.58	1.00								
CEO integrity 1	−0.02	0.57	0.36**	1.00							
CEO integrity 2	0.69	0.43	0.29**	0.28**	1.00						
CEO integrity 3	27.0	9.32	0.22**	0.12**	0.24**	1.00					
Firm reputation	0.67	0.2	0.42**	0.49**	0.43**	0.35**	1.00				
HC-C	0.64	0.14	0.39**	0.28**	0.25**	0.20**	0.37**	1.00			
C-SDGS	0.58	0.19	0.33**	0.27**	0.24**	0.19**	0.29**	0.52**	1.00		
Firm size	5.71	0.52	0.27**	0.23**	0.20**	0.16**	0.30**	0.22**	0.21**	1.00	
Financial leverage	0.32	0.08	0.11**	0.14**	0.12**	0.10**	−0.08*	0.19**	0.16**	0.17**	1.00
Firm age	3.23	0.61	0.18**	0.13**	0.12**	0.09**	0.21**	0.19**	0.20**	0.22**	0.14**
ER	0.25	0.17	0.15**	0.18**	0.16**	0.13**	0.20**	0.22**	0.19**	0.23**	0.11**
EII	0.54	0.23	0.41**	0.29**	0.26**	0.21*	0.39**	0.33**	0.29**	0.27**	0.10**
ROA	0.08	0.03	0.19**	0.16**	0.14**	0.11**	0.22**	0.17**	0.20**	0.24**	0.12**
SDS	0.21	0.11	−0.08*	0.11**	0.10**	0.08*	−0.09*	−0.07*	0.12**	0.13**	0.14**
Mill ratio	0.14	0.05	0.17**	0.11**	0.10**	0.08**	0.21**	0.19**	0.17**	0.16**	−0.09*
CSR-S	0.63	0.21	0.38**	0.36**	0.32*	0.26**	0.40**	0.34**	0.32**	0.26**	−0.08*
CEO-D	0.22	0.39	−0.02	−0.07*	−0.06*	−0.05*	−0.03	−0.05	−0.07*	0.10**	0.15**
B-independence	0.64	0.13	0.18**	0.20**	0.18**	0.14**	0.22**	0.23**	0.19**	0.18**	−0.09*
BMF	5.94	1.17	0.21**	0.18**	0.16**	0.13**	0.20**	0.22**	0.17**	0.23**	−0.07*

Notes: Pearson correlation matrix is used for the correlation test. * and ** are represented by $p < 0.05$ and $p < 0.01$. VIF represents variance inflation factor
Source: Authors' own work

(*continued*)

Table 2. Continued

Variable	FA	ER	*EII*	*ROA*	*SDS*	*MillR*	*CSRS*	*CEOD*	*BI*	*BMF*
SDGD										
CEO integrity 1										
CEO integrity 2										
CEO integrity 3										
Firm reputation										
HC-C										
C-SDGS										
Firm size										
Financial leverage										
Firm age	1.00									
ER	0.12**	1.00								
EII	0.18**	0.21**	1.00							
ROA	0.11**	0.14**	0.16**	1.00						
SDS	−0.09*	0.11**	−0.10*	0.18**	1.00					
Mill ratio	0.15**	0.13**	0.19**	0.18**	0.13**	1.00				
CSR-S	0.20**	0.18**	0.35**	0.21**	−0.09*	0.22**	1.00			
CEO-D	−0.08*	0.05	−0.03	−0.02	0.03	−0.04	0.16**	1.00		
B-independence	0.13**	0.11**	0.17**	0.16**	−0.08*	0.19**	0.15**	0.22**	1.00	
BMF	0.21**	0.18**	0.25	0.22	−0.08*	0.17**	0.20**	0.18**	0.38**	1.00

frequency (BMF) are positively connected with SDG disclosures ($r = 0.18$, $p < 0.01$ and $r = 0.21$, $p < 0.01$, respectively). These connections reflect the study's theoretical framework, showing that CEO honesty, business reputation, home country competitiveness and governance affect SDG disclosure quality. In competitive home countries, enterprises with ethical leadership, strong reputations and solid governance systems are more likely to disclose sustainability transparently and responsibly.

3.7 Estimation approach

Each pair of predictors' correlation coefficients and variance inflation factors (VIF) are examined to check multicollinearity. All VIFs are smaller than 5, significantly smaller than

Table 3. Multilevel generalized linear mixed-effects model with Heckman's two-step corrections

	1		2		3	
Factors	β	S/E	β	S/E	B	S/E
Financial control factors						
Firm size (logs)	0.144**	[0.069]	0.147**	[0.072]	0.145**	[0.068]
Financial leverage	−0.088*	[0.048]	−0.084*	[0.044]	−0.081*	[0.045]
Firm age (logs)	0.167**	[0.055]	0.170**	[0.078]	0.168**	[0.079]
Exports ratio	0.135**	[0.053]	0.132**	[0.064]	0.139**	[0.065]
Environment innovation index	0.280***	[0.132]	0.281***	[0.137]	0.278***	[0.136]
ROA	0.316***	[0.094]	0.319***	[0.155]	0.317***	[0.157]
SD-sales	−0.082**	[0.037]	−0.079**	[0.036]	−0.080**	[0.039]
Mill's ratio	0.162**	[0.049]	0.165**	[0.080]	0.164**	[0.082]
Company control factors						
CSR score	0.288***	[0.107]	0.274***	[0.110]	0.269***	[0.110]
Governance						
CEO duality	−0.005	[0.004]	−0.007	[0.005]	−0.007	[0.006]
Board independence	0.111*	[0.060]	0.099*	[0.052]	0.098*	[0.051]
Board meeting frequency	0.198**	[0.091]	0.170**	[0.086]	0.131**	[0.062]
Country level						
GDP growth	0.150**	[0.071]	0.112	[0.051]	0.119**	[0.051]
C-SDG score	0.344***	[0.159]	0.328***	[0.153]	0.339***	[0.156]
Host market size	0.132**	[0.097]	0.116**	[0.055]	0.125**	[0.051]
CEO integrity						
CEO integrity1	0.088*	[0.045]				
CEO integrity2			0.092*	[0.048]		
CEO integrity3					0.083*	[0.044]
Year dummy	Yes		Yes		Yes	
Sectorial dummy	Yes		Yes		Yes	
Developed market dummy	Yes		Yes		Yes	
Covid-19 dummy	Yes		Yes		Yes	
Log-likelihood	−1,454.21		−1,494.01		−1,317.17	
Tests of endogeneity (instrumented)	1.6545		1.5989		1.5754	

Notes: The presented values are the coefficient estimates, and robust standard errors were obtained from maximum likelihood regressions where we used an F-test of *H0*, where the variables were exogenous (DWH endogeneity test). *, ** and *** denote significance at the 10, 5 and 1 % levels, respectively. We also regressed the separate regression for each dummy to avoid the dummy trap. Our results showed robustness
Source: Authors' own work

the thread hold of 10, indicating that our data set does not have multicollinearity. The correlation matrix, VIF and descriptive values are provided in Table 3.

Second, we test our important predictors' endogeneity (Wooldridge, 2015). A variable is endogenous when correlated with a model's error term or when the independent and dependent variables are causally linked (Wooldridge, 2015). We examine whether CEO integrity and error terms are endogenous. Using SDG disclosures as dependent variables, we calculate the error term using residual value. We use Pearson correlation, OLS and fixed-effects estimations to explore the relationship between CEO integrity and the error term. Each residual has no significant association with CSR disclosure ($p > 0.05$).

As Wooldridge (2015) recommended, we use the Instrumental Variable Two-Stage Least Square regression approach to address the endogeneity problem of corporate social responsibility (CSR) in causality loops between independent and dependent variables. The Fortune rankings of a firm's financial soundness measure sound finance, which we use as the IV for CSR disclosure following Pham and Tran (2020). We used the Durbin (score) chi-squared test and Wu–Hausman F test to see if the IV addresses CSR disclosure endogeneity. These tests provide substantial p-values ($p > 0.1$); the exogenous regressor hypothesis cannot be discarded. The Wald test's first-stage regression summary statistics indicate a strong IV ($p < 0.05$). In addition, Sargan (score) and Baumann chi-squared tests ($p < 0.05$) show that our models lack overidentifying limitations (Ke, 2024; Kılıç and Kuzey, 2016). Therefore, the endogeneity issue is insignificant in our models.

4. Main findings

4.1 Direct effect

We used an instrumental approach to address the concern of endogeneity (Bascle, 2008). The results show that a firm's net income significantly impacts CEO integrity (see Appendix 2). We constructed a dummy for each measure of CEO integrity and regressed separate models for each construct. We conferred that a higher level of net income will likely increase CEO integrity. Once the first condition is satisfied, we precede the main regression. The findings of the multilevel generalized linear mixed-effects model and the second stage of the Heckman procedure are reported in Table 3. The model is adjusted for the endogeneity of the CEO integrity with the results of the Durbin Wu Hausman test (DWH) test (Bouaziz *et al.*, 2020). Notably, the DMH variable is not significantly associated with SDG disclosures (Bouaziz *et al.*, 2020). The findings indicate that endogeneity is controlled and does not cause biases in our models, and our selected instruments for the Heckman procedure are validated.

Control factors are included in each regression (see Table 3). The results show that CEO integrity significantly impacts SDG disclosure ($\beta = 0.088$ and $p < 0.10$; refer to column 1 in Table 3). The relationship is significant at a marginally acceptable level of 10%, thus supporting *H1a*. Likewise, the relationship is positive and statistically significant for CEO integrity2 ($\beta = 0.092$ and $p < 0.10$; refer to column 2 in Table 3) and CEO integrity3 ($\beta = 0.083$ and $p < 0.10$; refer to column 3 in Table 4). In addition, the coefficient estimates are also almost similar, implying that our three measures of CEO integrity provide identical results.

Importantly, we explore the impact of CEO integrity on SDGs disclosure over the nine-year panel data set, which captures before, during and after the COVID-19 period. So, the impact of CEO integrity is not only in the initial stages of strategic adoption of SDGs but also consistent during and after COVID-19. Hence, CEO integrity systematically influences SDG disclosure rather than in an ad hoc manner. COVID-19 positively influences SDG adoption in firms' strategic choices. We also used the COVID-19 dummy for the COVID-19 period (Haque *et al.*, 2022). Chief Executive Officer integrity is positively and substantially linked

Table 4. Mediation effect

	Dependent variable-firm reputation			Dependent variable-SDG disclosures		
	1	2	3	4	5	6
Factors	*β*	*β*	*β*	*β*	*β*	*β*
Financial control factors						
Firm size (logs)	0.250***	0.253***	0.251***	0.147**	0.150**	0.148**
Financial leverage	−0.092**	−0.088**	−0.085**	−0.090*	−0.086*	−0.083*
Firm age (logs)	0.174**	0.177**	0.175**	0.171**	0.174**	0.172**
Exports ratio	0.141***	0.138***	0.145***	0.138**	0.135**	0.142**
Environment innovation index	0.292***	0.293***	0.290***	0.286***	0.287***	0.284***
ROA	0.330***	0.333***	0.331***	0.323***	0.326***	0.324***
SD-sales	−0.086**	−0.082**	−0.084**	−0.084**	−0.081**	−0.082**
Mill's ratio	0.169**	0.172**	0.171**	0.166**	0.169**	0.168**
Company control factors						
CSR score	0.301***	0.286***	0.281***	0.294***	0.280***	0.275***
CEO duality	−0.008	−0.009	−0.011	−0.005	−0.007	−0.007
Board independence	0.116**	0.103**	0.102**	0.113*	0.101*	0.100*
Board meeting frequency	0.207**	0.177**	0.137**	0.202**	0.174**	0.134**
Country level						
GDP growth	0.157**	0.117**	0.124**	0.153**	0.114**	0.122**
C-SDG score	0.359***	0.342***	0.354***	0.351***	0.335***	0.346***
Host market size	0.138***	0.121***	0.131***	0.135**	0.119**	0.128**
CEO integrity						
CEO integrity1	0.212***			0.217***		
CEO integrity2		0.237***			0.205***	
CEO integrity3			0.217***			0.199***
Firm reputation				0.373***	0.316***	0.323***
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Sectorial dummy	Yes	Yes	Yes	Yes	Yes	Yes
Developed market dummy	Yes	Yes	Yes	Yes	Yes	Yes
Covid-19 dummy	Yes	Yes	Yes	Yes	Yes	Yes
Log-likelihood	−1,454.21	−1,494.01	−1,317.17	−1,121.44	−1,331.31	−1,065.50
Tests of endogeneity (instrumented)	1.6545	1.5989	1.5754	1.6545	1.5989	1.5759

Notes: The presented values are the coefficient estimates, and robust standard errors were obtained from maximum likelihood regressions. We used an F-test of *H0*, where the variables were exogenous (DWH endogeneity test). *, ** and *** denote significance at the 10, 5 and 1 % levels, respectively. We also regressed the separate regression for each dummy to avoid the dummy trap. Our results showed robustness
Source: Authors' own work

to SDG disclosures ($\beta = 0.088$, 0.092 and 0.083; $p < 0.10$) across three models. That supports the theory that CEOs with high integrity emphasize honest and accurate sustainability reporting because they follow ethical governance standards. Opportunistic behavior is reduced by ethical leadership and improving SDG disclosures (Eisenbeiss and Van Knippenberg, 2015). Results show that CEO integrity affects sustainability disclosures in all three criteria, highlighting the significance of ethical leadership in corporate governance (Eisenbeiss and Van Knippenberg, 2015).

The results of control factors are discussed only based on column 1 in Table 3. Among the financial controls are firm size ($\beta = 0.144$ and $p < 0.05$), firm age (logs) ($\beta = 0.167$ and $p < 0.05$), export ratio ($\beta = 0.135$ and $p < 0.05$). Environment innovation index ($\beta = 0.280$ and $p < 0.01$), ROA ($\beta = 0.316$ and $p < 0.01$) and Mill's ratio ($\beta = 0.131$ and $p < 0.05$) are positive predictors of SDG disclosures. In contrast, financial leverage ($\beta = -0.088$ and $p < 0.10$) and SD-sales ($\beta = -0.162$ and $p < 0.05$) are negative predictors of SDG disclosures. Among the governance factors, CEO duality does not predict SDG disclosure. In contrast, BI ($\beta = 0.111$ and $p < 0.10$) and frequency of board meetings ($\beta = 0.198$ and $p < 0.05$) positively predict CSR disclosures. We also find that the corporate social responsibility (CSR) score ($\beta = 0.288$ and $p < 0.01$) strongly predicts the SDG score. Finally, GDP growth ($\beta = 0.150$ and $p < 0.05$), C-SDG score ($\beta = 0.344$ and $p < 0.01$) and home country size ($\beta = 0.132$ and $p < 0.05$) also predict SDG disclosure. Finally, we include year, industry and developed market dummies to control for any year, industry effect or developed market impact.

This research shows that CEO integrity positively affects SDG disclosures, with business reputation and national SDG performance moderating this link. The findings demonstrate the relevance of ethical leadership in corporate reporting transparency and accountability (Pham and Tran, 2020). SDG disclosures are also affected by financial and governance variables, including corporate size, BI and CSR focus. This work adds to corporate sustainability and governance literature by controlling endogeneity and assuring robustness across model specifications using robust statistical methods.

4.2 Mediation effect of firm reputation

In this stage, we tested the mediating role of firm reputation. The results are reported in Table 4. In columns 1, 2 and 3, the three measures of CEO integrity (three proxies) are positively associated with a firm reputation ($\beta = 0.212$; $p < 0.01$ in the case of CEO integrity1; $\beta = 0.237$; $p < 0.01$in case of CEO integrity2 and $\beta = 0.217$; $p < 0.01$ in case of CEO integrity3: see columns 1, 2 and 3). The results satisfy the first condition of mediation.

Next, we tested the impact of CEO integrity on SDG disclosures by mediating the role of the firm's reputation. The results are reported in columns 4, 5 and 6 of Table 4. The measures of CEO integrity have a significant and improved impact on SDG disclosures in terms of level of significance and coefficient estimates. In Table 4, CEO integrity predicts SDG disclosures only at an acceptable level of 10%. Including firm reputation in columns 4, 5 and 6 of Table 4 significantly improves the direct association between CEO integrity and SDG disclosures ($\beta = 0.217$; $p < 0.01$ in the case of CEO integrity 1; $\beta = 0.205$; $p < 0.01$ in case of CEO integrity 2 and $\beta = 0.199$; $p < 0.01$ in case of CEO integrity 3: see columns 4, 5 and 6). In addition, the impact on firms' reputation is also statistically significant at a 1% significance level in these columns. Thus, firm reputation mediates the relationship between measures of CEO integrity and SDG disclosure. However, the direct impact of CEO integrity on SDG disclosures is significant at an acceptable 10% level of significance; the inclusion of the firm reputation as a mediator significantly improved its effect, supporting the partial mediation effect.

We also found changes in the effect of control factors. The impact of firm size, export ratio, financial leverage, BI and host market size has changed as we observed an increase in significant levels (see columns 1, 2 and 3). However, these findings only show improvement on a significant level. We find no change in the direction of impact, which is negligible in the context of the current study. The findings strongly suggest that corporate reputation mediates CEO honesty and SDG disclosures. CEO integrity positively impacts business reputation, as shown by significant coefficients in models 1, 2 and 3 ($\beta = 0.212$, $p < 0.01$; $\beta = 0.237$, $p <$

0.01; and $\beta = 0.217$, $p < 0.01$). That shows that CEOs with high integrity boost the firm's reputation and promote openness and ethical governance. Stronger reputations lead to more extensive sustainability disclosure, as shown by the significant coefficient in models 4, 5 and 6 ($\beta = 0.373$, $p < 0.01$).

In addition, we also used the structural equation modeling (SEM) bootstrap to examine the mediation effect. We used Data Stata 13 software to conduct our analyses (Alfons *et al.*, 2022). In Table 5, we reported CEO integrity's direct, indirect and total effects on SDG disclosures. For each measure of CEO integrity, we used separate regression. Control factors are included in each regression. The results are suppressed for brevity. Further, we also used the structural equation modeling (SEM) bootstrap to examine the mediation effect.

Table 5 shows structural equation modeling (SEM) bootstrap findings confirming the mediation effect. CEO honesty and corporate reputation affect SDG disclosures directly and indirectly. CEO integrity 1 has a direct impact of $\beta = 0.102$ ($p < 0.10$) on SDG disclosures, but its overall effect, including mediation via company reputation, is $\beta = 0.223$ ($p < 0.01$), with a variation accounted for (VAF) of 82.36%. CEO integrity 2 and CEO integrity 3 also mediate well, with VAFs of 81.80% and 82.64%, respectively. The high VAF values suggest that CEO integrity's influence on corporate reputation explains most of its effect on SDG disclosures. These findings imply that CEO honesty directly affects SDG disclosures, while corporate reputation indirectly determines scope and quality. According to the mediation study, reputation helps ethical leadership lead to honest and thorough sustainability reporting. Thus, CEO integrity indirectly impacts SDG disclosures, mediated by firm reputation. In conclusion, our *H2* is supported.

4.3 Moderating effect

Moreover, we tested *H3*, which predicts that firms from more competitive markets will exhibit more SDG reporting than those operating in relatively less competitive markets. The results are reported in Table 6. This model included iteration terms to investigate this moderating effect. The joint results (p <0.01) support *H3*. The three interaction terms show an increase in coefficient estimates and significance levels. We included control factors in each regression to ensure the reliability of our findings. For each interaction term, we used a separate regression.

The moderated regression models reveal how home country competitiveness (HC-C) moderates CEO honesty and SDG disclosures. Several critical financial and governance aspects are similar across all models, whereas CEO integrity and home country competitiveness (HC-C) interaction terms show that a country's home country competitiveness moderates sustainability

Table 5. Bootstrap indirect effects of CEO integrity on SDG disclosures

	Direct effect	Indirect effect Via firm reputation	Total effect	PBCI			
	Coefficient	Coefficient	Coefficient	Lower	Upper	Significance	VAF (%)
CEO integrity1	0.102*	0.121**	0.223***	0.165	0.316	Yes	82.36
CEO integrity2	0.091*	0.130**	0.221***	0.159	0.298	Yes	81.80
CEO integrity3	0.101*	0.131**	0.232***	0.177	0.312	Yes	82.64
Control factors	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: PBCI denotes percentile bootstrap confidence interval. The hypothesized effect is assessed by applying a one-sided test (PBCI-90%). Effects from CEO integrity and control variables are assessed using a two-tailed test. Bootstrapping based o*n n* = 5,000 subsamples. VAF = variance accounted for
Source: Authors' own work

Table 6. Moderating effect of HC-C

Factors	1 β	1 S/E	2 β	2 S/E	3 B	3 S/E
Financial control factors						
Firm size (logs)	0.144**	[0.069]	0.147**	[0.072]	0.145**	[0.068]
Financial leverage	−0.088*	[0.048]	−0.084*	[0.044]	−0.081*	[0.045]
Firm age (logs)	0.167**	[0.055]	0.170**	[0.078]	0.168**	[0.079]
Exports ratio	0.135**	[0.053]	0.132**	[0.064]	0.139**	[0.065]
Environment innovation index	0.280***	[0.132]	0.281***	[0.137]	0.278***	[0.136]
ROA	0.316***	[0.094]	0.319***	[0.155]	0.317***	[0.157]
SD-sales	−0.082**	[0.037]	−0.079**	[0.036]	−0.080**	[0.039]
Mill's ratio	0.162**	[0.049]	0.165**	[0.080]	0.164**	[0.082]
Company control factors						
CSR score	0.288***	[0.107]	0.274***	[0.110]	0.269***	[0.110]
Governance						
CEO duality	−0.005	[0.004]	−0.007	[0.005]	−0.007	[0.006]
Board independence	0.111*	[0.060]	0.099*	[0.052]	0.098*	[0.051]
Board meeting frequency	0.198**	[0.091]	0.170**	[0.086]	0.131**	[0.062]
Country level						
GDP growth	0.150**	[0.071]	0.112	[0.051]	0.119**	[0.051]
C-SDG score	0.344***	[0.159]	0.328***	[0.153]	0.339***	[0.156]
Host market size	0.132**	[0.097]	0.116**	[0.055]	0.125**	[0.051]
CEO integrity						
CEO integrity1	0.090*	[0.051]				
CEO integrity1*HC-C	0.133**	[0.066]				
CEO integrity2			0.097*	[0.053]		
CEO integrity2*HC-C			0.121**	[0.054]		
CEO integrity3					0.073*	[0.064]
CEO integrity3*HC-C					0.115**	[0.051]
Year dummy	Yes		Yes		Yes	
Sectorial dummy	Yes		Yes		Yes	
Developed market dummy	Yes		Yes		Yes	
Covid-19 dummy	Yes		Yes		Yes	
Log-likelihood	−1,454.21		−1,494.01		−1,317.17	
Tests of endogeneity (instrumented)	1.6545		1.5989		1.5754	

Notes: The presented values are the coefficient estimates and robust standard errors obtained from maximum likelihood regressions where we used an F-test of *H0*: the variables are exogenous (DWH endogeneity test) *, ** and ***denote significance at the 10, 5 and 1 % levels, respectively. We also regressed the separate regression for each dummy to avoid the dummy trap. Our results showed robustness
Source: Authors' own work

disclosures. Financial control characteristics such as business size, financial leverage, age and export ratio remain important across models. SDG disclosures positively correlate with business size ($\beta = 0.144$, $p < 0.05$), suggesting bigger organizations are more likely to share their sustainability efforts. Larger enterprises, which are more visible and scrutinized by stakeholders, publish more information. Financial leverage negatively correlates with SDG disclosures ($\beta = -0.088$, $p < 0.10$), suggesting highly leveraged enterprises prioritize financial success above sustainability transparency (Fainshmidt *et al.*, 2016; Sadaf *et al.*, 2018). Firm age positively correlates with SDG disclosures ($\beta = 0.167$, $p < 0.05$), indicating that established enterprises with better governance processes are more likely to disclose sustainability (Petrakis

et al., 2015). The export ratio favorably impacts SDG disclosures ($\beta = 0.135$, $p < 0.05$) since foreign enterprises are pressured to comply with global sustainability standards.

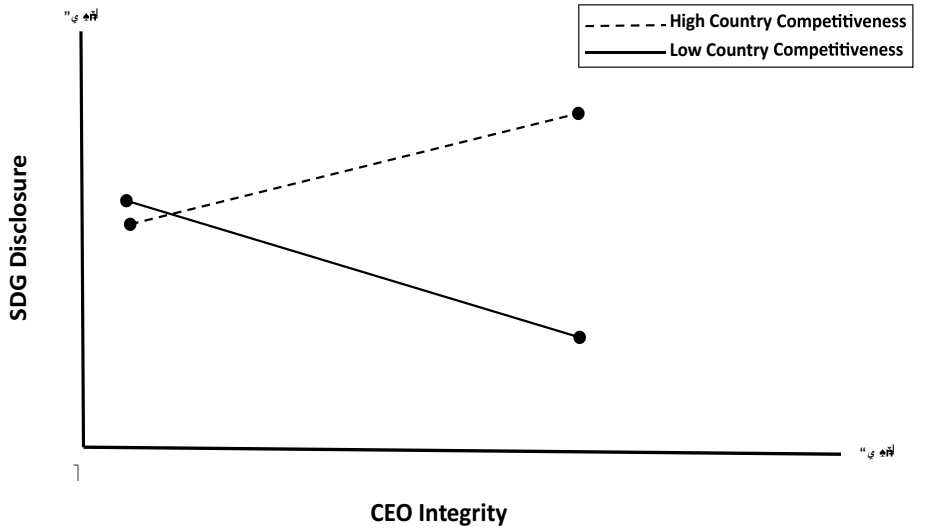
Strong positive correlations exist between SDG disclosures and the environment innovation index ($\beta = 0.280$, $p < 0.01$) and return on assets (ROA) ($\beta = 0.316$, $p < 0.01$). These findings suggest that commercially successful environmental innovators disclose sustainability more extensively (Li *et al.*, 2020). Higher environmental innovation indicates a firm's long-term sustainability, shown in transparency. Governance issues, including BI and meeting frequency, influence SDG disclosures. A positive correlation ($\beta = 0.111$, $p < 0.10$) between BI and SDG disclosures suggests that more independent boards may offer better supervision and accountability, resulting in more transparent sustainability reporting. The number of board meetings ($\beta = 0.198$, $p < 0.05$) positively impacts SDG disclosures, indicating that frequent meetings enable the board to remain involved in sustainability activities and guarantee proper disclosure.

At the national level, GDP growth and C-SDG score reflect external institutional influences on enterprises' sustainability reporting. Higher GDP growth ($\beta = 0.150$, $p < 0.05$) positively affects SDG disclosures, indicating enterprises in high-growth nations participate in more transparent sustainability reporting owing to better regulatory frameworks and investor expectations (Sharma and Sathish, 2022). Companies in countries with stronger national SDG performance face more pressure to align reporting procedures with sustainability objectives, as shown by the C-SDG score ($\beta = 0.344$, $p < 0.01$). These models emphasize CEO integrity and home country competitiveness (HC-C)'s moderating influence on SDG disclosures. CEO integrity positively and significantly affects SDG disclosures in all three models, proving that ethical leadership drives sustainability reporting openness. CEO integrity 1 is positively linked to SDG disclosures ($\beta = 0.090$, $p < 0.10$), and the interaction term adds to this ($\beta = 0.133$, $p < 0.05$). That shows CEO integrity boosts SDG disclosures in nations with better competitiveness in the home country. CEO integrity2 and 3 exhibit similar patterns ($\beta = 0.097$, $p < 0.10$) and CEO integrity2*HC-C ($\beta = 0.121$, $p < 0.05$).

In countries with highly competitive home countries, talented workforces – transparency and sustainability are in higher demand, and ethical CEOs should use this environment to improve their businesses' sustainability reporting (Ehnert *et al.*, 2016). HC-C's moderating function suggests that country-specific elements, notably home country, may considerably affect CEO integrity and reporting standards. Countries with better home-country competitiveness may have more demanding stakeholders, workers and investors who expect improved governance and sustainability, driving corporations to disclose more (Ehnert *et al.*, 2016). When paired with external challenges, ethical leadership improves sustainability reporting. In Figure 2, we also plotted the moderation role of home country competitiveness (HC-C).

5. Conclusive remarks

The research underlines the importance of CEO honesty in determining corporate SDG disclosures, with firm reputation mediating and country-specific characteristics like home country competitiveness (HC-C) moderating. The data supports the claim that ethical leadership increases sustainability reporting transparency, aligning company activities with global sustainability goals. The research found that enterprises managed by CEOs with high integrity are more likely to disclose SDGs in contexts with better home country competitiveness and institutional support for sustainability. The findings match corporate governance and sustainability reporting literature. CEO integrity is essential to ethical leadership, which reduces agency conflicts and promotes corporate decision-making openness (Yammarino *et al.*, 2020). High-integrity CEOs reduce the likelihood of



Source: Authors' own work

Figure 2. Interaction impact of home country competitiveness

opportunistic behaviors by promoting transparency and accountability and communicating the firm's sustainability initiatives to stakeholders. Agency theory indicates that ethical leadership reduces manager–shareholder knowledge asymmetry, improving governance (Bendickson *et al.*, 2016; Jensen and Meckling, 1976, 2019).

The mediation study shows that CEO honesty affects SDG disclosures via corporate reputation. Responsible and transparent sustainability reporting is more frequent in firms with higher reputations because they recognize the long-term advantages of stakeholder trust and company image, consistent with Esenyel (2020). CEOs prioritizing openness and ethical governance boost corporate reputation, encouraging enterprises to produce more extensive and accurate SDG disclosures. Corporate reputation drives sustainable practices because enterprises with good reputations are more likely to follow social norms. This is backed by Schaltegger *et al.* (2022). Moreover, the moderating influence of home country competitiveness emphasizes the relevance of external institutional elements in determining the connection between CEO integrity and SDG disclosures. Our results are also consistent with Pham and Tran (2020), where nations with strong home-country competitiveness witness the beneficial effect of CEO integrity on sustainability reporting, which is enhanced as businesses face heightened pressure from educated and competent stakeholders who expect openness and responsibility. That shows that country-specific variables like home country and SDG achievement affect how much ethical leadership leads to complete sustainability disclosures. According to institutional theory, corporations are melded by their institutional contexts, including regulatory frameworks, cultural norms and social expectations.

5.1 Research implications and limitations

CEO integrity significantly affects SDG disclosure quality, highlighting the relevance of ethical leadership in corporate reporting openness and accountability. Firms should emphasize ethical leadership development since CEO integrity influences corporate reputation and sustainability reporting. This indicates that ethical leadership and governance should be key factors in business

sustainability studies. Top management ethics become crucial to reporting quality as stakeholders urge corporations to disclose their sustainability initiatives clearly and accurately. This allows researchers to study how ethical leadership affects sustainability, corporate governance and stakeholder involvement.

The mediation effect of business reputation between CEO integrity and SDG disclosures shows that organizations with higher reputations report their sustainability strategies more fully. This means that reputation drives corporate responsibility and ethical action. Research on reputation, transparency and corporate responsibility across industries and geographies may help determine how reputation-building tactics affect long-term sustainability. This also suggests a study on how organizations with excellent reputations reconcile short-term financial success with long-term sustainability.

Home Country Competitiveness (HC-C) moderates sustainability reporting procedures, showing that a firm's home country's institutional context and competitiveness matter. This suggests that corporations in more competitive and institutionally strong nations are more likely to react to transparency and accountability requirements. The study suggests that ethical leadership promotes openness and accountability, and that home country competitiveness moderates its influence on sustainability reporting. Future studies should examine how national institutional frameworks and competitiveness levels impact company behavior and global sustainability. Comparative studies of enterprises in countries with various levels of competitiveness might indicate how national settings affect corporate governance, sustainability practices and global sustainability frameworks. Ethical leadership will be crucial for long-term performance and stakeholder confidence as stakeholders demand that enterprises align their operations with global environmental objectives.

Effective corporate governance frameworks encouraging openness and accountability are essential for ethical leadership and accurate sustainability communication to stakeholders. In addition, authorities and regulatory bodies should explore increasing institutional support for sustainability reporting, especially in countries with poor home-country competitiveness. Despite the robust findings, this study has several limitations. While commonly used in the research, self-reported CEO integrity metrics may create subjective biases in the rating process. Objective CEO behavior measurements like ethical leadership evaluations or CEO decision-making trends across time are important avenues to consider in future studies. Heckman's two-step technique accounts for endogeneity, although other unobserved variables may still affect CEO honesty and SDG disclosures. To further understand sustainability reporting, future studies might examine additional mediators or moderators, such as company culture or industry-specific characteristics. Cross-sectional data captured firm behavior over a specific time but may not fully reflect CEO integrity or firm sustainability practices. Ethical leadership and corporate governance results may be better understood via longitudinal research of CEO behavior and sustainability reporting standards. While the research focuses on home country competition as a moderator, legal frameworks, political stability and environmental laws may also affect SDG disclosures. Future studies might investigate these elements more deeply to give a more nuanced picture of how external circumstances impact business sustainability policies.

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Appendix 1

Table A1. Random-effects probit estimates (two-step Heckman approach)

Factors	Column 1 β	S/E	Column 1 B	S/E	Column 1 B	S/E
Firm size (logs)	0.209	0.049	0.204	0.050	0.199	0.050
Firm age (logs)	0.234	0.083	0.228	0.084	0.223	0.085
Financial leverage	−0.022	0.016	−0.022	0.016	−0.021	0.016
S/D sales	0.189	0.075	0.184	0.076	0.179	0.077
Export ratio	0.146	0.034	0.143	0.034	0.139	0.035
Environment innovation index	0.344	0.148	0.336	0.150	0.327	0.152
Age squared	−0.188	0.047	−0.183	0.048	−0.178	0.048
Constant	−7.954	0.871	−8.988	0.882	−7.608	0.893
Year and sectorial dummies	Yes		Yes		Yes	
Sigma U	5.572		6.056		6.725	
Rho	0.751		0.412		0.502	
Sample period	2016−2023		2016−2023		2016−2023	
Likelihood-ratio test						
$Wald\chi^2$	2,111.45		1,232.06		1,266.01	
$Prob > \chi^2$	0.000		0.000		0.000	

Notes: We constructed dummies for each construct of TMT composition (gender, national diversity and education). We regressed separate regression for the two-step Heckman approach. We calculated the Mills ratio for each TMT composition construct. Robust standard errors are in parentheses. *, ** and *** denote significance at the 10, 5 and 1 % levels, respectively
Source: Authors' own work

Appendix 2

Table A2. Variables and description

Variables	Measurement	Data source
SDG disclosures	The score was calculated through content analysis of sustainability reports	Firm sustainability reports, Bloomberg ESG database
CEO integrity	Proxy for ethical leadership based on external assessments and leadership behavior	Firm annual reports, executive profiles and governance indices
Firm reputation	Reputation scores from external rankings, such as the fortune world most admired companies (FWMA)	Fortune rankings, LexisNexis media database
Home country competitiveness (HC-C)	IMD world competitiveness ranking or similar country-level competitiveness index	World economic forum (WEF) reports
C-SDG score	Country-level SDG score, capturing national performance on SDGs	Firm financial statements, DataStream
Firm size (logs)	Log of total assets	Firm financial statements, DataStream
Financial leverage	Debt-to-equity ratio	Firm financial statements, DataStream
Firm age (logs)	Log of firm age	Firm financial statements, DataStream
Exports ratio	Percentage of export sales to total sales	Firm financial statements, DataStream
Environment innovation index	Environmental innovation index from the Thomson Reuters Eikon database	Firm financial statements, DataStream
Environment innovation index	Environmental innovation index from the Thomson Reuters Eikon database	Firm financial statements, DataStream
ROA	Return on assets: total profit scaled by total assets	Firm financial statements, DataStream
SD-sales	The standard deviation of firm sales over the study period	Firm financial statements, DataStream
Mill's ratio	Calculated from Heckman's two-step procedure to control for selection bias	Firm financial statements, DataStream
CSR score	Firm CSR scores from external databases like Thomson Reuters Eikon	Firm financial statements, DataStream
CEO duality	The dummy variable equal to 1 if the CEO also serves as the board chair, 0 otherwise	Firm financial statements, DataStream
Board independence	Percentage of independent directors on the board	Firm financial statements, DataStream
Board meeting frequency	Number of board meetings held in a calendar year	Firm financial statements, DataStream
GDP growth	Annual GDP growth rate data from the world bank	World development indicators (WDI)
Host market size	Host country market size measured in USD (billions)	World development indicators (WDI)

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