

# DISCOVERING THE RELATIONSHIP BETWEEN INTERNAL FIRM CHARACTERISTICS AND ENVIRONMENTAL DISCLOSURE IN TANZANIA: THE MODERATION ROLE OF CORPORATE GOVERNANCE

**Ntui Ponsian Prot**

*St. Augustine University of Tanzania, Tanzania.*  
*E-mail: [ntui.proti@saut.ac.tz](mailto:ntui.proti@saut.ac.tz); [ponsianproti@yahoo.com](mailto:ponsianproti@yahoo.com)*

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**Abstract:** In contemporary discussions on environmental management and sustainability, there is a growing consensus that a substantial portion of environmental damage and climate change can be attributed to economic activities. To address these concerns, regulatory frameworks have been implemented to minimize the adverse effects of these activities. Nevertheless, there is now a continuing dispute and a deficiency in a thorough comprehension regarding the rationale behind corporations' decision to include their environmental practices and impacts in their annual reports. This study examines how corporate governance frameworks influence the relationship between firm internal characteristics and environmental disclosure in Tanzania's extractive industry. Drawing from institutional theory, the research used content analysis and panel data from annual reports from 18 companies, spanning the years 2004 to 2018. The study classifies its variables into two primary categories: the first category comprises firm internal characteristics (such as age, size, profitability, kind, structure of ownership, and structure of capital of the organization) that directly impact environmental disclosure. The second group examines corporate governance structures, such as the board's independence, size, gender diversity among board members, and board committees, as factors that reduce or enhance the impacts. The research findings are important because they show that gender diversity has a moderating effect on the relationship between business size and environmental disclosure. Conversely, the autonomy of the board diminishes the correlation between the company's dimensions, longevity, ownership composition, financial framework, and nature, as well as its disclosure of environmental information. Moreover, the

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size of the board has a moderating effect on the relationship between a company's environmental performance and its capital structure. Furthermore, the committees of the board exert a substantial influence on the relationship between the company's nature, its financial structure, and its communication of environmental data. These findings highlight the importance of promoting greater gender diversity within corporate boards and ensuring active involvement, especially in audit committees. Ultimately, the study encourages managers, company leadership, and boards to proactively engage in environmental protection, sustainable practices, and transparent reporting of their environmental activities. By doing so, they can contribute to the broader goals of environmental conservation and accountability in the business world.

**Keywords:** Environmental Disclosure, Corporate Governance Practices, Moderation Effect, Institutional Theory, Extractive Industry, Tanzania

## 1. INTRODUCTION

The global environmental discourse has evolved in response to the imperative of safeguarding our planet's well-being. Human-induced changes, as emphasized and reported in the United Nations Development Programme (UNDP, 2022) and Lumbanga (2018), have ushered in uncertainties and insecurities, with climate change standing as a prominent issue in the midst of these concerns. Climate change poses a challenge that can be addressed through comprehensive environmental information disclosure, empowering stakeholders to make informed decisions. This is particularly significant in the context of global poverty, as underscored by the World Bank's Poverty and Shared Prosperity Report of 2021, which identifies climate change as one of the three factors exacerbating poverty.

The progression of these environmental dialogues may be tracked from the Rio de Janeiro Declaration to the Paris Agreement, which amalgamates the principles of sustainable development and the accessibility of environmental data (UN, 2015). The Rio Declaration emphasizes the public's right to obtain environmental information in order to promote sustainable development. This access enables citizens to actively engage in the protection of environmental and natural resources, including data pertaining to water, air, soil, wildlife, plants, land, and natural regions. Furthermore, it acknowledges the entitlement to acquire information regarding activities that could potentially have detrimental effects on these resources, encompassing administrative measures and environmental management programs (UN, 1992). The Paris Agreement, enacted in 2015, signifies a worldwide pledge to address climate change by decreasing carbon and noxious gasoline emissions with the aim of constraining the rise in temperature (UN, 2015).

Environmental resources in Tanzania contribute a substantial 70% of the country's gross domestic product (GDP) and have a vital role in sustaining the livelihoods of its population. Hence, it is imperative to efficiently oversee them for the benefit of both current and future generations. Despite the implementation of the National Environmental Policy (NEP) in 1997, environmental challenges persist, especially in the mining industry. The Tanzanian government (URT, 2021) has acknowledged that inadequately supervised mining, oil, and gas activities can have adverse consequences for the environment, human health, and safety. Consequently, there have been substantial deliberations over the most efficient approaches to supervising the industrial sector and reducing the effects of these developments on nearby communities. The debates have led to the implementation of policy and legislative reforms, such as the enactment of the Mineral Policy of Tanzania in 2009 and the Tanzanian Mining Law in 2010 among other initiatives.

Environmental information is being disseminated more widely as a result of the increased awareness of environmental challenges around the world and the necessity of effectively managing resources. As a result, a number of laws have been passed with the intention of safeguarding the environment (O'Connor, 2006; Ena-horo, 2009; Kamal *et al.*, 2012). Because of environmental concerns, businesses have embraced ecologically sustainable and socially responsible strategies (Millar & Searcy, 2020). It is noteworthy, therefore, that emerging nations slack down in terms of environmental disclosure policies (Kamal *et al.*, 2012). Studies on environmental accounting and transparency are few in number, despite the environment's obvious degradation and suffering (O'Connor, 2006). With the increasing interest in environmental disclosure among firms, several theories have been developed to explain the reasons behind this disclosure (Roslan *et al.*, 2013; Wang'ombe, 2013).

Research on the factors influencing environmental disclosure (EvD) has produced varied findings (Dienes *et al.*, 2016; Nurhayati *et al.*, 2016; Dobbs & Staden, 2016; Ahmadi & Bouri, 2017; Chandok & Singh, 2017; Al-Shaer *et al.*, 2017; Adusei, 2017; Hossain *et al.*, 2017). Variables that are significant in one country or industry may not hold the same weight in others, with some even exhibiting contradictory influences. Methodological, theoretical, and geographical factors contribute to the inconsistency of results. Similarly, studies on corporate governance structures also present divergent findings (Rouf, 2011; Rao *et al.*, 2012; Michelon & Parbonetti, 2012; Khan *et al.*, 2013; Fernandez-Feijoo *et al.*, 2014; Ika *et al.*, 2021; Raimo *et al.*, 2022; Jing Lin & Md Qamruzzaman, 2023; Faozi *et al.*, 2023); some suggest a positive

correlation between corporate governance structures and EvD, while others argue the opposite, and some find no significant link at all. This diversity in findings is attributed to various contextual and methodological factors (Wang'ombe, 2013).

Considering the significant consequences of extractive industry operations on the environment, local communities, and the national economy, the Tanzanian context provides a distinctive perspective for exploring how corporate governance structures and company attributes influence EvD (URT, 2016; Abdullah, 2017; TEITI, 2020). Therefore, the present study aims to examine how corporate governance systems influence the connection between the internal features of firms and their environmental disclosure in Tanzania's extractive industry.

## 2. LITERATURE REVIEW AND HYPOTHESES FORMULATION

It is thought that corporate governance frameworks play a critical role in controlling the relationship between an organization's internal characteristics and its EvD level. Depending on how they affect a firm's actions—which can be influenced by peer pressure, authoritative rules, social norms, imitation tendencies, or coercive demands from professional associations—this moderating effect can either increase or decrease EvD. These governance frameworks are intended to direct and impact the disclosure of environmental information, drawing on institutional theory, which holds that businesses adopt structures and actions in accordance with institutional norms and external standards.

Numerous studies contribute to this ongoing conversation. For example, Said *et al.* (2013) found a significant relationship between the level of EvD and the presence of an independent, non-executive chairperson. Board independence and voluntary corporate disclosure are positively correlated, according to studies by Rouf (2011), Rao *et al.* (2012), Amran *et al.* (2014), Jizi *et al.* (2014), Shamil *et al.* (2014), Shan (2009), Sharif and Rashid (2014), and Faozi *et al.* (2023). The findings imply that boards are more likely to offer thorough information on environmental issues if there is a higher proportion of independent members. According to Arayssi *et al.* (2020), boards led by chief executive officers (CEOs) typically place less value on social responsibility. CEOs, according to Zahra and Pearce (1989), have a significant influence on the composition and direction of boards. On the other hand, board independence and EvD have been found to negatively correlate by Li *et al.* (2013) and Abdelsalam and El-Masry (2008). However, research by Said *et al.* (2009) and Nurhayati *et al.* (2016) has shown that the two variables do not appear to be related.

In Tanzania, according to the Corporate Governance Practices Act of 1994 and its guidelines (URT, 2002a), it is required that boards retain a significant level of independence by having non-executive directors make up at least one-third (33%) of the board. Consequently, firms are expected to adhere to these institutional norms and guidelines, fostering the hypothesis that:

***H1: Independence of the board positively moderates the influence of firm characteristics on environmental disclosure***

Regarding the proportions of the board, extensive research reveals a wide array of findings. According to Villiers *et al.* (2009), smaller boards are considered more successful in overseeing managerial actions. Furthermore, as stated by Cheng (2008), smaller boards are more proficient in attaining consensus choices. Zahra and Pearce (1989) suggest that smaller enterprises with smaller boards may provide CEOs or owners with the opportunity to hire acquaintances who are not fully used, thereby ensuring legitimacy.

On the other hand, larger companies with more comprehensive boards can function as mechanisms for supervision and regulation. A number of studies (e.g., Jizi *et al.*, 2014; Shamil *et al.*, 2014; Faozi *et al.*, 2023; Raimo *et al.*, 2022; Ika *et al.*, 2021) have identified a positive link between the quantity of board members and the level of corporate social responsibility (CSR) disclosure. However, Amran *et al.* (2014) were unable to find any correlation, while Rao *et al.* (2012) discovered a positive relationship that goes against previous predictions. Kolsi (2017) contended that the size of the board has no substantial influence on voluntary disclosure. Conversely, Nurhayati *et al.* (2016) discovered that the magnitude of the firm's size significantly affects the fluctuations in EvD.

In Tanzania, the regulatory framework mandates that corporations must have a minimum of two directors and encourages boards to have an appropriate number of members to exert an effective impact on company decisions while adhering to legislation and norms. Consequently, it is anticipated that boards will function equitably and impartially, adhering to these regulations. In accordance with institutional theory, businesses with larger boards are more inclined to provide a more extensive amount of precise information regarding the environment. Consequently, the subsequent hypothesis can be formulated:

***H2: Size of the board positively moderates the influence of firm characteristics on environmental disclosure***

The impact of gender diversity on boards has produced a range of outcomes. Studies by Fernandez-Feijoo *et al.* (2014), Barako and Brown (2008), Raimo

*et al.* (2022), and others have demonstrated a clear correlation between the presence of women on company boards and increased levels of EvD and CSR. Nevertheless, no discernible effect has been discovered in other later research (Khan, 2010; Galbreath, 2010; Bowrin, 2013; Amran *et al.*, 2014; Faozi *et al.*, 2023). Galbreath (2010) asserts that female directors are more likely to engage with a broader variety of stakeholders and show a higher awareness of their concerns. This could strengthen corporate social responsibility. However, Khan (2010) is unable to find a significant relationship between the amount of voluntary disclosure and the representation of women on corporate boards. Said *et al.* (2013) and Ewert and Baker (2001), on the other hand, discover relationships between gender and environmental activities. This implies a relationship between gender and environmental issues, most likely indicating that women are more likely to be concerned about environmental issues. In this specific framework, the following hypothesis is put forth:

***H3: Diversity of gender in the board positively moderates the influence of firm characteristics on environmental disclosure***

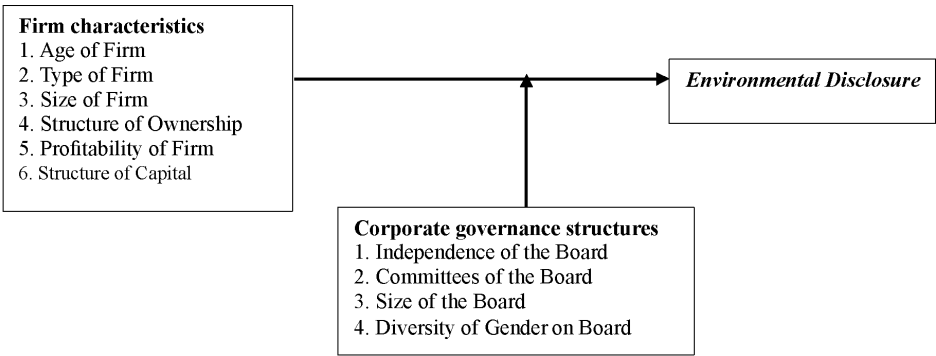
The influence of board committees has demonstrated a wide range of results. The research undertaken by Khan *et al.* (2013), Ika *et al.* (2021), and Raimo *et al.* (2022) demonstrates a direct relationship between the existence of audit committees and the provision of social and environmental information. In a similar vein, Amran *et al.* (2014) discovered a direct correlation between the presence of sustainability committees and the disclosure of corporate social responsibility (CSR) information. Michelon and Parbonetti (2012) found a clear link between the existence of sustainability committees and the reporting of corporate social responsibility (CSR), but not with environmental disclosure (EvD). However, Dilling (2010) does not find any meaningful association.

In the Tanzanian context, companies are required to hold at least one audit committee meeting annually (URT, 2002b), creating the expectation that firms with active committees will have higher levels of EvD. From an institutional perspective, these committees serve as mechanisms for checks and balances, professionalism, and sustainability. This leads to the following hypothesis:

***H4: Committees of the board moderate the influence of firm characteristics on environmental disclosure***

This framework illustrates how corporate governance systems affect the connection between business characteristics and environmental disclosure (EvD), which in turn affects both voluntary and required disclosure practices.

Studying EvD necessitates the careful examination of business features and corporate governance systems to fully grasp their significance.



**Figure 2.1: Conceptual Framework**

### 3. RESEARCH DESIGN

The study entailed gathering imbalanced panel data from annual reports through the use of a content analysis technique. The decision to use manifest content analysis was based on its objectivity and the clear and objective quality of the recorded data pertaining to the internal characteristics of the organization and corporate governance systems. The data gathering instruments were standardized according to professional norms such as the Global Reporting Initiative (GRI) and generally established literature. This was done to ensure the reliability and validity of the data collection process. Annual reports were chosen for data collection due to their wide distribution, the wealth of information they provide, and their formal review and approval by governing boards, ensuring transparency.

#### 3.1. Population, sample and data collection

The total population consisted of 1,287 firms within the Tanzanian extractive industry, encompassing mining, oil, and gas sectors. To establish a sample, 55 firms were selected based on their materiality threshold, with a minimum of TZS 300 million in reporting government receipts. These firms were assumed to be financially robust and transparent in their annual report disclosures. The study utilized structural equation modeling (SEM) for analysis, which required a sample size compliant with the rule of 10. The study met the criteria of having a sample frame of 55 and a sample size of 18, resulting in a total of 216 observations. Additionally, it fulfilled the conditions established by Comrey & Lee (1992) and satisfied the rule of 10.



Data was gathered from annual reports and financial statements covering the period from 2004 to 2018. This period spans from the year when the Environmental Management Act was put into effect and the year Tanzania formally adopted the International Financial Reporting Standards (IFRS) to the year when natural resources reforms were effected in 2017-2018. Annual reports were acquired from company websites as they are crucial for disseminating information to stakeholders and facilitating continuous public examination.

### **3.2. Data analysis**

Descriptive statistics, including measures such as mean, standard deviation, maximum and lowest values, and percentages, were employed to present a comprehensive summary of firm profiles and response rates. The study employed structural equation modeling (SEM) methodology to investigate hypotheses and evaluate the relationships among internal firm features, corporate governance structures, and EvD variables. SEM was selected for its robust and all-encompassing analytical capabilities.

### **3.3. Variable measurement and operationalization**

The study consisted of ten predictor variables categorized into firm internal characteristics (FiC) and corporate governance structures (CoG), with one criterion (EvD). Firm internal characteristics directly influence EvD, while corporate governance structures play a moderating role. Here is a list of variables in the model and how they were measured: Under Firm Characteristics, several factors were assessed, including Size of Firm (FiZ), Profitability of Firm (FiP), Structure of Capital (CaS), Structure of Ownership (OwS), Age of Firm (FiA), and Type of Firm (FiT). These variables collectively represented the intrinsic characteristics of the firms under study, and their direct influence on EvD was analyzed.

On the other hand, corporate governance structures (CoG) comprise variables like size of the board (BoS), independence of the board (BoI), committee of the board (BoC), and diversity of gender in the board (GeD). These factors were seen as potentially moderating the relationship between firm characteristics and EvD.

Ultimately, the criterion for assessing the research's outcomes is EvD. The study explored how the combination of firm characteristics and corporate governance structures influences the extent to which firms disclose information related to their environmental practices and impacts. This framework allows for a comprehensive investigation into the complex dynamics between these variables within the context of the Tanzanian extractive industry.



To establish a direct relationship between firm characteristics and EvD and investigate the moderation effects of corporate governance structures on this relationship, two models were employed for data analysis:

**Model 1:**  $EvD = i_1 + a \text{ FiC} + e_1$  (Firm characteristics that determine EvD)

**Model 2:**  $EvD = i_2 + b'_1 \text{ FiC} + b'_2 \text{ CoG} + b'_3 \text{ FiC.CoG} + e_2$  (Moderating effect of corporate governance structures on FiC to EvD)

The study employed a thorough methodology to investigate the relationships between the variables and to understand the impact of corporate governance systems on the interaction between company characteristics and EvD. This approach facilitated a comprehensive investigation into the interplay and impact of these factors on the magnitude of EvD within the specific context of the study.

**Table 1: Operationalization of variables**

<i>Variable</i>	<i>Definition</i>	<i>Measurement</i>	<i>References</i>
Environmental Disclosure (EvD)	The scoring system involved tallying the points obtained from 20 disclosure items. Specifically, a score of 3 was allocated for monetary disclosure, 2 for quantitative disclosure, 1 for general disclosure, and 0 for non-disclosure in each item.	Number of Scores	Beck <i>et al.</i> (2010), Eltaib (2012), Kamal <i>et al.</i> (2012), Said <i>et al.</i> (2013), Bowrin (2013), Dobbs and Staden (2016), Kolsi (2017), Hossain <i>et al.</i> (2017).
Age of Firm (FiA)	Duration since the firm started operations	The number of years since establishment	Dienes <i>et al.</i> , (2016); Chandok and Singh, (2017),
Structure of Ownership (OwS)	The ratio of block shareholders to public shareholders.	The degree of share ownership concentration, particularly referring to shareholders who hold 5% or more of the shares.	Waweru <i>et al.</i> , (2011); Aljifri <i>et al.</i> , (2012), Al-Shaer <i>et al.</i> , (2017).
Type of Firm (FiT)	The operational stages encompassing upstream, midstream, and downstream activities.	Stream levels: Downstream (3), Midstream (2), Upstream (1).	Galani <i>et al.</i> , (2012), Said <i>et al.</i> , (2013).
Structure of Capital (CaS)	The ratio of the funds provided by the owners (equity) and the funds acquired through debt or borrowing.	Debt Equity Ratio	Waweru <i>et al.</i> , (2011), Dienes <i>et al.</i> , (2016), Al-Shaer <i>et al.</i> , (2017), Chandok and Singh, (2017).

<i>Variable</i>	<i>Definition</i>	<i>Measurement</i>	<i>References</i>
Size of Firm (FiZ)	The size of a firm measured in terms of the assets it possesses.	The value of natural logarithm of total assets.	Joshi, (2011), Waweru <i>et al.</i> , (2011), Nurhayati <i>et al.</i> , (2016), Al-Shaer <i>et al.</i> , (2017).
Profitability of Firm(FiP)	The quantitative or monetary performance of the firms	The ratio of Return on Assets	Dienes <i>et al.</i> , (2016).
Committees of the Board(BoC)	The number of board members serving on special control function committees.	The number of meetings held by the audit committee.	Dilling (2010); Al-Shaer <i>et al.</i> (2017).
Size of the Board (BoS)	The total number of members on boards	Board Members Attended Meetings	Al-Shaer <i>et al.</i> (2017),Shamil <i>et al.</i> (2014).
Independence of the Board (BoI)	The count of independent directors serving on the board.	The ratio or percentage of non-executive directors on the board.	Waweru <i>et al.</i> , (2011), Said <i>et al.</i> , (2013), Nurhayati <i>et al.</i> , (2016), Dienes <i>et al.</i> , (2016)
Diversity of Gender in the Board (GeD)	AllWomen on Boards	Ratioof Women on Board	Barako and Brown (2008), Kathyayini <i>et al.</i> , (2012), Fernandez-Feijoo <i>et al.</i> , (2014).

This table 1 provides a concise overview of the variables, making it easy to reference their definitions, measurements, and the relevant literature associated with each variable.

## 4. RESEARCH FINDINGS AND DISCUSSION

### 4.1. Industry characteristics

The study focused on two main divisions of the industry: the mining sector and the oil and gas sector. Among the 55 companies in this specific industry, only 18 (almost 33%) of them offered access to their annual reports on their websites for the purpose of collecting data. Out of the total of 18 enterprises, 12 of them (about 67%) were from the mining sector, while the remaining 6 (about 33%) were from the oil and gas sector. Out of the sample, 4 entities (about 22%) were locally owned businesses, whereas 14 (about 78%) were held by foreign entities, demonstrating a predominance of foreign ownership. A total of 216 yearly reports were analyzed for this study, taking into account the unbalanced nature of the panel data.

### 4.2. Descriptive statistics

Table 2 provides a thorough examination of the composition of boards in the extractive industry. The mean number of directors on these boards is 9, with

a minimum of 4 and a maximum of 18. This suggests that the boards are typically of modest dimensions. When examining the oil and gas industry in isolation, there is often an average of 8 directors, with a range of 4 to 13. The lower average can be attributed to the sector's relative freshness. However, these figures bear a resemblance to those documented in the mining industry, suggesting a notable degree of consistency throughout the firm.

According to the data, board committee meetings, particularly those of the audit committee, take place an average of three times each year across all business groupings. This indicates adherence to the Corporate Governance Practices Act, 1994, and its 2002 standards for corporate governance practices in Tanzanian listed firms. It is important to mention that several companies did not hold any committee meetings on a yearly basis, as indicated in Table 1.

The extractive industry faces a notable obstacle in achieving gender diversity since it often has an average of one female director on boards, with the number of female directors ranging from zero to five. The mining group, on average, lacks female directors, indicating a substantial disparity in gender diversity, with the number of female directors ranging from zero to three. Conversely, the oil and gas sector demonstrates a more resolute dedication to gender diversity, boasting an average of two female directors.

The level of board independence, as evaluated by the ratio of non-executive directors, is consistently strong across all categories. The industry group has a board independence rate of 68%, with the oil and gas group having the highest

**Table 2: Descriptive statistics of corporate governance structures**

<i>Structures of Corporate Governance</i>	<i>Mean</i>	<i>Std.D</i>	<i>Min.</i>	<i>Max.</i>
<b>Mining Group</b>				
Committees of the Board	3.03700	2.071200	.00000	14.00000
Size of the Board	8.75560	3.153900	4.0000	18.00000
Independence of the Board	.655900	.1792000	.14290	1.000000
Diversity of Gender in the Board	.488900	.7214000	.00000	3.000000
<b>Oil and Gas</b>				
Committees of the board	2.53090	1.851300	.00000	7.000000
Size of the Board	8.49380	2.292000	4.0000	13.00000
Independence of the Board	.724300	.1991000	.14290	1.000000
Diversity of Gender in the Board	1.69140	1.678100	.00000	5.000000
<b>Industry Group</b>				
Committees of the Board	2.8472220	2.00227580	.00000	14.00000
Size of the Board	8.6574070	2.85840100	4.0000	18.00000
Independence of the Board	.68152700	.189369400	.14290	1.000000
Diversity of Gender in the Board	.93981500	1.30867870	.00000	5.000000

percentage at 72% and the mining group reporting a board independence rate of 66%. The range spans from a minimum of 14% to a maximum of 100%, indicating that the boards are well-balanced with minimal variation among organizations, as evidenced by low standard deviations.

4.3. Model Fit and Confirmatory Factor Analysis (CFA)

Table 3 provides a thorough summary of the results obtained from the model fit test and confirmatory factor analysis conducted on both models. The purpose of these analyses is to assess the accuracy of the model in representing the data and the appropriateness of the variables included in the model.

Practically, when the values of CFI and TLI approach exceed or surpass 0.95 and RMSEA is less than 0.06 and SRMR is close to 0.08, these indications typically indicate a strong alignment between the model and the data. Additionally, the p-values associated with the chi-square statistic can also be used to assess goodness of fit, where non-significant p-values indicate a reasonable fit.

Table 3 : Model fit statistics and confirmatory factor analysis results

<i>Model1</i>	<i>Direct Variables</i>		<i>Estimates</i>		<i>S.E.</i>		<i>C.R.</i>
	FiP		3.5760*		1.6060		2.2270
	CaS		-.12200		.28200		-.4340
	FiT		.22300		.44200		.50500
	FiA		.02800**		.00600		4.9060
	FiZ		.73700**		.06000		12.2840
	OwS		1.0000		.44200		.50500
	COEFFICIENT	GFI	AGFI	CMIN/DF	P	CFI	RMSEA
<i>Model2</i>	Significant.	.9100	.8210	6.1010	0.0000	.6430	.1150

\*Significant at the 0.05 level

\*\*Significant at the 0.01 level

Model 1 analyzed six parameters to directly determine the corporate attributes that influence environmental disclosure. The goodness of fit indices, as well as the intercepts and estimates, suggest that the model is a satisfactory fit for the data.

The results from Model 2 showed favorable goodness of fit indices, indicating that no adjustments were necessary. The ratio of Chi-square to degrees of freedom (CMIN/df) is 6.1010, and the Goodness of Fit Index (GFI) is 0.9100. Moreover, all of the parameter estimations are non-zero. The

results validate the accuracy of the original model in representing the data and indicate that all variables are appropriate for future exploration.

An extensive analysis was conducted to assess the autonomy of each variable in the model. The VIF analysis reveals that there are no issues of multicollinearity in the data since all VIF values are below 5, which aligns with the accepted study requirements (Akinwande, 2015; Kock & Lynn, 2012; Henseler *et al.*, 2016). The maximum measured VIF is 2, with most values below 2, and a significant proportion having a VIF of 1, as seen in Table 4. The VIF test demonstrates that the explanatory variables in the multiple regression models have very low linear correlation, suggesting their independence from each other.

Furthermore, a correlation matrix was utilized to assess the independence of variables. Table 4 presents the correlation matrix, indicating that the variables maintain their independence from one another. No variable is found to be nested within another or measuring more than one variable, and there are no substantial correlations between the independent variables. The highest correlation observed was 0.4180, signifying that the variables are largely independent of each other. This rigorous analysis ensures that the data and models used in the study are suitable for further investigation and provide a robust foundation for drawing meaningful conclusions.

Table 4 presents the correlation values between variables, ranging from a minimum of 0.0010 to a maximum of 0.4180. This indicates a substantial level of independence among the variables, emphasizing that none of the variables is embedded within another or significantly related to another variable. The independent variables display minimal correlations, with none exceeding 0.4180, as evident in the correlation between the type of firm and the independence of the board.

These modest correlations between variables affirm the presence of a sufficient degree of diversity and independence among the independent variables, enabling the estimation of their distinct effects. This limited correlation is particularly advantageous for the analysis as it mitigates concerns related to multicollinearity, which can arise when highly correlated variables are included in the same analysis.

The modest correlation levels among the independent variables also imply the absence of strong associations among them, allowing for an individual assessment of each variable's influence on environmental disclosure. High correlations between variables might indicate that one variable is a subset of another or that they are closely intertwined, potentially complicating the

Table 4: Correlations of variables and variance inflation factor (VIF)

	<i>FiA</i>	<i>FiT</i>	<i>OuS</i>	<i>FiZ</i>	<i>CaS</i>	<i>FiP</i>	<i>BoS</i>	<i>BoC</i>	<i>GeD</i>	<i>BoI</i>	<i>EvD</i>	<i>VIF</i>
<i>FiA</i>	1											1.06
<i>FiT</i>	-.0450	1										2.14
<i>OwS</i>	.0090	.3380**	1									1.33
<i>FiZ</i>	.0710	.1030	.0710	1								1.82
<i>CaS</i>	-.0040	.0700	-.0300	.2340**	1							1.11
<i>FiP</i>	.0370	.2020**	-.0900	.0920	-.0260	1						1.18
<i>BoS</i>	.0810	.1630**	.0640	.1420*	.0200	.2370**	1					1.46
<i>BoC</i>	-.0940	.3870**	.1380*	.1040	.0110	-.0070	.1690**	1				1.42
<i>GeD</i>	.1240*	-.0540	-.1420*	.3610**	.0680	.1250*	.4200**	-.1080	1			1.63
<i>BoI</i>	-.0970	<b>.4180**</b>	-.0750	-.2510**	-.0320	.0930	-.0910	<b>.0010</b>	-.0090	1		1.65
<i>EvD</i>	.2940**	.1910**	.0990	.6590**	.1120	.1580*	.450**	.2850**	.5510**	-.1990**	1	1.06

\*Significant at the 0.05

\*\*Significant at the 0.01

analysis. The findings validate the assertion that the variables maintain an adequate level of independence from each other, assuring the validity of the hypotheses under investigation.

#### **4.4. Firm characteristics and environmental disclosure**

Model 1, as depicted in table 3, demonstrates that the age, size, and profitability of the enterprise have notable and favorable impacts on EVD. These effects are statistically significant at the 1%, 1%, and 5% levels of significance, respectively. Conversely, the other components in the model do not exert substantial influence on EvD. The conditions for the three mentioned variables (firm age, business size, and firm profitability) are met as a result. It's essential to emphasize that, as noted by Memon *et al.* (2019), significant moderation effects can still be observed even if independent variables were initially non-significant.

#### **4.5. Moderating effects of corporate governance structures**

The results displayed in table 5 provide insight into how corporate governance frameworks influence the relationship between the internal features of a firm and EvD. Significant interactions are evident, notably between gender diversity and the size of the firm at the 1% significance level. Additionally, the interaction between independence of the board and size of the firm is significant at the 1% level, as are age of firm at 1%, structure of ownership at 1%, structure of capital at 1%, and type of firm at 1%. The size of the board significantly correlates with the profitability of the firm at 1% and the structure of capital at 5%. Lastly, the committees of the board significantly interact with the type of firm at 1% and the structure of capital at 1%.

These findings underscore the importance of various aspects of corporate governance structures in moderating and shaping the relationship between firm internal characteristics and EvD. The specific interactions between these variables provide valuable insights into the intricate dynamics at play within the study's context.

The findings suggest that the level of independence of the board significantly influences the connection between the internal attributes of the company and its disclosure of environmental information. To be more precise, it diminishes the correlation between the size of a company, the age of the firm, and the ownership structure. At the same time, it enhances the association between the type of business, the structure of capital, and the disclosure of environmental information.



Table 5 : Corporate governance structures effects on firm internal characteristics

ESTIMATES									
FiCs	Direct Model	Indirect Models							
	FiCs	BoI	FiC.BoI	BoS	FiC.BoS	GeD	FiC.GeD	BoC	FiC.BoC
FiA	.0280**	.0050**	-.1470**	.0050**	-.0870	.0050**	.0120	.0070**	.0060
FiT	.2230	.3640**	-.1520**	.0830	.0090	.1410	.0450	.1280	.2620**
FiZ	.7370**	.1220**	.1720**	.1090**	.0460	.0890**	-.0020**	.0870**	-.0240
CaS	-.1220	.0140	.1520**	-.0340	.0900*	.0010	.0540	-.0030	-.2440**
OwS	1.0000	.0260	.1350**	.0270	-.0130	.0800*	.0590	.0330	-.0120
FiP	3.5760*	.0120	-.0350	.0240	-.0130**	.0410	.0790	.0080	-.0320

\*Significant at the 0.05 level

\*\*Significant at the 0.01 level

Specifically, firms with independent boards tend to have reduced levels of environmental disclosure when they are large or well-established over time. This reduction in disclosure in larger or older companies might be because CEOs in such firms often wield more authority, and older companies may prioritize maintaining their positive reputation over stringent environmental disclosures. However, in certain contexts, independent boards can enhance environmental disclosure, particularly in firms with specific structures of ownership, those with a downstream orientation, and highly leveraged companies. This suggests that the existence of autonomous boards may restrict the extent of environmental information provided by larger and more established companies, but it can enhance such disclosure in enterprises with specific attributes.

The size of the board in corporate governance has a negative moderating effect on the relationship between firm profitability, capital structure, and environmental disclosure. The relationship between the company's profitability and its disclosure of environmental information appears to be weakened by a larger board, maybe due to the varied skills of the board members and their focus on financial stability. Moreover, the inclusion of board size as a moderator substantially modifies the correlation between capital structure and environmental disclosure.

Gender diversity is a vital aspect to take into account while evaluating corporate governance systems and board moderating. It negatively affects the association between a company's size and its amount of environmental disclosure. Specifically, the inclusion of women on larger boards diminishes the correlation between a company's size and its extent of environmental disclosure. The results indicate that women who are members of larger boards have a tendency to emphasize legal adherence and the interests of shareholders over more extensive socioeconomic and environmental matters.

However, the influence of board committees seems to be restricted in their role as moderators. The research suggests that they have a minimal impact on the correlation between the internal features of a corporation and its environmental disclosure. The observed discrepancy can be attributed to fluctuations in the frequency of committee meetings among firms.

To summarize, the research emphasizes the intricate influence of corporate governance structures, such as board independence, board size, gender diversity, and the existence of board committees, on the governance of the connection between a firm's internal characteristics and its disclosure of environmental information. These findings offer useful insights into the impact of various governance practices on the environmental disclosure behavior of enterprises.

They highlight the significance of taking into account the distinct characteristics of each company when assessing the influence of corporate governance.

#### 4.6. Discussion

The research findings highlight the substantial impact of corporate governance structures on firm internal characteristics (FiC) and their moderating effects on EvD. The study explores the influence of various governance elements in the Tanzanian extractive industry, offering insights into how they interact with different internal aspects of firms and environmental disclosure.

The results demonstrate that independence of the board negatively moderates the effects of size of the firm, age of the firm, and structure of ownership on environmental disclosure. This suggests that independent boards, particularly in larger, older firms with numerous block holders, alleviate the pressure to disclose more environmental information. This moderation helps protect firms from undue stakeholder pressure and promotes adherence to guidelines and regulations, reducing unnecessary expenses. The results are consistent with Ahmadi and Bouri (2017), who emphasize the role of effective corporate governance structures in reducing legitimacy pressures on environmental disclosure.

On the other hand, independence of the board positively moderates the relationship between type of firm, structure of capital, and EvD. This may be attributed to the influence of independent boards in firms facing high-risk situations, such as downstream companies. Additionally, boards of highly leveraged firms may strive to demonstrate social and environmental compliance to regulators. The observed negative moderation aligns with Zahra and Pearce (1989), who argue that smaller, younger firms often underutilize their boards, while larger, older firms may use them as control instruments, which can reduce internal pressures for EvD. Positive moderation may signify firms' efforts to meet regulatory and environmental compliance standards.

Larger boards are found to negatively moderate the profitability of firms and the structure of capital in relation to EvD. This implies that extensive boards tend to restrain the environmental spending and activities of profitable and highly leveraged firms, safeguarding their financial performance. This result corresponds to several prior studies that have shown the impact of the board on EvD, as seen in Jizi *et al.* (2014), Raimo *et al.* (2022), Faozi *et al.* (2023), and others. It is worth noting that the size of the board does not moderate other firm internal characteristics, such as age of firm, structure of ownership, type of firm, and size of firm. This suggests that large boards primarily prioritize

profit maximization while leaving other aspects to be managed by the CEOs, who often wield more influence. This finding is consistent with the notion that large boards tend to focus on financial objectives, as advocated by Zahra and Pearce (1989).

Gender diversity has been observed to mitigate the influence of company size on the extent of environmental disclosure. This indicates that the presence of gender diversity reduces the responsibility of larger firms to furnish environmental data. The discussion emphasizes the range of gender obstacles in the Tanzanian extractive industry, where there is a lack of female presence. This is consistent with the findings of Shamil *et al.* (2014) and Said *et al.* (2013), who have discovered diverse connections between gender diversity and environmental disclosure.

Gender diversity has no moderating effect on other internal features of a firm, including the age of the firm, ownership structure, capital structure, firm type, and profitability. This could be attributed to the insufficient presence of women in the governing bodies of smaller companies, potentially constraining their mitigating influence. This finding aligns with prior studies conducted by Khan (2010), Bowrin (2013), Amran *et al.* (2014), and Faozi *et al.* (2023), which have documented varied or restricted effects of gender diversity on the disclosure of corporate social responsibility (CSR).

Board committees have been found to reduce the influence of business type and capital structure on environmental disclosure. Regular board committee meetings have a substantial positive impact on EvD, especially for companies operating in downstream or high-risk industries, as well as companies with high levels of debt. This finding aligns with previous research conducted by Said *et al.* (2009), Khan *et al.* (2013), Nurhayati *et al.* (2016), Ika *et al.* (2021), and Raimo *et al.* (2022), which emphasize the influence of board committees on EvD. The board committees do not mitigate the correlation between the age, size, ownership structure, and profitability of a corporation and its environmental disclosure. This might be attributed to infrequent meetings or low attendance during the year, reducing the committees' effectiveness. This result is consistent with Dilling (2010), which suggests that the efficiency of committees on the board in moderating environmental disclosure may be compromised by infrequent meetings and deliberations.

In conclusion, the study underscores the substantial role of corporate governance structures in shaping environmental disclosure practices. Independent boards, size of the boards, diversity of gender in the boards, and

specialized committees in the boards impact different aspects of firms and their approach to environmental responsibility. These findings contribute valuable insights to our understanding of how corporate governance can influence firms' environmental disclosure practices, affecting stakeholder relationships and compliance with regulations.

## **5. CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS**

### **5.1. Conclusions**

The results show that the association between the size of the company, the age of the company, the ownership structure, and the amount of environmental disclosure in the extractive industry is negatively impacted by the existence of an autonomous board. Businesses with a larger proportion of independent directors are also more likely to follow national and international laws and provide objective assessments on environmental issues. Furthermore, respectable businesses that put their reputation first could withhold some environmental disclosures in order to allay worries about rules. This cut usually aligns with a reputation-protection strategy, even if it means sacrificing shareholder value. Additionally, the relationship between capital structure, business type, and EvD is positively moderated by the independence of boards. Independent boards can help make environmental data more accessible, especially for companies that are perceived as heavy users of resources or pollutants. The desire to cultivate positive relationships with authorities may be the motivation behind this disclosure.

It has been noticed that the existence of big boards negatively affects the correlation between a company's profitability, capital structure, and environmental disclosure. The platform they provide enables the seamless integration of multiple domains of expertise, efficiently overseeing the dissemination of environmental data while simultaneously attaining financial goals. Moreover, boards in prosperous corporations and severely indebted organizations ensure that profits are allocated in accordance with the objectives of shareholders while also allocating a portion to environmental projects. This acts as a protective measure against fines for failure to comply and aids in fulfilling the requirements of stakeholders. Gender diversity negatively influences the relationship between a company's size and its amount of environmental disclosure. Increasing the number of women on a board of directors decreases the internal pressure on management to reveal environmental information in order to maintain credibility, even if it could have adverse

effects on shareholders. Female directors are crucial in guaranteeing impartial and consistent environmental reporting.

Board committees mitigate the correlation between the nature of the company, its financial framework, and the extent of environmental disclosure. Regular board committee meetings are associated with a rise in environmental disclosure in corporations that have a significant impact on pollution and in organizations that have a high level of debt. During these occurrences, board meetings may be driven by the necessity to appease stakeholders, evade fines or penalties, and execute strategies to reduce debt payments. However, the board committees do not intervene in the relationship between the age of the company, its size, ownership structure, profitability, and environmental disclosure. This can be attributed to the infrequency of board committee meetings throughout the year.

## **5.2. Recommendations and implications**

Companies should prioritize the regular convening of board committees, particularly audit committees, to influence firm decisions, including environmental disclosure. The absence of or rare committee meetings in a given year should be avoided, and a commitment to scheduled meetings should be maintained. Policymakers should develop environmental policies that take into account various factors affecting environmental disclosure. This could involve offering tax incentives and integrating environmental disclosure into the public tendering system, which could incentivize improved disclosure practices among companies.

Regulators should establish a comprehensive regulatory framework or guidelines to ensure consistent and comparable reporting of environmental activities by firms. This framework should accommodate the diversity of firms based on their size, industry, or other relevant criteria. NEMC should incorporate environmental disclosure as a mandatory component in companies' financial and annual reports, aligning it with broader environmental policy. This would provide clear guidance to firms on how to report their environmental activities.

Standard-setting bodies, such as the International Accounting Standards Board (IASB) and the National Board of Accountants and Auditors (NBAA), should consider the establishment of standards specific to firm characteristics such as size, age, and industry. This would offer precise guidelines for companies within each category. Users of environmental reports, including civil society, investors, and activists, should recognize the voluntary nature of disclosure. Implementing incentives beyond legal requirements could encourage enhanced

disclosure practices. Investment decisions should also take into account the environmental, social, and governance (ESG) ratings of companies as a valuable criterion.

Future research should promote ongoing discussions and studies in sustainability and environmental accounting, disclosure, and reporting. Qualitative approaches, including interviews with financial statement preparers, can provide additional insights. Future studies should consider large samples, multiple industries, and multi-country or multi-industry comparisons to generalize findings for different contexts. In-depth research on locally owned firms will reveal the factors that influence environmental disclosure within the framework of local regulations and stakeholders.

This study is significant for several stakeholders, encompassing individuals, groups, institutions, and government entities. Each of these categories can employ the findings for knowledge and practical applications, contributing to a larger comprehension of the influence of corporate governance frameworks on environmental disclosure.

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### *Conflict of Interest*

There is no conflict of interest involved in the publication of this paper.

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