Board characteristics and ESG disclosure in energy industry: evidence from emerging economies

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Abstract

Purpose – This paper aims to investigate the impact of board characteristics on environmental, social and governance (ESG) disclosure in the energy industry of emerging economies.

Design/methodology/approach – The authors adopt the Bloomberg ESG rating to measure the extent of ESG disclosure using a sample of 1,260 observations from BRICS emerging economies. Multiple regression techniques were used to estimate the effect of board characteristics on ESG disclosures of a sample Brazil, Russia, India, China, and South Africa (BRICS) listed companies between 2010 and 2019.

Findings – The authors find a relatively low (at 37%) level of ESG disclosure among the sampled firms and a relatively high degree of variability. The authors also find that board gender diversity, board composition and board diligence are positively related to the level of ESG disclosure while the study documents no relationship between board size and ESG disclosure.

Practical implications – The study's findings highlight the importance of corporate board attributes in influencing strategic decisions such as the level of ESG disclosure and the findings may be useful to regulators, policymakers and investors in making informed investment decisions.

Originality/value – To the best of the authors' knowledge, this study is one of the first attempts at examining the impact of board characteristics on ESG disclosure in the energy industry in emerging economies. The paper provides new evidence on the relationship between board characteristics (BC) and ESG disclosure in the energy industry of emerging BRICS countries within a panel multi-country research setting.

Keywords Board characteristics, Board gender diversity, ESG disclosure, Board size, Emerging economies, BRICS

Paper type Research paper

1. Introduction

The concepts of corporate governance, accountability, sustainability, transparency and disclosure have become a topical issue in accounting and finance literature in recent years, corporate organisations are now expected to play leading roles in achieving a net zero economy. The increasing demand for more environmental, social and governance (ESG)/ sustainability disclosure can be attributed to the growing interest from both local and international investors and the financial risks and opportunities it has provided

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(Wasiuzzaman and Wan Mohammad, 2020). Guo *et al.* (2022) noted that the growing stakeholder interest regarding corporate transparency and disclosure stems from the level of societal awareness and pressure. Deloitte (2019) posits that for stakeholders to make informed decisions and evaluate how companies respond to risks and opportunities, there is increasing demand for more "transparent, comparable and reliable information on companies' environmental, social, and governance (ESG) risks and performance and this demand have never been greater—and the corporate community is taking notice".

Tao *et al.* (2022) noted that the board of directors is important in corporate strategies and outcomes and as the boards of directors are primarily responsible for both financial and non-financial disclosure policies and strategies, ESG disclosure is a function of the characteristics of the board (Michelon and Parbonetti, 2012). Previous studies have examined the impact of firm-level characteristics such as size, liquidity, age, industry, leverage and financial performance on ESG disclosure (Ananzeh *et al.*, 2022; Wang and Hussainey 2013; Alshbili and Elamer, 2020; Oliveira *et al.*, 2019) while neglecting the composition, structure or diversity of the board. Eccles *et al.* (2020) posit that lack of diversity of the board hinders sustainability reporting and performance. Zamil *et al.* (2021) noted that company-level characteristics and ESG disclosure nexus have been well investigated in the literature while governance and board attributes received little or no attention and therefore call for more studies on board–ESG disclosure nexus.

The scanty empirical studies in the literature that have explored the relationship between corporate governance mechanisms and the extent of ESG/sustainability disclosure are mostly in developed countries such as (Liao *et al.*, 2015; Louie *et al.*, 2019; Manita *et al.*, 2017; Aburaya, 2012; Ntim *et al.*, 2017; Khaireddine *et al.*, 2020) only few studies examine the relationship between corporate board and ESG or sustainability disclosure level in the context of emerging economies (Husted and Sousa-Filho, 2019; Arayssi *et al.*, 2020; Alshbili and Elamer, 2020). Similarly, only limited studies explored the impact of corporate board characteristics and structure on ESG disclosure in the energy industry despite the social and environmental costs associated with extractive and exploration activities and its impact on the environment. According to Sankara *et al.* (2016) and Chatzivgeri *et al.* (2020), more studies of the financial accounting and reporting practices of extractives and energy industries are needed, including disclosure of oil and gas reserves and voluntary disclosures of reserves or risk among others (Baudot *et al.*, 2020). Investigating the impact of corporate board characteristics on the ESG disclosure in the energy industry within the context of emerging economies will enrich the literature, shed more light, provide more insight and possibly provide an outcome that differs from the mainstream literature.

A review of the extant literature shows that many factors contribute to the quantity and quality of ESG disclosure. As noted earlier, there is significant empirical evidence in the literature that document the role of firm-level characteristics on the extent of sustainability disclosure; however, studies on the BC-ESG disclosure link in the energy sector have not been properly harnessed especially in emerging economies context. Therefore, this study attempts to fill the gap in the literature by examining the impact of board characteristics on the level of ESG disclosure in the energy industry. The series of studies on the BC-ESG nexus document mixed findings. Specifically, the study of Arayssi *et al.* (2019) examine the impact of board composition on ESG disclosure of six gulf cooperation council (GCC) countries. The study found that board independence and board gender diversity have a statistically positive impact on ESG disclosure quality. Also, the work of Husted and Sousa-Filho (2019) examines the impact of board structure on ESG disclosure of four Latin American countries using four-year panel data. The study found a positive relationship between board size and board independence with the extent ESG disclosure, whereas board gender diversity and chief executive officer (CEO) duality are found to have a negative relationship with ESG disclosure. In America, Manita *et al.* (2017) examine the impact of board gender diversity on ESG disclosure using a sample of 379 firms from the Standard and Poor's 500 Index. The study reported no significant relationship between board gender diversity and ESG disclosure in line with the critical mass theory. It is clear from the empirical evidence that the findings are mixed, and the current study seeks to extend on the recent and previous literature because of the inconsistent findings. Similarly, it is also obvious from the studies above that even though a strand of studies examines the board characteristics–sustainability disclosure nexus (e.g. Arayssi, *et al.*, 2019; Manita *et al.*, 2017; Disli *et al.*, 2022), there is a need for studies that seek to examine the relationship between board characteristics and ESG disclosure in the energy sector.

Empirically, the study examines a panel of 1,260 firm-year observations from 5 BRICS member countries over a period of 10 years from 2010 and 2019. Specifically, the study examines the impact of board size, board composition, board diligence and board gender diversity on the extent of ESG disclosure. Following previous studies on ESG/sustainability disclosure such as Pei-yi Yu *et al.* (2018), the ESG disclosure score provided by Bloomberg was used to measure the extent of ESG disclosure because of the quality and consistency of Bloomberg ESG score. The study finds a positive and statistically significant relationship between board gender diversity, board composition, board diligence and the extent of ESG disclosure. Similarly, additional analysis shows that neither CEO gender nor the degree of country's freedom impacts the relationship between BC and the level of ESG disclosure.

Consequently, this study extends and contributes to the existing literature in a number of ways. First, the study contributes to the literature by adopting a multi-theoretical framework approach to analyse the empirical findings of the relationship between board characteristics and ESG disclosure in the energy industry using stakeholder and resource dependence theories. It has been noted that existing studies on corporate governance usually adopt agency theory despite the importance of using theory triangulation (Filatotchev and Boyd, 2009; Chalevas, 2011; Zattoni *et al.*, 2020). Zattoni *et al.* (2020) opined that the mixed findings obtained by corporate governance and disclosure studies are a result of adopting only agency theory or one of the "trinity theories" [1]. Nguyen *et al.* (2021) noted that a multi-theoretical perspective is necessary in understanding board and corporate outcomes. Therefore, this study contributes to the literature by using a multi-theoretical perspective using two theories i.e. resource dependence and stakeholder theories in examining and interpreting the empirical findings of the relationship between corporate boards and transparency of ESG disclosure.

Second, as noted earlier, there is a dearth of studies on corporate board and ESG disclosure in emerging markets, especially in the context of multi-country research settings (Elmagrhi *et al.*, 2016; Md Zaini *et al.*, 2018). Tsang *et al.* (2022) noted that more than 80% of the empirical studies conducted on corporate social responsibility (CSR) are in developed countries context and therefore calls for more empirical studies in emerging economies. This multi-country study of Brazil, Russia, India, China and South Africa within the context of the energy industry will shed more light and provide new insights into the relationship between corporate boards and ESG disclosure. Third, the study focused on BRICS as a representation of emerging countries is apt and timely considering the importance of emerging countries to the global economy and the role, they are expected to play in achieving net zero economy. According to Lessambo (2014) BRICS has becomes an important force in the conduct of world business and international trade. According to World Bank data of 2019, BRICS account for 41% of the global population with 3.14 billion people, 24% of global gross domestic product (GDP) and 16% of world trade. Therefore, this study heed to a call for more empirical studies on corporate boards and corporate outcomes in emerging economies that are based on multi-country setting (Lu *et al.*, 2022).

Finally, we contribute to the extant literature by examining the impact of corporate boards on the extent of ESG disclosure in an emerging market setting characterised by low investor protection, weak regulation and low investor confidence. The empirical findings enhance our understanding of the role of corporate board characteristics and the propensity to disclose ESG information. Therefore, the findings should be useful for policymakers in emerging economies as they have distinct regulations, corporate and national characteristics with developed countries.

The remainder of the paper is organised as follows. Section 2 reviews relevant literature of prior studies and hypotheses development on the relationship between corporate board and ESG disclosure. Section 3 discusses the sample, methodology and variables of the study. The empirical results of the study and robustness tests are presented in Section 4. Finally, summary, conclusion, policy implications and frontiers for future studies are in Section 5.

2. Related literature, theoretical framework and hypothesis development

2.1 Environmental, social and governance practice in the energy industries of emerging economies

Extant literature has shown that social and environmental impact varies across industries or sectors (Yoo and Managi, 2022; Shahbaz *et al.*, 2020), with many industries such as oil and gas, metals and steel, mining and chemicals termed as sensitive industries (Garcia *et al.*, 2017; Montes-Sancho *et al.*, 2022); controversial industries (Baudot *et al.*, 2021); carbon-intensive industries (Liao *et al.*, 2015) or environmentally sensitive industries (Martínez-Ferrero *et al.*, 2023).

Garcia *et al.* (2017) noted that due to the social and environmental costs associated with activities of the energy industry, there is high demand for ESG disclosure in the energy industry, especially in emerging economies, and strict scrutiny by the regulatory authorities (Liao *et al.*, 2015). Baudot et al. (2021) posit that extractive and exploration activities in emerging economies are associated with unethical practices, social unrest, unfavourable environmental impact, human rights abuses, bribery and corruption thus the high demand for ESG disclosure from firms operating in energy industry. Similarly, Liu *et al.* (2022) argue that as emerging and developed economies are at different developmental stages, stakeholders' demand and support for ESG disclosure varies between developed and developing economies. Consistent with this view, Haji *et al.* (2023) noted that ESG regulations and outcomes in developing economies focused more on welfare such as poverty alleviation and human rights abuses. Due to the above variations in ESG disclosure between the energy industry and other non-environmentally sensitive industries and between developed and emerging economies, this study explores the nexus between board characteristics and ESG disclosure in the energy industry of emerging economies.

2.2 Board size and environmental, social and governance disclosure

From the stakeholder theoretical perspective, larger governing boards may have the advantage of representing the various interest of a wider group of key players and actors interested in the activities of the company (Freeman and Reed, 1983; Freeman, 1983). In the same vein, resource dependence theory suggests that larger corporate boards are associated with members with diverse backgrounds, knowledge, skills and expertise, as well as greater political and economic connections needed to access critical resources from the external environment, such as assets, capital, markets, materials, contacts and contracts (Pfeffer and Salancik, 1978; Reverte, 2009). However, empirical evidence in the literature has shown that larger boards are also associated with slow decision-making, lack of coordination and poor communication (Jizi *et al.*, 2014; Nicolo *et al.*, 2023; Nguyen *et al.*, 2021). Similarly, a strand of literature has shown that energy industries are associated with greenhouse gas (GHG) emissions, carbon dioxide emissions, pollution, depletion of natural resources and climate change (Shahbaz *et al.*, 2020; Nicolo *et al.*, 2023; Nguyen *et al.*, 2021), thus the need to balance their financial and non-financial goals to serve the interest of various stakeholders such as employees, regulators, policymakers, society and the environment.

Wang and Hussainey (2013) defined board size as the total number of executive and non-executive members on the board. Prior empirical studies show mixed findings regarding the relationship between board size and the extent of ESG disclosure. Some studies in corporate governance and accounting literature find a positive relationship between the size of the board and voluntary ESG disclosure (Allegrini and Greco, 2011; Samaha *et al.*, 2012; Ntim *et al.*, 2012; Michelon and Parbonetti, 2012; Ntim and Soobaroyen, 2013; Khaireddine *et al.*, 2020; Nguyen *et al.*, 2021), while some prior studies indicate a negative relationship between board size and the extent of voluntary ESG disclosure (Alzead, 2017; Ntim *et al.*, 2017).

Empirically, Nguyen *et al.* (2021) in a study of heavily polluting firms in China document a positive association between board size and environmental performance. The findings of Nicolo *et al.* (2023) also show a positive and statistically significant relationship between BS and ESG disclosure. Samaha *et al.* (2015) conducted a meta-analysis of a sample of 64 empirical studies to understand possible determinants of the relationship between corporate board characteristics, audit committee characteristics and the extent of sustainability disclosure. The findings of the study recognised the existence of a positive and significant relationship between board size and the extent of voluntary ESG disclosure. On the other hand, Alnabsha *et al.* (2018) find a negative and statistically significant relationship between board size and the extent of voluntary disclosure. Based on the stakeholders and resource dependence theoretical perspective and the vague findings from previous empirical studies that show a positive and negative relationship between board size and the ESG disclosure as discussed above and in line with theoretical evidence that small boards are more effective in controlling and monitoring the activities of the board: based on the above discussion, the first hypothesis to be tested is formulated as follows:

H1. There is a negative relationship between board size and ESG disclosure.

2.3 Board gender diversity and environmental, social and governance disclosure

Prior studies on the impact of corporate governance variables on ESG disclosure indicate that corporate board diversity considerably enhances leadership efficiency and effectiveness (Ntim and Soobaroyen, 2013; Nicolo *et al.*, 2023; Nguyen *et al.*, 2021). Ntim *et al.* (2017) posit that board diversity is an emerging and relatively less studied area in corporate governance and accounting literature that relates to the impact of diversity or lack of it on the board. Diversity involves both observable and non-visible attributes such as gender, ethnicity, age, religion, experience, professional qualification and educational background. Extant literature shows that women are culturally and socially different from men (Hofstede and Minkov, 2010), improve governance quality and reduce misconduct and malpractice (Gull *et al.*, 2023) and that board gender diversity (BGD) can significantly enhance board monitoring role (Liao *et al.*, 2016).

Ntim *et al.* (2013) suggest that a board of directors populated with members with diverse skills, experience, backgrounds and knowledge are more capable of enhancing the level of

ESG disclosure. From the resource dependence theory perspective, a diverse board may be useful in linking corporate organisations to their external environment, including key stakeholders that may be useful in obtaining critical resources. Similarly, various corporate governance codes recommended that to ensure the effective discharge of its responsibilities, the board and its committees should have an "appropriate balance of skills and diversity (including experience and gender) without compromising competence, independence and integrity".

Even though prior literature looks at the impact of board gender diversity on ESG disclosure, the energy industry was overlooked in the literature despite the social and environmental impact of the industry. Ntim *et al.* (2017) examine corporate governance and disclosure in Higher Education Institutions context; Jizi *et al.* (2014) investigate the impact of governance variables on CSR in the context of the US banking industry, whereas Boulouta (2013) using a sample of S&P500 firms mostly from IT, tech, industrial and health sectors document a positive association between BGD and corporate social performance.

Empirically, Eng and Mak (2003), Ntim and Soobaroyen (2013), Ntim *et al.* (2017), Elmagrhi *et al.* (2016) and Wang and Hussainey (2013) found a positive association between board diversity and the extent of voluntary ESG disclosure, whereas Boulouta (2013) and Husted and Sousa-Filho (2019) document negative relationship between BGD and ESG disclosure, thus this study hypothesises the second hypothesis as follows:

H2. There is a positive relationship between board gender diversity and the level of ESG disclosure.

2.4 Board composition and environmental, social and governance disclosure

Liao *et al.* (2015) argue that the existence of Independent Non-Executive Directors (INEDs) on the board is associated with better monitoring and control of the activities of the board and management. The independence of the board is considered a key attribute of good corporate governance behaviour as INEDs are found to enhance board efficiency (Ahmed and Atif 2021) and are critical to board independence (Gull *et al.*, 2023). Similarly, Croci *et al.* (2023) contend that by having no family or financial ties with the management, INEDs are in a better position to challenge, advise and monitor management decisions.

Ntim and Soobaroyen (2013) postulate that INEDs tend to bring greater diversity to the boards, including knowledge, expertise, skills and business networks and opportunities. Stakeholder theory highlights the importance of having INEDs in the composition of the board to protect the interest of the diverse stakeholder groups. In line with stakeholder theory, Liao *et al.* (2018) also posit that firms with higher percentages of INEDs are more sensitive to stakeholders' and societal demands and concerns. Similarly, Ntim *et al.* (2017) argue that INEDs are mindful of the public interest and expectations of the society, therefore appear to support initiatives that will enhance the level of financial and non-financial voluntary reporting and disclosure. It has been suggested that decreasing the proportion of executive directors can enhance non-financial disclosure to various stakeholder groups (Fama and Jensen, 1983), thus improving the board's effectiveness and efficiency. Theoretically, stakeholder theory suggests that as corporate organisations have various stakeholders, ESG disclosure becomes necessary. Tsang *et al.* (2022) noted that ESG disclosure is in response to the demands of various stakeholders other than shareholders. Due to the social and environmental impact of energy industry activities, the industry is under tremendous pressure from various stakeholders such as environmental activists, policymakers and society to report their non-financial performance.

Some prior studies find a positive and significant association between the composition of the board and the level of ESG disclosure (Samaha, 2012; Elmagrhi *et al.*, 2016; Eng and Mak, 2003; Ntim *et al.*, 2012; Ntim *et al.*, 2017; Samaha *et al.*, 2015; Wang and Hussainey, 2013; Wang and Chen 2017). Similarly, some studies find a negative or no relationship between board composition and the extent of ESG disclosure (Allegrini and Greco, 2011; Alnabsha *et al.* (2018). Jizi *et al.* (2014) document the existence of a positive relationship between a higher level of INEDs and the level of ESG disclosure. Based on the above discussion, the third hypothesis is formulated as follows:

H3. There is a positive relationship between the percentage of INEDs and the level of ESG disclosure.

2.5 Board diligence and environmental, social and governance disclosure

To promote sustainability and greater ESG disclosure, it has been suggested that corporate organisations need to strengthen their internal governance structures such as board frequent board meetings, board diversity and independence (García Martín and Herrero, 2020). The number of board meetings has severally been considered as a measure of corporate board quality and efforts (Shahbaz *et al.*, 2020). In line with stakeholder theory, the complex nature and uncertainty in today's business environment have increased the need to have frequent meetings by the corporate boards to address multiple stakeholders' concerns and better evaluate firms' various risks (Hussain *et al.*, 2018) and strengthen stakeholder relationship through ESG initiatives (Orazalin *et al.*, 2023). Similarly, Liao *et al.* (2015) argue that regulators and policymakers are strict in terms of carbon regulation for carbon-intensive industries like energy industries thus necessitating frequent meetings in order to meet the demands of various stakeholders and societal pressure.

Empirically, Jizi *et al.* (2014) conducted a study of 107 US commercial banks and found a statistically positive association between corporate social responsibility disclosures and the frequency of board meetings. Similarly, Nguyen *et al.* (2021) in a study of heavily polluted firms in China, found a positive association between the frequency of board meetings and environmental performance. Given the above findings, we expect a positive association between board diligence and the extent of ESG disclosure. Hence, our fourth hypothesis is as follows:

H4. There is a positive relationship between the number of board meetings and the level of ESG disclosure.

3. Research methodology

3.1 Sample

To investigate the relationship between board characteristics variables and the extent of ESG disclosure, the Bloomberg database was used to collect data for listed energy industry firms. Bloomberg was used because it provides one of the most widely used ESG disclosure ratings and ESG disclosure coverage in accounting literature (Ioannou and Serafeim, 2012). For a company to be considered in the sample, it must have data for five consecutive years in line with studies of (Pei-yi Yu *et al.*, 2018). The final sample comprises (126) companies from 5 BRICS member countries with a total of 1,260 firm-year observations. The final sample and country distribution are reported in Table 1. Both the corporate board characteristics variables, control variables and ESG data were collected from Bloomberg. Hypotheses were tested using a ten-year panel from 2010 to 2019. Bloomberg ESG data was used to measure ESG disclosure because researchers such as Grewal *et al.* (2019) posit that "Bloomberg calculates an ESG Disclosure Score to quantify a company's transparency in reporting ESG information" and Bloomberg ESG attracts the most attention from investors (Eccles *et al.*, 2012). We started our analysis with the year 2010 as the period witnessed significant policy pronouncements regarding ESG, sustainability and other non-financial reporting and disclosure in emerging economies such as India Ministry of Corporate Affairs CSR guidelines 2009, China State Council CSR guideline 2008, Shanghai Stock Exchange guidelines on Social and Environmental Disclosure 2007, South African King III report 2009 and the Brazilian Corporate Sustainability Index 2005. The 2019 financial year was the last year with data available at the time of collecting the data. Therefore, due to the non-availability of ESG data of most BRICS firms and the limited quantity of firms from the BRICS in the Bloomberg database pre-2010, this study decided to go with a minimum of 20 firms per country and the 2010–2019 period, respectively.

3.2 Variables and their measurement

3.2.1 Dependent variable. ESG disclosure is the dependent variable of this study. ESG scores were obtained from the Bloomberg database, it comprises of environmental, social and governance dimensions. ESG disclosure ratios provided by the Bloomberg database is one of the most widely used disclosure score in accounting, finance and sustainability literature in recent years (Nollet *et al.*, 2016). Manita (2017) noted that the Bloomberg ESG scoring range from 0 to 100 in line with Global Reporting Initiative, and each data point were weighted depending on the relevance to a particular industry.

3.2.2 Independent variables. Board size, board composition, board gender diversity and board diligence are the independent variables of the study. Board size was measured as the total number of members of the Board of Directors as reported by the company. The data were extracted from the Bloomberg database. Similarly, board composition was measured as the percentage of the total number of INEDs to the total number of directors on the board at the end of a financial year. The data were also extracted from the Bloomberg database. Board gender diversity was measured as the percentage of female members to the total number of board members at the end of the financial year. Finally, board diligence was measured as the total number of meetings by the boards at the end of the financial year.

3.2.3 Control variables. As with previous disclosure studies, certain variables that might affect the board's relationship with ESG disclosure were controlled. These variables are: Economic performance which was measured using return on capital while risk was measured by firm gearing as the ratio of total debt to total assets as firms with high leverage are likely to make more disclosure because of higher monitoring costs (Jensen and Meckling, 1976). Firm size was measured by the logarithm of total assets. Liquidity was measured as a

No. of	Sample companies
Brazil	26
Russia	21
India	34
China	25
South Africa	20
Total	*126*

Source: Table created by the authors

Table 1.
Study sample

ratio of the company's current assets in relation to its to current liabilities at the end of the financial year. Finally, the presence of board CSR or sustainability committee is a dummy variable 1 if the board has CSR/Sustainability and 0 otherwise.

All data used in this study were extracted from the Bloomberg database.

3.3 Regression model

A multiple regression model was used to test the association between the independent variables and the dependent variable (ESG disclosure). The regression model used is as follows:

$$\mathrm{ESG} = \alpha + \beta_1 \mathrm{BSize}_{it} + \beta_2 \mathrm{BCom}_{it} + \beta_3 \mathrm{BGDiv}_{it} + \beta_4 \mathrm{BM}_{it} + \beta_5 \mathrm{FS}it + \beta_6 \mathrm{Prof}_{it} + \beta_7 \mathrm{Liq}_{it} + \beta_8 \mathrm{Gea}_{it} + \beta_9 \mathrm{CSR/SC}_{it+} e_{it}$$

Where:

ESG = environmental, social and governance disclosure;
BSize = board size;
BCom = board composition;
BGDiv = board gender diversity;
BM = board meetings;
FS = firm size;
Prof = profitability;
Liq = liquidity;
Gea = gearing;
CSR/SC = board CSR/Sustainability committee; and
e = error term.

4. Empirical results and discussion

4.1 Descriptive statistics

Table 2 explain the descriptive statistics of the variables. Table 2 indicates the overall mean ESG disclosure of BRICS listed companies is 37% with a maximum of 72.73% and a minimum of 4.96%. The average ESG disclosure is higher than previous studies in developed countries such as UK, e.g. Li *et al.* (2012). Regarding the independent variables, board size has an average of 10 members on the board with a maximum member on the

Variable	Observation	Mean	SD	Minimum value	Maximum value
ESG	1,259	37.90	16.45	4.96	72.73
BS	1,259	10.29	2.64	4.00	19.00
% BGDiv	1,259	9.76	10.26	0.00	45.45
BM	1,259	10.64	8.98	0.00	87.00
% BI	1,259	47.17	21.67	0.00	100.00
Log of TA	1,259	4.01	0.80	2.13	5.61
Prof	1,259	6.37	17.83	−291.58	106.81
Liq	1,259	1.89	4.75	0.00	100.31
Gearing	1,259	27.74	19.89	0.00	149.43
CSR/SC	1,259	0.57	0.50	0.00	1.00

Source: Table created by the authors

Table 2.
Descriptive statistics

board of 19, whereas the average percentage women on the board is approximately 10% with the maximum of 45%. The 10% of women on the board is the same with what is reported in the studies of Disli *et al.* (2022) but lower than the 15.8% reported in Manita *et al.* (2018) which may be attributed to cultural and institutional differences between emerging economies such as BRICS and developed economies such as USA but in line with studies in emerging economies such as Disli *et al.* (2022). In terms of board composition, the average percentage of INEDs on the board is 48% while the average number of meetings is 10 and a maximum of 87 meetings, this is in line with findings of Disli *et al.* (2022). BRICS energy industry firms use an average of 27.7% of debt while the average profit is 6.37%. A total of 57% of the sampled firms have board CSR and/or sustainability committee. Overall, the descriptive statistics shows that there is wide variation indicating adequate variation in the variables.

4.2 Correlation analysis

Table 3 shows the correlation between all the variables of the study. Table 3 shows that board size, board composition, board gender diversity, board meetings, profitability, liquidity and firm size are positively and significantly correlated with the overall ESG disclosure while a negative association have been found between gearing and the overall ESG disclosure. The low correlation among the variables also suggests there is no serious issue of multicollinearity in the model which was further confirmed from the variance inflation factors (VIF).

To further check for the problem of multicollinearity, VIF was used. The results shows that the highest observed VIF value in the study variables is 1.20 and a mean VIF of 1.16 which are all below the conventional rule of thumb of 10.0 (Chatterjee and Hadi, 2012). Consequently, it was concluded that there is no serious problem of multicollinearity. This has been further confirmed by the low correlation among the variables of the study as no explanatory variables has a correlation of more than 0.70.

4.3 Results and discussions

The result of the baseline regression analysis of the sample companies using ordinary least squares (OLS) is shown in Table 4. The R-squared is 0.433, meaning the explanatory variables explain 43.4% of the variation in ESG disclosure of the sampled firms while the adjusted R^2 of the model is 42.9%. This confirms the fitness of the model. The panel consist of consists of 1259 firm-year observations, and the overall coefficient is statistically significant at 1% significant level.

Table 3.
Correlation matrix

Variables	ESG	BSize	BDiv	BCom	BM	LogTA	Prof	Liq	Ge
ESG	1.000								
BSize	0.202*	1.000							
BDiv	0.283*	0.172*	1.000						
BCom	0.164*	0.172*	0.356*	1.000					
BM	0.181*	0.057*	−0.098*	−0.285*	1.000				
LogofTA	0.423*	0.295*	0.066*	−0.001	0.229*	1.000			
Prof	0.099*	0.295*	0.0003	−0.113*	0.042	0.045	1.000		
Liq	0.036	−0.046	−0.059*	−0.009	−0.023	−0.033	0.133*	1.000	
Gear	−0.113*	−0.152*	−0.072*	−0.082*	−0.011	−0.017	−0.240*	−0.13*	1.0

Note: * indicate statistical significance at the 0.05
Source: Table created by the authors

Variables	Coef.	t-stat	p-value
BS	−0.08	−0.57	0.5719
% BGDiv	0.27	7.03	0.0000
BM	0.36	8.47	0.0000
% BC	0.10	5.17	0.0000
Log of TA	7.03	14.62	0.0000
Prof	0.05	2.20	0.0278
Liq	0.23	3.07	0.0022
Gearing	−0.02	−1.06	0.2892
CSR/SC	11.16	13.83	0.0000
Intercept	−6.97	−3.00	0.0028

Source: Table created by the authors

Table 4.
Regression results

Firstly, the regression results show a negative but statistically insignificant relationship between board size and the extent of ESG disclosure. In terms of economic significance, the regression result suggest that a one standard deviation increase in board size results in a decrease in the level of ESG disclosure by 0.56%. The finding indicates that our first hypothesis prediction of a negative association between board size and ESG disclosure is supported by the findings. The finding is in line with recent studies that suggest small boards of directors are more effective and easier to coordinate and supports our multiple-theoretical perspective that associated larger boards of directors with poor monitoring, free-riding and poor communication, thus negatively affecting the extent of ESG disclosure. The studies of Ntim *et al.* (2017) and Githaiga and Kosgei (2023) also document similar finding while the finding contradicts the results of Jizi (2014), Salem *et al.* (2019), Tran *et al.* (2021), Nguyen *et al.* (2021), Erin *et al.* (2022). The finding is in line with our H1 prediction; thus, we accept our hypothesis. The plausible explanation for the contradiction in this finding and the findings documented in some prior studies is the fact that a mere increase in the number of board members does not translate to better ESG disclosure and other corporate outcomes, the board has to be diligent (through frequent meetings), diverse and truly independent (Nguyen *et al.*, 2021). Secondly, recent studies have highlighted the need for more independent directors on the board than a mere increase in board size that has a significant number of executive directors (Gull *et al.*, 2023). Finally, the size of the board could be counterproductive if it goes beyond a certain limit or with significant executive members. The results suggest that it is more in support of stakeholder theory than the resource dependence theory.

The results also indicate that board gender diversity has a positive and statistically significant impact on the level of ESG disclosure of the sampled BRICS companies at a 1% significant level. In terms of economic importance, the finding can be quantified as a one standard deviation increase in board gender diversity results in a 7.3% increase in the level of ESG disclosure. The result is in line with the findings of Ntim *et al.* (2012), Boulouta (2013), Elmagrhi *et al.* (2016) and Ntim *et al.* (2017), Arayssi *et al.* (2019), Wasiuzzaman and Wan Mohammad (2020), Nguyen *et al.* (2021), Erin *et al.*, Githaiga and Kosgei (2023), Nicolo *et al.* (2023) as well as support our theoretical prediction that draws insight from stakeholder and resource dependence theories that suggest a positive impact of board gender diversity on the overall ESG disclosure. The finding is inconsistent with the finding of Manita *et al.* (2018). Therefore, the results support H2.

The contradiction with the finding of Manita *et al.* (2018) can be explained as follows. Firstly, the context of the studies varies, while Manita *et al.* (2018) examine firms from developed country (USA), this study focused on emerging economies. As noted earlier and unlike emerging countries that are characterised by weak institutions and rule of the law, developed countries such as the USA have strong institutions and regulators that make gender-diverse boards less important force in ensuring proper monitoring and protection for the environment. Finally, Manita *et al.* (2018) examine globally large firms (S&P 500) which are associated with greater ESG disclosure with or without diverse board. Extant literature links firm's size with the extent of ESG disclosure (Nguyen *et al.*, 2021: Erin *et al.*, 2022). The finding is more in support of resource dependence theory than stakeholders' theory to access critical resources.

Similarly, the results indicate that there is a positive and statistically significant relationship between board composition and ESG disclosure at a 1% significant level. The finding provides empirical support of a positive and statistically significant relationship between BC and the extent of ESG disclosure ($\beta = 0.095$, $P = 0.000$) in line with the results of prior studies (Salem *et al.*, 2019; Tran *et al.*, 2021; Erin *et al.*, Githaiga and Kosgei, 2023) but inconsistent with the findings of Ntim *et al.* (2012), Samaha *et al.* (2015), Ntim *et al.* (2017), Nguyen *et al.* (2021). The finding is consistent with our hypothesis prediction thus hypothesis is accepted. Economically, the results suggest that a one standard deviation increase in board composition leads to an increase in the level of ESG disclosure by 11.44%. The finding is not surprising as the plausible explanation for this is a board with higher INEDs is associated with greater monitoring over management and the finding support stakeholder theory. The contradiction with some of the previous studies can be explained as follows. First, as noted earlier, ESG practices vary across industries, while this study focused on energy industry firms in emerging economies, Ntim *et al.* (2017) examined Higher Educational Institutions in the UK. In the case of Samaha *et al.* (2015), a further analysis carried out in his study shows that the result is positive and significant in emerging economies with weak investor protection which is consistent with our findings. The finding is in support of stakeholders' theory than resource dependence theory.

Finally, the findings indicate a positive and statistically significant relationship between the frequency of board meetings and the extent of ESG disclosure at a 1% significant level. The positive impact of board diligence on ESG disclosure further supports the findings of prior studies (Jizi *et al.*, 2014; Nguyen *et al.*, 2021) and theoretical predictions that the frequency of board meetings creates good opportunities for the board of directors to discuss issues to address the issues of sustainability that have to do with environmental, social and governance disclosure. In terms of economic significance, the finding suggests that a one standard deviation increase in board diligence results in an 8.53% increase in the level of ESG disclosure. Theoretically, the finding is in line with our theoretical prediction of stakeholder theory. Thus, we do not reject the empirical hypothesis. The finding is in support of stakeholders' theory than resource dependence theory.

Regarding the control variables, the regression results suggest that liquidity, profitability, size and presence of sustainability committee have positive and statistically significant effect on the level of ESG disclosure in line with findings documented in while gearing is negative but insignificant.

Overall, the regression results indicate that there is significant relationship between corporate board variables and the extent of ESG disclosure at 1% significant level. The regression results indicates that corporate board characteristics are important factors in explaining the extent and level of ESG disclosure.

4.4 Robustness test and additional analyses

Additional analyses were carried out to complement our baseline results.

First, extant literature has shown that CEO gender have an influence on the level of ESG disclosure. Manita *et al.* (2018) noted that female board members' characteristics, background and experience influence the extent of ESG disclosure. Some studies such as Marquis and Lee (2013) and Zhang *et al.* (2013) document positive relationship between female CEO and the extent of ESG disclosure. Similarly, Nielsen and Huse (2010) noted that CEOs gender can influence women directors' contributions in board decision-making. In the same vein, Frye and Pham (2018) suggest that female CEOs are more efficient than their male counterparts in control and monitoring, whereas Ullah *et al.* (2019) noted that female CEOs enhance firm value.

For this, this study divides the sample based on CEO gender and run a regression of a subsamples based on female and male CEOs and the result presented in Table 5. The R squared for sample with female CEOs and male CEOs is 51% and 43%, respectively. Inconsistent with the main findings, the results indicate that board gender diversity and board diligence have no impact on sustainability reporting for the subsample of firms with female CEO during the period of the study. The finding is in line with the findings of Peni and Vahamaa (2010), Aabo and Giorici (2022) who find no association between CEO gender and the level of ESG disclosure. The findings further provide evidence that there is no significant difference between female CEOs and male CEOs regarding the level of ESG disclosure. However, for the subsample with male CEOs, the findings remain qualitatively similar with the main findings reported in Table 4. Another interesting finding from the additional analysis is the percentage of women CEOs which is significantly low at 5% as in the studies of Aabo and Giorici (2022) who document 4%.

Similarly, extant literature documents that the degree of freedom and civil liberty are among the country-level factors that affect the extent of ESG disclosure. Guo *et al.* (2022) noted that civil liberties enable both traditional and new media, civil societies, activists, social movements, NGOs and other stakeholders to challenge corporate organisations about their social and environmental transparency.

Using freedom house civil liberty index, we divide the sample into observations from free and not free countries. The R squared for free and not-free subsamples is 39% and 45%, respectively. The result presented in Table 5 find no significant differences in the results across the subsamples. For example, the coefficients of BGD, BC and BM remain positive

Variables	(1) Free	(2) NF	(3) FCEO	(4) MCEO
BS	−0.0579 (0.242)	0.169 (0.170)	−1.312* (0.543)	0.0482 (0.154)
BGDiv	0.347*** (0.0562)	0.111* (0.0503)	−0.242 (0.214)	0.265*** (0.0392)
BM	0.291** (0.0926)	0.340*** (0.0447)	1.478 (0.758)	0.363*** (0.0429)
BC	0.000392 (0.0251)	0.104*** (0.0265)	0.254* (0.112)	0.0989*** (0.0189)
LogofTA	5.110*** (0.709)	8.096*** (0.589)	2.313 (5.492)	6.719*** (0.490)
Prof	0.0911*** (0.0261)	0.0323 (0.0299)	−0.152 (0.138)	0.0585** (0.0213)
Liq	−0.438** (0.146)	0.361*** (0.0799)	−4.736 (3.638)	0.225** (0.0757)
Gearing	−0.0306 (0.0400)	−0.00287 (0.0203)	0.150 (0.144)	−0.0246 (0.0190)
CSRSC	7.997*** (1.490)	9.967*** (0.902)	1.540 (5.764)	11.38*** (0.822)
Constant	14.30*** (3.774)	−15.81*** (2.826)	27.31 (26.52)	−7.147** (2.370)
N	461	798	60	1199
R-squared	0.397	0.452	0.517	0.443

Notes: Standard errors in parentheses; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$
Source: Table created by the authors

Table 5. Results of the additional analysis of the sub-samples

and significant across the sub-samples at 1 to 10% significant level except the BC coefficient for free samples. Similarly, the coefficient of BS remains negative and non-significant.

Similarly, several robustness tests were carried out to confirm the stability of the panel regression results and check the potential issue of endogeneity, simultaneity, reverse causality and sample selection bias. Chau and Gray (2010) posit that the issue of endogeneity is a potential problem in the analyses of the association between corporate governance variables and voluntary disclosure. To control for endogeneity and possible reverse causality problem, lagged independent variables were used as suggested by Larcker and Rusticus (2010), Wintoki *et al.* (2012), Gonzalez (2015), Manita *et al.* (2017), Liu *et al.* (2014) and Issa and Zaid (2021). The results remained basically the same with only board gender diversity changing from statistically significant to non-significant.

Secondly, Table 6 present the results of a two-stage least square (2SLS) using three instrumental variables was used. In line with the studies of Cho and Kim (2021) and Nguyen *et al.* (2021), board composition was used as endogenous variable with gearing, firm size and two years lagged of board composition as instrumental variables. The results of the 2SLS regression indicates all the variables have positive and statistically significant relationship with the extent ESG disclosure. Similarly, a post-estimation tests were carried to confirm the validity of our tests, the results of the Durbin (score) chi2(1) of 3.79827 with a *P* value of ($p =$ 0.0513) and Wu-Hausman F(1,943) 3.78142 ($p = 0.0521$) indicates that the null hypothesis is statistically insignificant, thus there is no endogeneity concern. Also, the result of postestimation test of the first-stage regression in Table 6 indicate that the F statistic of 609.395 is greater than all the critical values in the table meaning our variables are not weak. In all, the findings of the robustness tests suggests that our results do not suffer from potential endogenous problem.

5. Conclusion

Drawing on stakeholders and resource dependence theories, this paper examines the impact of the corporate board characteristics on the level of ESG disclosure in emerging economies using the BRICS countries energy industries as the sample. Specifically, we examine the impact of board size, board composition, board gender diversity and frequency of board meetings on the extent of ESG disclosure. First, the descriptive statistics show a relatively low (at 37%) level of ESG disclosure and a relatively high degree of variability among the sampled BRICS energy firms. Consequently, our empirical results show mixed findings in line with our hypotheses predictions. The results confirm that corporate boards' variables are significant in explaining the extent of ESG disclosure. Overall, we conclude that board gender diversity, board composition and frequency of board meetings are found to have a

ESG	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
BC	0.186064	0.0338117	5.50	0.000	0.1197943	0.2523337
BS	1.03856	0.1945588	5.34	0.000	0.6572317	1.419888
BDiv	0.2667655	0.0553909	4.82	0.000	0.1582013	0.3753296
BM	0.4321114	0.054647	7.91	0.000	0.3250052	0.5392175
Prof	0.1252979	0.0356834	3.51	0.000	0.0553597	0.195236
Liq	0.3071171	0.1230459	2.50	0.013	0.0659516	0.5482826
_cons	9.894006	2.579296	3.84	0.000	4.838678	14.94933

Source: Table created by the authors

Table 6.
2SLS regression

positive impact on the level of ESG disclosure while board size was found to be negatively associated with the quantity and quality of the overall ESG disclosure.

The findings of our study have important practical, policy, regulatory and theoretical implications. The results indicate that board size has negative but insignificant impact on the level of ESG disclosure, therefore finding an optimal board size would help firms in improving their ESG performance. Similarly, board gender diversity, board composition and frequency of board meetings are found to be effective in enhancing the level of ESG disclosure. Therefore, firms interested in enhancing the quality and performance of their ESG activities should be diligent with board activities, ensure the presence of more women on the board and have an adequate number of INEDs on the board. The theoretical implication of the finding is, independent boards, diligent boards and gender-diverse boards lead to improve ESG disclosure and performance, through which corporate organisations signify their commitment to ESG/sustainability issues to the wider stakeholders in order to access critical resources needed to achieve their corporate goal in line with stakeholder and resource dependence theories. Theoretically, the finding shows gender diverse, diligent and independent boards benefit both equity providers and other stakeholders in line with resource dependence and stakeholder theories, respectively. The study is arguably the first attempt to explore the impact of corporate board characteristics on the level of ESG disclosures of energy industry firms from emerging economies.

Finally, despite a cross-country longitudinal study based on a multiple-theoretical perspective, this study has some limitations that need to be acknowledged. The study is limited to corporate board variables of size, gender diversity, number of meetings and independence. Future studies should look at the impact of other corporate board variables such as foreign members on the board, board expertise, CEO duality, multiple directorships, business knowledge of directors, age, experience and qualifications of the board members among others on the ESG reporting, performance and disclosure. Also, future studies may consider governance or board sub-committee variables such as ownership structure, audit committee characteristics and the presence of sustainability committee and their impact on ESG reporting. Similarly, future studies should look at the impact of external governance structures and country-level characteristics such as regulations, government policies, corporate governance codes, culture, labour law, governmental efficiency and political stability on ESG disclosure behaviour. Finally, this study relies on data from the Bloomberg database implying only listed firms with complete datasets were considered. Future studies should consider using both listed and non-listed firms and using mixed method of data analysis, this may help in enhancing the generalisability of the findings.

Note

1. The corporate governance literature considers and refers agency, stakeholder and legitimacy theories as trinity theories. Lu *et al.*, (2022) noted that agency, stakeholder and legitimacy theories are the most frequently used theories in board structures, characteristics and diversity literature.

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