

The association between corporate governance and environmental disclosure quality: evidence from Nigerian listed companies.

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The association between corporate governance and environmental disclosure quality – Evidence from Nigerian listed companies

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A thesis submitted in partial fulfilment of the requirement of the Robert Gordon University for the degree of Doctor of Philosophy

October 2024

DEDICATION

This thesis is dedicated to the most important person in my life, my leader and role model, Prophet Muhammad (SAW), whose teaching and guidance have led me to where I am presently.

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Muhammad received various academic award such as:

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- b) First position poster doctoral showcase presentation award by Robert Gordon University Aberdeen, United Kingdom (2019).
- c) Petroleum Technology Development Fund (PTDF) Overseas PhD scholarship award.
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ABSTRACT

Purpose: Environmental Disclosure Quality (EDQ) refers to the transparency, accuracy, and comprehensive disclosure that companies use to disclose their environmental impact. High EDQ is vital for stakeholders to examine their environmental sustainability. Corporate governance is the principles and system of directing and controlling companies, which plays an important role in improving stakeholder trust through corporate accountability, such as EDQ. Despite corporate governance and EDQ's importance, there is a dearth of literature on corporate governance and EDQ in general and from developing countries in particular. This study advances the literature by investigating EDQ and its association with corporate governance amongst listed Nigerian companies, a country identified as one of the top 20 polluters worldwide on an emission's per capita basis, which increases environmental pollution. The study employs a multi-theory approach, incorporating insights from stakeholder, legitimacy, agency, signalling and resource dependency theories.

Research design/methodology/approach: It uses a comprehensive hand-collected dataset from various sources for all listed companies on the Nigerian Stock Exchange for the year 2017, a year predating the 2018 code of corporate governance, making it the most extensive dataset in this research area in Nigeria. It employs a weighted self-constructed disclosure index method to measure EDQ. It then uses ordinary least squares (OLS) and stepwise regression analysis to validate the disclosure index and then investigate the association between EDQ and various corporate governance variables after controlling for firm characteristics.

Findings: The results show low-quality environmental disclosure amongst listed Nigerian companies. Regarding the firm characteristics, the results indicate a highly significant association between firm size, profitability, multinationalism and industry type with EDQ. On the contrary, leverage, liquidity, and auditor type have no association with EDQ. Secondly, the results show that board characteristics such as board size, board independence, board meeting frequency, board experience and presence of foreign members have significant positive associations with EDQ. CEO duality has a significant negative association with EDQ. Interestingly, gender diversity has no association with EDQ. Lastly, the results show that ownership structure plays an important role in EDQ. Institutional and

managerial ownership have a significant negative association with EDQ. On the contrary, ownership concentration has a significant negative association with EDQ.

Implications: The findings of this study would likely be of interest to regulators, investors, companies and academic scholarship. For regulators, it will help the Nigerian government understand the quality of environmental disclosure amongst listed companies and direct resources towards tackling the low level of engagement in high-quality disclosure. Investors can use these results to find lower-risk Nigerian-listed companies. Companies can use the results to improve their governance structure and environmental disclosure quality to legitimise their activities within the environment in which they operate. Lastly, the study's results contribute to academic scholarship on corporate governance and environmental sustainability, where such literature is limited due to data availability.

Contributions: The study contributed to two literatures: disclosure literature and governance literature. In terms of disclosure literature, it investigates the quality of voluntary corporate environmental disclosure in one of the top 20 global polluters of metric tonnes of emissions. More importantly, the measure of the quality considers the importance of climate-related financial disclosure in line with the recent development of the Task Force on Climate-Related Financial Disclosures (TCFD) by the Financial Stability Board. It uses a disclosure index with fifty-seven items of environmental information (the highest of its kind) to measure EDQ released in annual, sustainability and website reports. Better corporate governance involves better disclosure but what constitute this better governance is context dependent. Accordingly, this study contributes to the literature by providing empirical evidence of what constitute better corporate governance amongst Nigerian listed firms. Lastly, the study considers the whole Nigerian market, which makes the results generalisable.

Keywords: *environmental disclosure, quality, Nigeria, corporate governance, emerging, developing, stakeholder, legitimacy, agency, signalling and resource dependency.*

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ABBREVIATIONS

Attorney-General of the Federation - AGF
Bureau of Public Enterprises - BPE
Companies and Allied matters Decree - CAMD
Companies and Allied Matters Act - CAMA
Corporate Affairs Commission - CAC
Department of Petroleum Resources - DPR
Economic and Financial Crimes Commission -EFCC
Environmental disclosure quality - EDQ
Environmental social and governance disclosure - ESG
Financial Reporting Council of Nigeria - FRCN
National Petroleum Investment Management Services - NAPIMS
Nigerian Exchange Group -NGX
Nigerian National Petroleum Corporation Limited - NNPC Limited
Nigerian Exchange Limited - NGX Exchange
Nigerian National Oil Corporation - NNOC
Nigerian National Petroleum Resources - NNPC
Nigeria Real Estate Limited - NGX RELCO
Nigeria Regulation Limited -NGX REGCO
Nigerian Stock Exchange - NSE
Organisation of Petroleum Exporting Countries - OPEC
Petroleum Industry Act- PIA
Social and environmental disclosure - SED
Securities and Exchange Commission -SEC

Chapter 1: INTRODUCTION

1.1 Background of the Study

The impact of industrial pollution and anthropogenic activities on the environment is of global concern. Large-scale heavy industries, which consume high energy and have significant environmental impacts, are major sources of global warming and environmental damage (Osemene et al., 2021; Welbeck et al., 2017). These industries are expected to make environmental disclosure to various stakeholders on how the negative impact of their operations on the environment is addressed. Therefore, the United Nations Sustainable Development Goals (SDG) indicate that countries should motivate companies to actively contribute to sustainable development projects that will help to attain global environmental targets (United Nations Environmental Programme, 2024). In this context, corporations can use environmental disclosure to provide information about their environmental activities to shareholders, customers, suppliers, regulators, employees, companies, environmental activists, creditors, media and identifies environmental priorities.

Corporate governance is the principles and system of direction and control to improve stakeholders' trust in different areas, such as policies and practices, which ensure transparency, accountability, and fairness practices in a manner of improving stakeholders' trust. Environmental disclosure is the process of communicating environmental impact and techniques used to address such impact. Corporate governance and environmental disclosure have their basis in accountability and ethical norms, leading to some entities establishing new constitutions (Al Fadli et al., 2022). Effective corporate governance structures should focus on economic, social and environmental goals to enable various stakeholder interest groups to enhance disclosure quality, integrity and reliability (Gerged, 2021).

Disclosure lies at the centre of nearly all codes and standard of corporate governance, such as, the UK Corporate Governance Code, OECD Principles of Corporate Governance and the Sarbanes-Oxley Act in the United States. To illustrate, transparency and disclosure are two of the corporate governance principles released by the Organization for Economic Cooperation and Development (OECD). According to this principle, "*the corporate governance*

framework should ensure that prompt and accurate disclosure is made on all material matters regarding the corporation, including the financial situation, performance, sustainability, ownership, and governance of the company" (OECD, 2023, p.27). Hence, better corporate governance is expected to enable credible and transparent corporate disclosure, including environmental disclosure (Okere et al., 2021). Better corporate governance increases companies' reputation and resource allocation. It also improves environmental strategies and reduces information asymmetry (Cormier et al., 2010). Therefore, prior studies have tried to investigate the determinants of environmental disclosure. One of such factors is corporate governance.

There is no universal environmental disclosure and governance practice that can be applied to all countries due to variations in economic/legislation development levels. In addition, differences exist in the level of awareness and attitude towards environmental disclosure and governance practices amongst countries/companies. Previous studies on corporate governance and environmental disclosure mainly focus on developed countries (Chand et al., 2022; Chouaibi, Miladi and Elouni, 2022; Gerwing, Kajüter and Wirth, 2022; Raimo et al., 2022; Khalid et al., 2022; Zouari and Dhifi, 2022; Acar et al., 2021; De Masi et al., 2021; Khaireddine et al., 2020; Nicolò et al., 2021; Chebbi, Aliedanb and Mohammed, 2020; Tingbani et al., 2020; Baalouch, Ayadi and Hussainey, 2018), while literature on developing African countries is extremely limited, especially in Nigeria which experiences the destruction of ecological systems and natural resources due to industrial/economic developments. Thus, this study aims to investigate the associations between corporate governance and EDQ among listed companies of Nigeria, which is one of the top 20 global polluters of metric tonnes of emission (Paddison and Choi, 2024).

This chapter is organised as follows. Section 1.2 provides research motivation. Research contribution is explained in section 1.3, followed by the research aim in section 1.4. Section 1.5 provides a research methodology overview, while section 1.6 covers the uniqueness of this research. Finally, the structure of this thesis is explained in 1.7.

1.2 Motivation of the study

Latest climate crises show that challenges and losses associated with environmental change are becoming severe day by day. For example, according to the Independent the US has experienced 28 climate and weather-related events, which have resulted in losses in excess of \$1bn in 2023, including major four floods, seventeen storms, two tornados' events, two tropical cyclones, a wildfire, a combined heatwave/drought, and a winter storm which disrupt business activities (Boyle, 2023). Hence, environmental damage is increasingly attracting public concerns, where parts of the world can become uninhabitable due to global warming (IPCC, 2021). Scientific evidence shows that global warming is driven by carbon dioxide emissions (ibid), to which the corporate sector is a major contributor. In addition, the Global Financial Stability Report highlights the importance of corporate environmental disclosure in reporting the extent of a company's exposure to climate-related risks (Hassan, Romilly and Khadaroo, 2023; IMF, 2020). Corporate environmental disclosure is a crucial tool that is used by firms to demonstrate business awareness of the adverse effect of its operations on the natural environment and the measures it takes to mitigate such impact.

Previous literature reveals that companies with better governance are more environmentally responsible than poorly governed ones (Ntim and Soobaroyen, 2013). However, what constitutes this better governance is context dependent. Studies on corporate governance aspects, such as board size, CEO duality, board independence, gender diversity, board meetings, institutional ownership, blockholder ownership and managerial ownership, vary amongst developed countries. To illustrate, previous studies on the association between corporate governance and environmental disclosure in New Zealand (Chand et al., 2022) and France (Khairredine et al., 2020) found that board size has a significant positive association with environmental disclosure. This means that a board with large members promote the release of higher environmental disclosure. Contrary, other studies on the association between corporate governance and environmental disclosure in Australia (No, Rao and Tilt, 2016) and the United Kingdom (Abu-Raya, 2012) found no association between board size and environmental disclosure. This demonstrated that size of boards does not increase or decrease environmental disclosure. In terms of CEO duality, previous studies in Australia (Rao and Tilt, 2016) have revealed that CEO duality does not increase or decrease

levels of environmental disclosure. Contrary studies on corporate governance and environmental disclosure in the United Kingdom (Abu-Raya) found that CEO Duality decreases environmental disclosure. Similarly, board independence studies have a significant positive association with environmental disclosure in France (Khairreddine et al., 2020) and the United Kingdom (Abu-Raya, 2012). Other studies in Canada (Cormier, Ledoux and Magnan, 2011) found a significant negative association between board independence and environmental disclosure. Board meetings have a significant positive association with environmental disclosure amongst French companies (Khairreddine et al., 2020) but have a significant negative association with environmental disclosure amongst United Kingdom companies (Abu-Raya, 2012). Institutional ownership has a significant positive association with environmental disclosure amongst French (Dakhli, 2021) and United Kingdom (Abu-Raya, 2012) companies. However, institutional ownership has a significant negative association with environmental disclosure amongst Spanish companies (García-Meca and Pucheta-Martínez, 2018). Managerial ownership has a significant positive association amongst German companies (Gerwing Kajüter and Wirth, 2022) and a significant negative association with French companies (Dakhli, 2021).

Similar to developed countries, differences exist within developing countries on what constitutes better corporate governance. For example, board size has a significant positive association with environmental disclosure in Jordan (Alkayed and Omar, 2022) and Indian (Kumari et al., 2022) companies. Contrary board size has no association with environmental disclosure amongst China (Wang, Fan and Zhuang, 2023) and Brazil (Fernandes, Bornia and Nakamura, 2018) companies. Board independence has a significant positive association with environmental disclosure amongst Jordan companies (Alkayed and Omar, 2022) but has no association with environmental disclosure amongst companies operating in India (Kumari et al., 2022) and China (Wang, Fan and Zhuang, 2023). CEO duality has a significant positive association with companies operating in Indonesia (Handayati et al., 2022) significant negative association with companies operating in China (Wang, Fan and Zhuang, 2023), India (Kumari et al., 2022) and no association with companies operating in Sri Lanka (Nuskiya et al., 2021). The presence of gender diversity has a significant positive association with environmental disclosure amongst Malaysian companies. Contrary gender

diversity has no association with environmental disclosure amongst companies operating in Jordan (Alkayed and Omar, 2022) and India (Kumari et al., 2022). Board meetings have a significant positive association with environmental disclosure in companies operating in India (Kumari et al., 2022), Jordan (Alkayed and Omar, 2022), and Indonesia (Handayati et al., 2022). Institutional ownership has a significant positive association with environmental disclosure amongst companies operating in Turkey (Akbas and Canikli, 2019). However, it has a significant negative association amongst companies operating in Jordan (Gerged, 2021) with environmental disclosure. Blockholder ownership has a significant positive association with environmental disclosure amongst companies operating in China (Wang, Fan and Zhuang, 2023). On the contrary, blockholder ownership has a significant negative association with environmental disclosure amongst companies operating in Jordan (Gerged, 2021). Hence, findings from a study on a particular country/industry may not be applicable to other countries.

A review of prior studies shows that the literature on the association between corporate governance and environmental disclosure mainly focuses in developed countries such as United States (Albitar, Abdoush and Hussainey, 2022; Feng, Groh and Wang, 2020; Giannarakis Andronikidis and Sariannidis, 2020; Manita et al., 2018; Rupley, Brown and Marshall, 2012; Post, Rahman and Rubow, 2011; Marshall, Brown and Plumlee, 2011; Boesso and Kumar, 2007), the United Kingdom (Tingbani et al., 2020; Al-Qahtani and Elgharbawy, 2020; Liao, Luo and Tang, 2015; Abu-Raya, 2012; Hassan, 2010; Brammer and Pavelin, 2008), Italy (De-Masi et al., 2021; Cucari, Esposito De Falco and Orlando, 2018) Australia (Arif et al. 2020; Nadeem, Zaman and Saleem 2017; Kathy Rao, Tilt and Lester, 2012), France (Khairreddine et al. 2020; Chebbia Aliedanb and Mohammed, 2020; Baalouch, Damak Ayadi and Hussainey 2018), New Zealand (Chand, et al. 2022), Germany (Gerwing Kajüter and Wirth, 2022), Australia (Arif et al. 2020; Nadeem, Zaman and Saleem, 2017; Kathy-Rao, Tilt and Lester, 2012; O'Sullivan Percy and Stewart, 2008). There are relatively fewer studies in developing countries which focussed on Asia and Middle East countries such as China (Wang Fan and Zhuang, 2023; Agyemang et al. 2020), Saudi Arabia (Bamahros et al., 2022; Habbash, Hussainey and Awad, 2016; Habbash, 2015), India (Kumari et al., 2022; Ghosh et al., 2022; Roy and Ghosh 2017; Ezhilarasi and Kabra, 2017), Jordan (Alkayed and Omar, 2022; Rabi', 2019; Alkayed, 2018), Indonesia (Handayati, et al.,

2022; Solikhah, and Maulina, 2021; Trireksani and Djajadikerta, 2016), Malaysia (Zahid et al., 2020; San-Ong, 2019; Ismail and Latiff, 2019), Brazil (Fernandes, Bornia and Nakamura, 2018; Husted and De- Sousa-Filho 2018), Pakistan (Lu et al., 2021 Naseer and Rashid, 2018), Bangladesh (Masud, Nurunnabi and Bae 2018) and even less studies in African countries Egypt (Elfeky, 2017; Akrouit and Othman, 2016; Soliman, El Din and Sakr, 2013), Libya (Alnabsha et al., 2018) Botswana, Kenya, Mauritius, South Africa, and Zambia (Kilincarslan et al., 2020) due to issues related to data availability and accessibility.

As a Sub-Saharan African country, Nigeria offers an interesting case to study the association between corporate governance mechanisms and EDQ. Nigeria is a very rich country in natural resources¹. To illustrate, Nigeria is the largest oil producer in Africa and the 14th largest producer worldwide (BP, 2022). It is the 2nd largest producer of gas amongst the African countries and the 17th largest gas producer globally (ibid). Moreover, it is the 2nd largest producer of coal amongst African countries and the 19th largest producer of coal globally (US Energy Information Administration, 2020). Nigeria is also the 7th largest country in Africa in terms of Iron ore exports and one of the fastest growers from 2021 to 2022 (World Top Exports, 2022). This richness in natural resources attracts domestic and international investments in the corporate sector, which reduces the unemployment rate and enhances the country's economic growth. According to data obtained from the International Monetary Fund (IMF) for the period 2017 to 2023, Nigeria has the largest economy in Africa based on gross domestic product², the 28th worldwide (International Monetary Fund, 2023).

This economic growth adversely affects the natural environment in land, sea, and air through the release of carbon dioxide and the disposal of toxic waste, creating environmental damage and environmental problems. For example, applying modern chemicals to seeds in agricultural businesses results in habitat loss for plants and animals. Oil exploration affects human health through oil spoilage, gas flaring, industrial pollution, and other related effects (Chukwudi et al. 2016). This potential environmental damage motivated the Nigerian government in 1988 to ban harmful waste dumping in Nigerian territory, either in water or land.

¹ See appendix 1.

² See appendix 1.

Additionally, the government established the Federal Environmental Protection Agency in 1988 and the National Environmental Standards and Regulation Enforcement Agency in 2007 (Adekanmi et al., 2015). The government issued the Nigerian Code of Corporate Governance in 2011, which requires the board of directors to disclose information about the extent and nature of health and safety, environmental policies and practices undertaken by the corporate sector, as well as initiatives to minimise environmental damages, especially for environmentally sensitive industries.

However, relatively recent statistics show that Nigeria has extremely poor environmental performance³. To illustrate, Nigeria is one of the top 20th global polluters, responsible for 83% of metric tonnes of emissions in 2022 (Paddison and Choi, 2024). The World Bank statistics on greenhouse gas emissions from 2017-2020 ranked Nigeria as the 11th country that released high greenhouse gas emissions amongst the same sample of emerging markets (World Bank, Total greenhouse gas emission, 2023). Furthermore, Nigeria is ranked 3rd amongst African countries and 9th worldwide in the level of gas flaring (World Bank, 2022). The Environmental Performance Index of 2022 ranked Nigeria as the 168th out of 180 countries for environmental performance, which indicates very poor environmental performance (Wolf et al., 2022). It also indicates the necessity to deal with various sustainability requirements, with an emphasis on key issues such as air and water quality, biodiversity, and climate change. The Children Climate Risk Index ranked Nigeria as 2nd out of 163 countries, which indicates that Nigeria is the second most climate-vulnerable country for children worldwide (United Nations Children's Fund, 2021). Nigeria suffers from environmental carelessness issues. Environmental carelessness is the negative impact of environmental sustainability carelessness on human activities (Rosen, 2020). To demonstrate, residents of Bille and Ogale of the Niger Delta area sued Shell BP in London court because of the destructive pollution, which destroyed farmland for agriculture and fishing and contaminated boreholes, wells and tap water for drinking (Guardian, 2023). In Kano state, Challawa, Wudil, and Sharada residents suffer from water diseases because industrial waste contaminates their water source (Daily Trust, 2018). Apart from that, washing toxic waste in rivers destroys fish, increasing

³ See appendix 1.

unemployment in the state (Daily Trust, 2018). This increases political unrest such as militancy, destruction of company's properties and abduction (Amaeshi et al., 2016).

Nigeria has a weak governance system⁴ (e.g., Adegbite 2015; Adegbite, Amaeshi and Amao, 2012). To illustrate, according to data obtained from the World Bank for the period 2017 to 2022, Nigeria is ranked 2nd amongst a sample of thirty-six emerging markets (Appendix 2), which lack control of corruption, government effectiveness, and rule of law. Nigeria ranked 3rd amongst the same sample of emerging markets in terms of low political stability and regulatory quality. Lastly, Nigeria ranked 13th for lack of voice and accountability (World Bank, Worldwide Governance Indicators, 2023).

Hence, measures taken by the top global polluters responsible for 83% of metric tonnes of emissions worldwide to address the environmental climate crisis have a significant impact on the global community (Paddison and Choi, 2024). One such measure is corporate environmental disclosure quality, which demonstrates business awareness of the adverse effect of its operations on the natural environment and the measures it takes to mitigate such impact. Therefore, understanding the quality of environmental disclosure for listed companies in Nigeria and the governance drivers of high-quality environmental disclosure are crucial not only domestically but also internationally.

1.3 Aim and objectives of the study

This study advances the literature by investigating the association between corporate governance and EDQ in one of the top 20 global polluters responsible for 83% of metric tonnes of emissions, i.e., Nigeria, employing a multi-theory approach (legitimacy, stakeholder, agency, signalling and resource dependency theories). It uses a sample of listed companies on the Nigerian Stock Exchange for the year 2017 and employs regression analysis (ordinary least square and stepwise). To achieve the purpose of this study, formulate the objectives below:

- i. To measure the quality of environmental disclosure released by Nigerian-listed companies.

⁴ See appendix 2.

- ii. To validate the disclosure index by investigating the association between firm characteristics and EDQ for Nigerian listed companies.
- iii. To investigate the association between board characteristics and EDQ for listed Nigerian companies.
- iv. To assess the association between ownership structure and EDQ.

1.4 Scope of the Study

The current study aims to examine the association between corporate governance and EDQ for Nigerian-listed companies for the year 2017. An association is a statistical relationship amongst two or more variables showing that one variable change relates another variable change. Associations are measured using statistical techniques such as correlations and regression (Cohen et al., 2020). The study is not about investigating the causation between corporate governance and EDQ for Nigerian listed companies. A causal relationship is a statistical investigation that implies one variable affects another variable directly. This shows how the cause variable directly produces a change effect variable, assuming controlling other confounding potential factors (Shadish, Cook, and Campbell, 2002). Causation shows the relationship between two variables where a direct change of one variable results in another variable change (Antonakis et al., 2010). There are differences between association and causation. Association does not assume influence or direction, while causation indicates directional influence of where a variable influences another. Apart from that, association does not show confounding potential variables where causality involves controlling confounders (Pearl, 2009). In terms of methodology, examining association is done using cross sectional and panel data, while investigating causation requires panel data to see how the past affects the future (Rosenbaum, 2020). This study uses cross sectional data. Thus, a temporal dimension in the data constrains the ability to test for causality for this study (Hassan and Martson, 2019; Antonakis et al., 2010). Finally, this study covers all companies listed on the Nigerian Stock Exchange; it does not consider other companies not listed on the Nigerian Stock Exchange.

1.5 Contribution of the study

This research contributes to two kinds of literature: disclosure literature and governance literature.

In terms of disclosure literature, firstly, it investigates the quality of voluntary corporate environmental disclosure in one of the top 20 global polluters of metric tonnes of emissions in contrast to most prior studies, whether from developed countries (Zhang, 2022; Danisch, 2021; Miklosik and Evans, 2021; Chithambo et al. 2021; Reboredo and Sowaity, 2022) or developing countries (Reboredo and Sowaity, 2022; Ntui, Mzenzi and Chalu, 2021; Boshnak, 2021; Ifada et al., 2021), which focused on the quantity of disclosure. This is particularly important because coding the disclosure practice of a company based on different aspects of disclosure, such as quality and quantity, could lead to different rankings and inferences (Hassan and Marston, 2019). While the quantity of disclosure considers whether an item of information is disclosed or not, the quality of disclosure focuses on the nature of the information reported. Even though measuring disclosure quality is complicated and unequivocally subjective, quality disclosure is more important than copious disclosure. Quality disclosure ensures that useful information is provided and presented in a clear and understandable manner. It helps the user grasp the essential points without being overwhelmed by irrelevant details (Hassan and Martson, 2019). This promotes better comprehension and reduces the risk of misunderstanding. In addition, a high-quality disclosure builds trust and credibility. For example, when information is verifiable, it inspires shareholders' confidence (Buchholtz, Brown, and Shabana, 2008). More importantly, the measure of the quality considers the importance of climate-related financial disclosure in line with the recent development of the Task Force on Climate-Related Financial Disclosures (TCFD) by the Financial Stability Board (e.g., Demaria and Rigot, 2021; D'Orazio, 2021; Edwards et al., 2020; Eccles and Krzus, 2019). This measure considers non-narrative disclosures, while narrative disclosures are information released in textual form, non-narrative disclosures are information presented in figures, charts, graphs, and pictures. They are vital communication tools, powerful instruments for clearer communication of information to stakeholders who do not have time to read everything in the report (Alkayed, 2018). For example, according to Wilmshurst and Frost (2000), pictures deliver more information than thousands of words.

Secondly, it measures EDQ for an emerging Sub-Saharan African market where there is a dearth of empirical evidence. Only a few studies in African markets measure EDQ amongst Egypt, Libya, and Tunisia oil and gas companies (Eljayash, 2015) compared to other continents. This study from Nigeria provides an understanding of how companies operating in African markets answer environmental pressure and other motivations for EDQ. This contributes to fill the research gap on EDQ. Nigeria studies on EDQ could play an important role in shaping regional environmental and economic trend as Nigeria has the largest economy amongst African countries. Studies on EDQ from Nigeria can reveal how other African companies report EDQ especially those with similar environmental conditions. This study can serve as a precedent for other African countries with limited EDQ research. Studies on EDQ in Nigeria could assist Nigerian and African policy makers on existing regulations efficiency and effectiveness which improve environmental accountability and transparency. Apart from that, findings from this study can contribute to literature on adjusting or creating international standard that meet specific challenges and needs of African economies. This study contributes to the literature on how African companies contribute or fails to environmental sustainability improving corporate behaviour responsibilities. This study contributes beyond Nigerian literature on EDQ (Egbunike and Tarilaye, 2017; Odera, Scott and Gow, 2016; Innocent, Okafor and Egolum, 2014) by focussing on the whole Nigerian market, develop disclosure index with the highest number of environmental disclosure items and consider environmental information released on websites and sustainability reports.

Thirdly, this research develops a disclosure index with the highest number of environmental disclosure items, containing fifty-seven items of environmental information compared to previous Nigerian studies that used a disclosure index ranging from ten to thirty-six items (e.g., see Appendices 7, 13 and 19), which may not capture all environmental disclosure released by Nigerian companies.

Fourthly, this study measures the quality of disclosure for a Sub-Saharan African country across several disclosure vehicles, namely annual reports, sustainability reports, and corporates' websites, using hand-collected data. Coding of these disclosure information manually from three different sources is a labour-intensive and time-consuming method. This, in turn, contributes to the literature on corporate environmental disclosure from emerging markets and draws a more

comprehensive picture of corporate environmental disclosure practices compared to studies that only used annual reports.

In terms of governance literature, better corporate governance involves better disclosure but what constitute this better governance is context dependent. For example, large proportion of board independence is an indicator of good governance in France, United Kingdom and Jordan where in Canada (Cormier Ledoux and Magnan, 2011) small board independence is an indicator of good corporate governance in size is Canada (Cormier Ledoux and Magnan, 2011) and board independence is not an indicator of good corporate governance in India and China (Wang, Fan and Zhuang, 2023; Kumari et al., 2022). Apart from that, previous Nigerian studies did not investigate what makes better corporate governance on important variables namely, gender diversity, CEO duality, board meetings, board experience, institutional ownership and managerial ownership. These variables are important as CEO duality provides self-servicing opportunities, which affects a decision to release information, including environmental information (Alotaibi, 2016). Experienced directors serving on more than one board had experience with environmental reporting policies and practices of the different boards they serve (Rupley et al., 2012). Frequent board meetings can lead to higher communication and coordination costs, spreading the board agenda to various formal meetings without adequately addressing environmental issues (Giannarakis, Konteos and Sariannidis, 2014). Women ensure more perspective issues are deliberated in decision-making, including environmental disclosure (Fernandez-Feijoo et al., 2014). Institutional ownership can increase or decrease motivation for EDQ. It increases EDQ when institutional ownership considers environmental issues as a means of long-term value creation. In contrast, it decreases motivations for environmental disclosure when institutional ownership obtains the required environmental information from alternative sources other than corporate disclosure. Blockholders have various access to information they want when they dominate the shareholding structure (Abu-Raya, 2012). This study contributes to the literature by using additional corporate governance variables which have not been captured to investigate the association between corporate governance and EDQ for listed Nigerian companies.

This study considers the whole Nigerian market, which makes it result generalisable compared to previous Nigerian studies that concentrated on only a subset of industries. The study arguably produces the largest dataset used in Nigerian studies, drawing a more comprehensive picture of corporate environmental disclosure practices in Nigeria. Lastly, this research employs a sample of all listed companies on the Nigerian stock exchange for the year 2017, compared to industry-specific studies and arguably produces the largest dataset used in Nigerian studies, drawing a more comprehensive picture of corporate governance and EDQ practices in Nigeria (See columns 7 of Appendices 7, 13 and 19) which enables the generalisation of the results of the current study compared to that of prior Nigerian studies.

1.6 Overview of research methodology

The current study is based on a positivist research philosophy, which follows a scientific approach to formulate research hypotheses using meaningful theories. The results obtained from this approach can either support or contradict the tested hypotheses. The study used a deductive research approach that involves hypotheses development, variable selection, and measurements to have a well-recognised role in the existing literature and theories. The study uses a quantitative method to measure EDQ released in annual, sustainability and internet reports based on a weighted self-constructed disclosure index. The study period is 2017, and a final sample of 147 companies.

1.7 Significance of the study

The findings of this study are likely to be of interest to regulators, investors, companies, environmental activists and academicians. The results will help regulators understand the quality of corporate environmental disclosure amongst listed companies on the NSE, which could initiate interventions to improve corporate environmental transparency and accountability. The findings of this study will also help investors evaluate corporate environmental sustainability practices for investment decision-making (Khalid et al., 2017). The findings will raise awareness of the corporate sector about current environmental disclosure practices, which might motivate it to produce higher-quality environmental disclosure. The study provides empirical evidence about corporate environmental disclosure quality practices and corporate governance drivers of these practices,

which can help environmental activists hold relevant stakeholders accountable to reduce the adverse effect of their operations on the natural environment. Lastly, the findings contribute to the academic advancement of knowledge in the field of corporate governance and sustainability in Nigeria.

1.8 Structure of this thesis

This section provides an overview of the thesis structure of this study. Chapter two provides an overview of Nigeria and the Nigerian economy. It also provides an overview of corporate governance codes and practices in Nigeria.

Chapter three provides a comprehensive literature review. It started by explaining the concepts of environmental disclosure, corporate governance, and ownership structure. It then reviews various theoretical frameworks used to explain an association between corporate governance and environmental disclosure practices. The chapter proposed using a multi-theoretical framework to explain the association between corporate governance and EDQ after a critical review of literature. The chapter further provides a critical empirical review of literature in three sub-sections. The chapter concludes by outlining gap in the literature which this study aims to address and contribute to the literature in sub-Saharan African countries.

Chapter four presented the research hypotheses used for the current study. The hypotheses are formulated based on the prediction of a theoretical framework and evidence from empirical findings. The chapter divided three main hypotheses into sub hypotheses, which will tested in the empirical chapter.

Chapter five presents the research methodology and methods used for the current study. It outlines the research's philosophical assumptions and justifies the rationale of using positivist research philosophy. The chapter further debated various research approaches and explained the reason for using a deductive research approach. The chapter explains steps that follow to develop a disclosure index used to measure EDQ. The chapter also identified sources of data and independent variables used for firm characteristics, board characteristics and ownership structure. The chapter concludes by explaining techniques used for data analysis.

Chapter six provides an empirical analysis to achieve four research objectives. It measures the EDQ for the Nigerian market and each industry to achieve first research objectives. It further uses OLS and stepwise regression to investigate the association between each of firm characteristics, board characteristics and ownership structure with EDQ. The chapter concludes by providing an overall discussion of the results and implications for the Nigerian capital market.

Finally, chapter seven provides a summary of research implications and recommendations. It further concludes by outlining research limitations and conclude by indicating recommendations for future researchers.

CHAPTER 2: AN OVERVIEW OF NIGERIA AND NIGERIAN ECONOMY

2.1 Introduction

The chapter aims to provide an overview of Nigeria and the Nigerian economy. It starts by a general introduction on Nigeria in section 2.2, followed by an overview of the Nigerian economic system in 2.3. Section 2.4 provide an overview of disclosure requirement in the Nigerian capital market is in section 2.5. In section 2.6, the study provides an overview of corporate governance code and practices in Nigeria while section 2.7 explains ownership structure in Nigeria, and the chapter concludes in section 2.8.

2.2 Overview of Nigeria

The name Nigeria originated from the river Niger during the 19th century by the wife of Lord Lugard Flora Shaw in 1914. This is achieved by amalgamating the northern and southern regions. Nigeria is a country located between latitudes of 4°N and 14°N and longitudes of 3°E and 15°E in western Africa. Nigeria shares 4,047 km to the west with Benin, 1497km to the north with Niger, to the east 87 km with Chad and 1690km with Cameroon; and the south is in the Atlantic Ocean with the Gulf of Guinea (World Bank, Climate Change, 2021; Williams, 2012). Nigeria has a land area of 910770 km² (World Bank Land Area Square Report, 2023). There are two main regions in Nigeria: high and lowlands (World Bank, Climate Change, 2021). The high land ranges above the sea between 300m-900m, including North-Eastern Highlands, Plateau North Central and Western Uplands. In contrast, the lowland range of 300m includes the Chad Basin, Sokoto Plains, and western Nigeria coastal lowlands (World Bank Climate Change, 2021). Nigeria has a population of 218,541,212 people, according to the World Bank's population review for 2022 (World Bank, Population, 2023). It has the highest population in Africa and the sixth most populated country in the world (World Bank, Population, 2023). There is no standard total number of ethnic groups in Nigeria. The sum of the total ethnic groups in Nigeria is speculation (Gberevbie and Oni, 2021). For example, according to Vanguard (2023), there are three hundred and seventy-one tribes in Nigeria. Hausa-Fulani, Yoruba, and Igbo are the three main ethnic groups that dominate Nigeria (Hakeem, 2006).

Nigeria has thirty-six states and the Federal Capital Territory, Abuja. These states have a total of 774 local government areas.

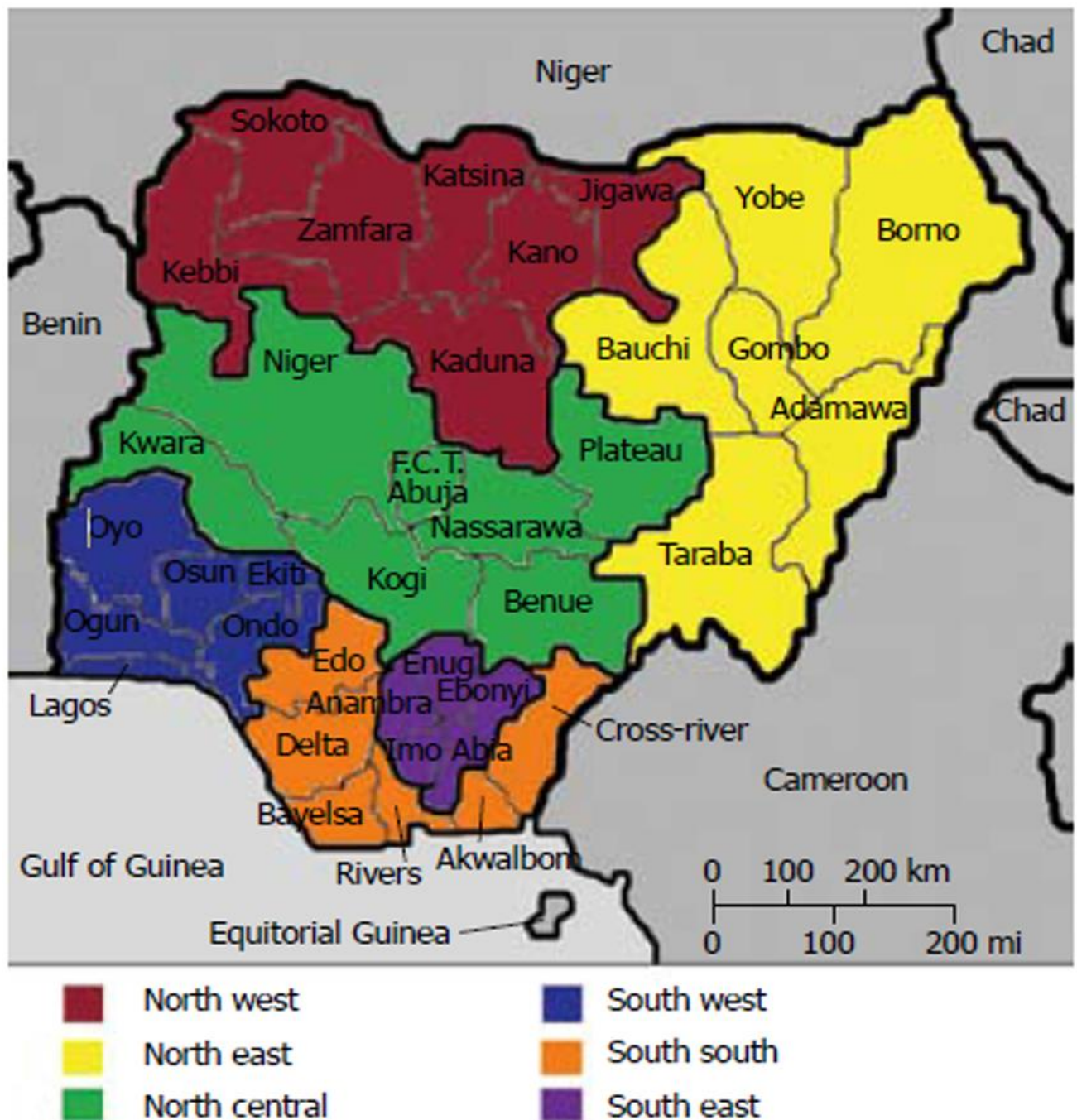


Figure 1: Nigeria map presenting the thirty-six state and federal capital territory (Abuja) under the six political zones.
Source: Adapted from Akinlua et al. (2015, p. 3).

2.3 An overview of Nigerian economic system

As explained in the motivation section, Nigeria has abundant natural resources such as oil and Gas, coal, limestone. Oil and Gas is the major source of Nigerian economy from 1956 to date (Ivungu et al., 2021; Ndal, Ibanichuka and Ofurum, 2021; Mohammed 2018; Odera, Scott and Gow, 2016; Oscar and Juliet, 2015; Dibia

and Onwuchekwa, 2015; James and Gbalam, 2013; Victor- Chiedu and Fodio, 2012; Fasanya, Onakoya and Adabanija, 2013).

Nigerian oil and gas exploration started by Nigerian Bitumen Corporation oil search in 1908 but, the exploration was interrupted because of various issues, such as difficulties in financing (Steyn, 2009). Later, in 1937, Shell D'Arcy was issued a licence to search for oil in the whole of Nigeria (Ogbuigwe, 2018). It started from Owerri state and continues searching for oil in Nigeria and the basin of the Niger Delta. However, the second world war interrupted the oil exploration. In 1951, Shell d'Arcy drilled the first oil well in Imo state, precisely Owerri, but oil was not discovered then. Two years later, oil was discovered in the same location but not for commercial purposes (Ogbuigwe, 2018).

In January 1956, a commercial quantity of crude oil was discovered in Nigeria at Oloibiri in the local government of Ogbia, Bayelsa State (Okorobia and Olali, 2018). After the discovery, Shell D'Arcy changed its name to Shell-BP Petroleum Development Company of Nigeria (Ogbuigwe, 2018). At the end of 1956, Shell-BP Petroleum Development Company of Nigeria drilled a second oil well in Rivers State. Two years later, in 1958, Nigeria exported the first crude oil cargo of about 5100 bd to Britain. During this period, Shell BP controlled oil production, and they only paid royalties, leases, and taxes to the colonial government until independence. In 1959, the government established the Federal Ministry of Lagos Affairs to protect government interests in the oil industry.

After the independence in 1961, the Nigerian government issued licenses to other multinational companies to search for oil in Nigeria's onshore and offshore territories (Ifesinachi and Aniche, 2013). During the year, a resolution was passed by the national assembly that gave the Nigerian government ownership rights to all natural resources found in the offshore and onshore territory of Nigeria. Later, in 1963, the government established the Federal Ministry of Power and Mines to take over supervising and regulating the oil industry from the Federal Ministry of Lagos Affairs (Ifesinachi and Aniche, 2013). In 1964, Nigeria discovered its first offshore oil in Delta State. This increases the exportation of crude oil and requires a specialised commission to supervise and regulate the industry. In response to that, in 1970, the government upgraded the hydrocarbon department of the Ministry of Power to an independent agency, the Department of Petroleum

Resources (DPPR), to regulate the petroleum industry in Nigeria (Ifesinachi and Aniche, 2013).

In 1970, Persian Gulf instability provided an advantage for the Nigerian oil market because it increased the export quota for Nigerian oil, marking the oil boom era (Okotie, 2018; Fasanya, Onakoya and Adabanija, 2013). Nigeria received high revenue from oil during that period and channelled the revenue to various capital projects such as developing power and increasing employment opportunities. However, this results in neglecting the agricultural sector (Okotie, 2018). From that time to date, oil become the major source of income for the Nigerian economy (Okotie, 2018; Fasanya, Onakoya and Adabanija, 2013). This marked the beginning of the period when Nigeria started depending on oil and neglecting agriculture.

In 1971, Nigeria joined the Organisation of Petroleum Exporting Countries (OPEC) (Ogbuigwe, 2018). OPEC was established in 1960 to coordinate and manage petroleum policies for its member states. It provides economic and technical assistance to its member states. It prevents international oil companies from controlling crude oil prices (Ogbuigwe, 2018), and joining OPEC increases government participation in the oil industry. In the same year, the government established the Nigerian National Oil Corporation (NNOC) (Ogbuigwe, 2018). NNOC's responsibilities include managing government investment in the exploration, production, and marketing of crude oil, also to represent the government in joint venture agreements with international oil companies.

In 1975, the government established the Ministry of Petroleum Resources, which resulted in mismanagement of the oil industry (Ifesinachi and Aniche, 2015). Thus, in 1976, the government set up a committee of investigation. The committee recommended excluding representatives of the ministry from being members of the NNOC board. Another important recommendation was to merge the Ministry of Petroleum Resources and NNOC. In April 1977, the government implemented the recommendation and merged the Ministry of Petroleum Resources and NNOC to establish the Nigerian National Petroleum Resources (NNPC) (Okorobia and Olali, 2018; Ifesinachi and Aniche, 2015). NNPC was bestowed with the exclusive power to supervise and regulate the oil industry on behalf of the federal government (Ogbuigwe, 2018).

On August 16th, 2021, Nigerian government passed the Petroleum Industry Act to replace the NNPC exclusive power of regulating oil industry after many years of attempts (Idiong, 2022). The Act bestows petroleum ownership within Nigeria's onshore and offshore territories to the Nigerian government at the federal level. The PIA aims to i) establish effective and efficient institutions governing clear responsibilities for the petroleum industry. ii) establish a structure for a commercial and profit-motivated national petroleum company. iii) To promote good governance, transparency, and accountability in administering Nigerian petroleum resources. iv) To promote a conducive petroleum business environment. v) To foster a business environment conducive to petroleum operations and vi) to develop Nigerian local content activities in the oil and gas industry.

The implementation of PIA established the Nigerian Upstream Regulatory Commission, Nigerian Mid-Down Stream Regulatory Commission, and Nigerian National Petroleum Limited (Idiong, 2022). The Nigerian Upstream Regulatory Commission was established under section 40 of PIA and saddled with the responsibility of supervising the Upstream Nigerian petroleum industry's operational, technical, and commercial activities (Idiong, 2022). The commission controls upstream petroleum activities by administering, enforcing, and implementing all national and international regulations, policies, laws, practices and standards relating to crude oil extraction, exploration and drilling (Idiong, 2022). The commission was established to replace the Department of Petroleum Resources (DPR). The commission has regulatory power of National Petroleum Investment Management Services (NAPIMS), which was previously a department under the Nigerian National Petroleum Commission (NNPC) relating to oil exploration (Idiong, 2022). The PIA gave the government the power to establish the board to manage the commission. The PIA gave the president the power to appoint board governing members who will be chaired by a non-executive commissioner subject to senate approval (Idiong, 2022).

Under section 29, the PIA established the Nigerian Midstream and Downstream Regulatory Commission (Idiong, 2022). The commission is responsible for regulating, commercialising and technical activities of Midstream and downstream activities. These include transmission and transportation of natural gas, crude oil transportation, and storage. Additionally, the commission has the power to issue,

grant, modify, terminate, or cancel permits, authorisation, and licenses for the operation of the Midstream and downstream activities of the petroleum industry (Idiong, 2022). The commission took over the Petroleum Products Pricing Regulatory Agency (PPRA) and Pipelines and Products Marketing Company (PPMC), which were previously departments of NNPC (Idiong, 2022). The PIA gave the government power to establish a board that would manage the commission similarly to the upstream commission. Additionally, the PIA gave the president the power to appoint board governing members who will be chaired by a non-executive commissioner subject to senate approval (Idiong, 2022). It is important to state that the board of upstream Midstream and downstream commissions have a tenure of five years, which can be renewable once (Idiong, 2022).

Thirdly, section 53 of the PIA establishes the Nigerian National Petroleum Corporation Limited (NNPC Limited) (Idiong, 2022). According to PIA, the minister of petroleum should establish NNPC Limited not more than six months from the date of implementation of the PIA. The finance ministry should hold the custodian of the shares on behalf of the federal government. The Act authorised the Ministry of Finance and the Ministry of Petroleum to oversee the transfer of NNPC assets and liabilities to NNPC Limited. Additionally, the PIA provides that the president of Nigeria should constitute the NNPC limited board members per the Companies and Allied Matters Act 1999 (CAMA) provision and should be given the right to operate like any other private company.

2.4 An Overview of the Nigerian Capital Market

The Nigerian capital market trades long and medium financial instruments. The capital market is divided into two: primary and secondary (Howells and Bain, 2007). The primary market trades new shares issued, while the secondary market trades existing shares and securities. The Securities and Exchange Commission (SEC) regulated Nigerian capital market activities, and the Nigerian Stock Exchange (NSE) supervised listed Nigerian firms' activities, while Corporate Affairs Commission register companies in Nigeria.

2.4.1 Securities and Exchange Commission (SEC)

The history of the Nigerian Securities and Exchange Commission dates back to 1962 when the Nigerian government constituted a capital issue committee for advisory and consultative purposes under the Central Bank of Nigeria. The aim

was to investigate companies' applications wanting to issue capital through the Nigerian capital market. The propose adequate time for issuing that to prevent the issuance of shares above the capacity of the Nigerian market. The committee worked as an advisory body under the Central Bank of Nigeria without statutory regulation. Eleven years later, the Nigerian government established the Capital Issue Commission Decree in March 1973, which created the Capital Issue Commission to overtake the committee. This is because of the increased economic activities in the capital market and the Nigerian Enterprise Promotion Committee pronouncement in 1972. Later, in 1976, the federal government set up a committee to review financial systems to overcome the challenges of the Capital Issues Commission and provide methods of growing the capital market. The committee recommends establishing the Securities and Exchange Commission Decree No. 7 of 1979, which led to the formation of the Securities and Exchange Commission that replaced the Capital Issue Commission. The commission commenced operation in January 1980 with fifty-one staff. The commission's responsibility is to control and develop Nigeria's capital market. Additionally, it regulates share issue prices and securities allotment basis.

Later, in 1988, the commission reviewed the Decree and came up with a revised Decree No. 79 of 1989. The aim is to have more provisions that facilitate the commission to function more effectively and to address the gaps created by the 1979 Decree. Lastly, the Investment and Securities Act (ISA) was reviewed and replaced by the Investment and Securities Act 29 of 2007, which is the current function of the regulation. The commission operates under four directorates: director general, operations legal and enforcement and corporate service. Its functions include registering investment securities and market intermediaries so that only proper institutions/persons can trade in the market. To inquire, inspect, and audit capital market operators when necessary. To observe and detect trading manipulations which can create market disruption. To investigate suspected violations of regulations and laws that govern the capital market. To enforce action in the form of fines, sanctions, suspension, or banning any person or institution found guilty of negative action. Lastly, the commission can forward any criminal allegation to anti-graft agencies such as the Economic and Financial Crimes Commission (EFCC) and the Office of Attorney-General of the Federation (AGF). One of the departments, Financial Standard and Corporate Governance (FS&CG)

is responsible for producing corporate governance codes and monitoring compliance. The department is also responsible for evaluating the financial health of Nigerian listed companies (Securities and Exchange Commission, 2019).

The SEC is the main body regulating the Nigerian capital market. It compels the Investment and Security Act (ISA) 2007, which comprehensively describes disclosure requirements, such as periodic reporting, annual reports, and material information. SEC instructs listed companies to submit periodic reports such as quarterly, semi-annual, and annual financial statements. Listed companies should submit quarterly, half-year and annual reports not more than thirty days after each quarter ends, sixty days after the semi-annual year ends and ninety days after the financial year ends, respectively. Failure to file reports with the SEC attract penalties, including paying fines of N500,000 (£251) with an additional N5000 (£3) for each delayed day after the deadline. Failure to fulfil reporting requirements sometimes results in company suspension from Nigerian Exchange trading. Consistent non-compliance can lead to legal action against the company's officers or directors, depending on the offence's gravity.

2.4.2 Nigerian Stock Exchange (NSE)

The Nigerian Stock Exchange was founded on 15th September 1960 and is known as the Lagos Stock Exchange, a non-profit entity. It started trading with nineteen securities and four main dealers: Investment Company of Nigeria (ICON), John Holt, Inlaks and Bowring. In 1977, the name was converted to Nigerian Stock Exchange, and branches opened in major commercial cities. Nigerian Stock Exchange started a share index in 1984, which reached 1000 points in 1992 and 10000 points in 2000. In 2011-2013, the market was transformed into a digital technology platform such as mobile trading technology X-GEN that improves direct access to the stock market. The structure of the market was changed in 2021 to profit-making. The Nigerian Stock Exchange was converted to a profit-making entity (Nigerian Exchange Group, 2023). The aim is to be the preferred African exchange market. Also, to provide a reliable, effective and adaptable exchange capital market to African businesses and investors that access capital. This established the Nigerian Exchange Group PLC.

The Nigerian Exchange Group (NGX) is Africa's integrated leading capital market (Nigerian Exchange Group, 2023). Its main functions include: i) Servicing the

largest African economy and strengthening African market competitiveness for global success. ii) Investing in technology and innovations that can shape the African future market iii) To implement global best practices to achieve the highest international standard iv) To meet customer's needs and reach the highest competitive level. The Nigerian Exchange Group (NGX) offers various services, such as securities trading and listing, real estate, licensing, market data, and regulations. The Nigerian Exchange Group PLC has three subsidiaries, namely, Nigerian Exchange Limited (NGX Exchange), Nigeria Real Estate Limited (NGX RELCO) and Nigeria Regulation Limited (NGX REGCO) (Nigerian Exchange Group, 2023).

Firstly, The NGX Exchange LTD is a Nigerian Stock Exchange Group subsidiary. SEC regulate it under the Investment and Securities Act 2007 (Nigerian Exchange Limited, 2023). It is a leading African trading and listing place for vibrant and professional exchange. It aims to adopt a modern capital market that provides a global competition platform for issuers' capital raising. To provide a smooth information flow that meet investor's financial objectives within the market. To assist customers in accomplishing their financial desires by providing exceptional customer service that creates reliable stakeholders and clients through promoting the ecosystem. Companies are listed on three boards, namely growth, main and premium boards (Nigerian Exchange Limited, 2023). The growth board is designed to link fast-growing companies operating in different sectors, such as small and medium companies and technology companies, to a large group of investors. The aim is to promote small-cap and growth-oriented companies for liquidity promotion, growth stimulation and long-term capital access. Companies with not less than N50 million Nigerian Naira (£ 26,247) in market capitalisation are listed under this category at the entry level, while N500 million Nigerian naira (£ 262,467) is for the standard level. The main board is designed to list well-established and demonstrate companies with track good records since 1961. The board lists companies under the main board according to their geographical, sectorial diversity and funding requirements to aid their economic growth. Companies listed under the main board can gain reputable capital access from international and local investors. The premium board is the section which lists the top groups of companies that lead their industrial area. This board lists companies that meet liquidity and capitalisation requirements of 200 billion Nigerian naira (£

10, 104,712,041). Companies listed under the premium board can access resources from global investor groups interested in companies managed according to best practices.

Secondly, NGX RELCO is a private limited company and a subsidiary of Nigerian Exchange Group. It was established to acquire, hire and lease personal or real property exchange. Nigerian real estate supervises highly significant public and personal properties, as well as institutional and private investors' properties. It has three main responsibilities: investment in real estate, letting property and management facilities (Nigerian Real Exchange, 2023).

Thirdly, NGX REGCO was established to supervising/making sure Nigeria Exchange (NGX) activities are carried out professionally and in line with market regulations (Nigeria Regulation Limited, 2023). Nigeria Regulation Limited's main responsibility is to promote equity trade principles and advocate open and free market and investor protection.

The Nigerian Stock Exchange instructs companies to release information that can impact securities prices or investors' decisions. This consists of announcements of financial results, material contract agreements, and changes in management positions (NSE, 2023). The Nigerian Stock Exchange recommends implementing a corporate governance code for accountability and transparency of governance practices (NSE, 2023). The time period for submission of quarterly, semi-annually and annual reports is consistent with the Securities and Exchange Commission's requirements submission period. Failure to meet file reports time attracts penalties, including paying fines between N100,000- N2000000 (£53-1052) depending on non-compliance duration (NSE,2023). Non-compliance persistently may result in suspension, while continued non-compliance may lead to delisting the company from trading within the NSE.

2.4.3 Corporate Affairs Commission (CAC)

Section 1 of the Companies and Allied Matters Act (CAMA) 1990 was designed to control the establishment and management of Nigerian companies. The aim of establishing the commission was to address the inefficiency facing the Company Registry Department under the Federal Ministry of Commerce and Industry, which was responsible for registering and supervising companies in Nigeria (Corporate Affairs Commission, 2023). The vision of CAC is to be an exceptional registry of

companies that offer world-class registration and regulatory services. The commission's functions include: i) supervising and regulating the company's establishment, running and winding up. ii) To maintain a registry of companies and all state offices with the federation having the proper equipment needed to carry out its duties as specified by the requirement of the Act or any law.

CAC has the power to conduct special investigations on the company's activities to benefit both shareholders and the public. Additionally, CAC can enforce legal sanctions for non-compliance with the CAMA provisions. Furthermore, it oversees the implementation of CAMA, which mandates Nigerian companies to submit annual returns to supervise compliance with the provision of the Act. The commission has seven board members. The commission management team is comprised of a registrar general/CEO, seven directors, twenty-four deputy directors, and forty-four assistant directors.

2.5 An overview of disclosure in the Nigerian Capital Market

Nigeria-listed companies have mandatory and voluntary disclosure requirements. Mandatory disclosure is a disclosure that is required legally. This type of disclosure is dictated primarily by the Nigerian Stock Exchange, Nigerian Securities and Exchange Commission, Corporate Affairs Commission and Financial Reporting Council of Nigeria. For example, companies listed on the Nigerian Stock Exchange must submit quarterly, half-yearly and annual financial statements to the Securities and Exchange Commission, Nigerian Stock Exchange and Corporate Affairs Commission. The content of quarterly and semi-annual financial statements are statements of financial position, income statements, and cash flow statements. While that of an annual financial statement content is an auditor's report and notes to the account in addition to what is in the quarterly and semi-annual statements. The aim is to show a true and fair view of companies' financial position and performance, which is vital for decision-making. Apart from the financial statements, Nigerian listed companies are mandated to disclose material events that affect financial health and stock price, such as earnings announcements, significant legal events, mergers and acquisitions, management changes, and major contracts. Nigerian listed companies are also mandated to release shareholding structures (such as shareholders with 5% and above) and insider trading activities.

Voluntary disclosure is information that is not mandated but encouraged to be released to improve transparency, meet stakeholders' expectations and build a reputation. Voluntary disclosure includes environmental, social and governance disclosure. Nigerian listed companies are motivated to disclose social responsibilities and environmental disclosure (FRCN, 2018; SEC, 2011; (Adegbite, Amaeshi, and Amao, 2012)). Apart from that, listed Nigerian companies are motivated to release CSR initiatives such as charitable donations projects for community development. This information shows how listed Nigerian companies demonstrate social responsibility and commitment. Voluntary disclosure is significant to Nigerian listed companies. Voluntary disclosure improves corporate accountability and transparency. It shows a comprehensive picture of company activities, strategic direction and financial health. It allows companies to demonstrate their corporate governance, ethical practice, and involvement in social and environmental responsibility. Voluntary disclosure reduces information asymmetry problems between shareholders and management, reducing management investors' trust and attracting new investors. Providing voluntary disclosure provides information about future foresight and risks of companies. Voluntary disclosure supports long-term sustainability practices. Voluntary disclosure helps listed Nigerian companies operate in a global market by meeting global standards that attract international investors. Voluntary disclosure improves the reputation and image of listed Nigerian companies. Listed companies operating in the Nigerian capital market can use voluntary disclosure to differentiate themselves from their competitors, which will improve their competitive advantages.

2.6 An overview of corporate governance codes and practices in Nigeria

The development of the Nigerian corporate governance codes can be outlined under two phases, namely, the pre-independence and the post-independence periods (Amaeshi et al., 2016).

During the pre-independence phase, between 1863 and 1912, firms working in Nigeria were registered in England and followed the British system, the Companies Ordinance Act of 1922. After gaining independence from the UK in 1960, Nigerian government replaced Companies Ordinance Act of 1922 with Companies Act of 1968. In 1990, Nigeria replaced Companies Act with Companies and Allied Matters Decree (CAMD) 1990. The aim was to limit corrupt and unethical practices that

affect business activities in Nigeria and address the observed lapses of the Companies Act of 1968 (Adekoya, 2011). The CAMD Act showed the Corporate Affairs Commission, which controlled the establishment and management of companies (Adekoya, 2011). However, during that period, the governance practice was at a very early stage.

In 1999, there was a transition from a military regime to a democratic administration, after which there was an amendment of CAMD to Companies and Allied Matters Act 1999. The government at that time was interested in implementing effective corporate governance to improve shareholders' power in decision-making (Adegbite, Amaeshi and Amao, 2012). So, in June 2000, the Nigerian Securities and Exchange Commission (SEC) convened a committee of seventeen members to draft the first corporate governance code in Nigeria. The aim was to rebuild trust, restore investors' confidence, attract foreign investments, and provide recommendations according to best international practices for Nigerian listed companies. The first Nigerian's governance code was active in 2003 and hereafter (the 2003 SEC code). However, several corporate scandals took place on the back of the first governance code, such as Cadbury Nigeria in 2007, Halliburton in 2008, and Siemens in 2009 (Adegbite, Amaeshi, and Amao, 2012), which proved that the 2003 SEC code failed to address new challenges and development of corporate reporting in Nigeria. To address the weaknesses of the 2003 SEC code, several industry-specific governance codes were issued, such as corporate governance code for National Insurance Commission 2009, and corporate governance code for pension licence companies 2008.

In September 2008, the Nigerian SEC set up a national committee under Mr M. B Mahmoud to review the 2003 corporate governance code. The committee was assigned three main tasks: (i) to identify the weaknesses of the 2003 SEC code, (ii) to explore international corporate governance codes and best practices, and (iii) to recommend solutions which can promote good corporate governance practices for public companies in Nigeria. The committee made most of their recommendations based on the OECD principles of corporate governance. The revised code of corporate governance (2011) was active in 2013 and hereafter to improve accountability, transparency and corporate governance practices without affecting firms' activities and innovations. The 2011 corporate governance code

applies to publicly listed companies but encourages other companies that do not fall within the scope of the code to implement it. The 2011 code of corporate governance includes compliance with provisions of the board of directors' composition, responsibilities, and duties of the board of directors, separation of CEO duality, and establishment of board committees.

In 2016, the Nigerian Accounting Standard Board issued a new corporate governance code to unite and harmonise corporate governance codes for different sectors of the Nigerian economy. The aim is to (i) promote the highest corporate governance standard, (ii) increase corporate governance practices and principles amongst the public, (iii) Become the body that coordinates nationally all corporate governance matters for both the public and private sectors of the Nigerian economy. (iv) Safeguard stakeholders' investment through effective information and internal control system; (v) Promote accountability and financial reporting through competent, independent auditor examination. The code was applicable to all listed and non-listed Nigerian companies, all private companies that are subsidiaries or parents of public companies and all regulated private companies. Compliance with the code provisions was mandatory commencing 17th October 2016 and hereafter. However, this code faced high criticism from professionals and industry stakeholders for its hard provisions, contradictions with corporate entities' legislation and sector-based corporate governance code. For example, implementing the 2016 code will provide compulsory changes to many companies' boards structure, especially in financial sectors where a minimum of thirteen CEOs for insurance companies must vacate their positions. Based on that, on 7th November 2016, the Ministry of Industry, Trade, and Investment, under the supervision of Okechukwu E. Enelamah, issued a circular suspending the implementation of the 2016 one month after its issuance and queried FRCN for issuing this code (Nwachukwu, 2016). This is because there is a conflict between 2011 Financial Reporting Council of Nigeria Act and the 2016 corporate governance code provision (Nwachukwu, 2016). Another reason for suspending the 2016 code of corporate governance is undermining the ease-of-business philosophy of the Federal government (Nwachukwu, 2016).

In 2018, the Financial Reporting Council of Nigeria revised the 2011 code of corporate governance code. The 2018 code of governance aims to improve three main areas (Ozili, 2020), namely: (i) to improve integrity of business by promoting

public understanding of ethical practice and corporate values, (ii) to institutionalise high standard of corporate values, and (iii) to improve trade and investment by restoring public confidence and trust on the economy of Nigeria. The 2018 code is effective for the financial year ending after 1st January 2020 and hereafter and is based on 'apply and explain' principle. This means that companies are recommended to implement the code and explained how they apply the code principles to meets the corporate governance expected outcomes. The code acknowledge that company or industry can modify code practices to meet it specific requirement (FRCN, 2018). This means that where implementing recommended code principles might not in the company's best interest, Company is allowed to use other practices or methods to achieve good corporate governance practice of accountability, fairness and transparency (Phillips et al., 2019).

One difference between the 2011 code and 2018 revise code is that the 2011 does not have the apply and explain principles. While the 2011 code of corporate governance code is applied to public listed companies only, the code of 2018 applies to both all listed and non-listed public, as well as private and not-for-profit organisations operating in Nigeria. In addition, the Financial Reporting Council of Nigeria supervises the implementation of the 2018 Code of Corporate Governance while the SEC supervised the implementation of the 2011 Code.

It is worth noting that the application of the revised code has a low bearing on the outcomes of the current study. This is because both 2011 and 2018 codes are voluntary (FRCN, 2018; SEC, 2011; Phillips, Somuyiwa and Olajide, 2019), and environmental disclosure is also voluntary in Nigeria (Okere et al., 2021; Eneh, 2019; Chijoke-Mgbame and Mgbame, 2018; Ofoegbu, Odoemelam and Okafor, 2018; Egbunike and Tarilaye, 2017; Eze, Nweze and Enekwe, 2016; Adekanmi, Adedoyin and Adewole, 2015; Dibia and Onwuchekwa, 2015). In addition, there are no differences between 2011 code and 2018 revised code of corporate governance in relation to board independence, board meetings, board experience, gender diversity and the presence of foreign members on the board, which forms the explanatory variables for the current study. The only difference is on board size and CEO duality. Regarding board size, the 2011 code specified that board size should not be below five members, while the 2018 revised code is silent on the minimum number of board size. In terms of CEO duality, the 2011 code did

not provide any window for duality, while the 2018 revised code allows duality when necessary but should not exist for more than three years.

2.7 An Overview of ownership structure in Nigeria

During the colonial period, the ownership structure was primarily dominated by foreign members, especially by British companies, which dominated Nigerian private sectors. To demonstrate, the first firms that operated in Nigeria in the 19th century were British companies from 1862 to 1912. Later, the National African Company was named Royal Niger Company in 1879.

After independence, the government intended to change the ownership structure amongst corporations to encourage indigenous participation and control of resources. Thus, the government established the Nigerian Enterprise Promotion Decree of 1972 and the Foreign Exchange Control Act of 1962 (Abijo, 2019). The provision prohibits foreigners from owning 100% of shares, which made many foreign companies operating divers its ownership structure to comply. The Act allowed 60% of foreign and 40% of indigenous participation to encourage the indigenisation participation programme.

During that period, Nigerian investors were not economically powerful because they had limited domestic funds for investment and could not compete with foreign investors (Abijo, 2019). This made the government buy most of the Nigerian intermediaries and provide room for state ownership and participation in various economic aspects. The increase in government intervention during that period gave political class advantages to monopolise economic investment. Thus, the federal and state governments drive the economy through investing in many sectors.

In 1970, the Nigerian government initiated an indigenisation agenda to attract Nigerians to participate in the private sector and to achieve economic independence. In 1986, the Nigerian government implemented the Structural Adjustment Programme (SAP), which was recommended by the International Monetary Fund for Nigeria. One of SAP's major recommendations is the privatisation of public enterprises. Privatisation aims to reduce public spending on enterprises to save funds for servicing the nation's debt (Ojo and Fajemisin, 2010; Asaolu et al., 2005); to minimise unproductive government investment in

government enterprises; to improve the overall effectiveness and performance of public enterprises; to ensure positive public investment returns and promote public enterprises' capital market. So based on that, the Nigerian government announced Decree Number 25 for legal policy commercialisation and Privatisation (Ojo and Fajemisin, 2010; Asaolu et al., 2005). The government has set up a commercialisation and privatisation technical committee that is responsible for privatising public enterprises. In 1990, the Nigerian government replaced the Nigerian Enterprise Promotion Decree of 1972 with the Companies and Allied Matters Decree (1990). In 1993, the committee privatised thirty-four public companies (Ojo and Fajemisin, 2010).

In 1995, the government established the Bureau of Public Enterprises (BPE) to take over the commercialisation and privatisation technical committee's responsibilities (Ojo and Fajemisin, 2010; Asaolu et al., 2005). In 1999, when the democratic government started, Nigerian lawmakers passed the Company and Allied Matters Act (1999), which replaced the Companies and Allied Matters Decree (1990). Additionally, the Bureau of Public Enterprises was given the power to decide which public enterprises would be privatised. In 2005, BPE privatised eight companies, including Afri Bank Nigeria Plc and Leyland Company.

Okeyide (2017) classifies the Nigerian ownership structure into four types. Type "A" companies, such as petroleum refineries, are owned entirely by the federal or state government. Type "B" encompasses joint venture agreements amongst the federal government and international crude oil production corporations. Although the government operates joint venture arrangements in other sectors, including this sector as a separate category makes sense due to its immense importance to the national economy. A key indicator of this sector's importance is that the government of Nigeria derives about 97% of its total revenue from joint ventures in oil and gas. Type "C" comprises publicly listed corporations, including foreign and local investors. The foreign investors are either parents or subsidiaries of multinational companies. Type "D" consists of privately owned companies that are not listed on the Nigerian Stock Exchange. These companies consist of family businesses which are owned and controlled by relatives.

2.8 Conclusion

This chapter provides an overview of Nigeria and the Nigerian economy and shows oil and gas are the major sources of the Nigerian economy. The chapter discusses an overview of the Nigerian capital market. The chapter discusses Nigeria's corporate governance codes and practices. Furthermore, it explains the overview of the ownership structure in Nigeria. The next chapter reviews relevant literature on the association between corporate governance and environmental disclosure.

CHAPTER 3: LITERATURE REVIEW

3.1 Introduction

There are six main sections in this chapter: overview of environmental disclosure in 3.2 overview of corporate governance 3.3 and overview of ownership structure in 3.4. Apart from that, theoretical framework is 3.5 followed by empirical review of literature in 3.6. Lastly, the chapter concludes in 3.7.

3.2 An overview of environmental disclosure

Corporate disclosure is the "*release of financial and non-financial information, be it qualitative or non-qualitative, voluntary or compulsory, through formal or informal communication channels*" (Alotaibi, 2016; p. 27). Companies disclose different types of information to various users. For example, companies provide information about their commitment to environmental responsibility to protect the natural environment and address environmental issues such as environmental pollution (Adekanmi, Adedoyin, and Adewole, 2015). The literature provides various definitions of environmental disclosure (see Table 1).

Table 1: Definition of environmental disclosure

S/N	Meaning	Source
1	<i>A "broad-based term that refers to the incorporation of environmental costs and information into a variety of accounting practices".</i>	Rahman and Anwar, (2016 p.70).
2	<i>"The process of communicating the social and environmental effects of the organisation's economic actions to particular interest groups within society, and society at large".</i>	Adekanmi, Adedoyin, and Adewole, (2015 p. 459)
3	<i>It is "providing information regarding the environmental issues to interested groups in society through the annual reports of companies".</i>	Ibrahim, (2014 p. 15).
4	<i>A "provision of public and private information, financial and non-financial information, and quantitative and non-quantitative information regarding the organisation's management of environmental issues".</i>	Burgwal and Vieira, (2014 p. 62)
5	<i>The "process of disseminating information on the impact corporate economic activities have on the natural environment for use by diverse stakeholders".</i>	Abu- Raya, (2012; p. 18)
6	<i>A "science looking at how environmental aspects affect the conventional accounting system and whether it is an effective tool to measure and evaluate the environmental aspects of facilities".</i>	Rahahleh, (2011 p. 127)
7	<i>"An umbrella term that describes the various means by which companies disclose information on their environmental activities".</i>	Mitali, Mukherjee and Pattanayak, 2011 (2011; p. 139)
8	<i>The "identification, measurement, and allocation of environmental costs, the integration of these environmental costs into a business cost, business decision and the subsequent communication of the information to a company's stakeholders".</i>	Stanko et al. 2006, p.21
9	<i>The "process of identification, allocation, and analysis of material streams and their related money flows by using environmental accounting system and provide insight in environmental impacts and associated financial effects".</i>	Berr and Friend, (2006 p. 549).
10	<i>The "external communication of environmental, health and safety and energy issues relating to the policies, undertaking and beliefs of an organisation through company-wide reports which are placed in the public domain on a regular and continuing basis".</i>	Hibbitt, (2004, p. 18).
S/N	Meaning	Source

11	The <i>"disclosure about the impact that an organisational process or operation may have on the natural environment"</i> .	Campbell, (2004, p. 108)
12	The <i>"accounting for the value of natural resources gained or loss relative to gross domestic product"</i> .	Rogers and Kirstof, (2003 p. 21)
13	The <i>"set of information items that relate to a firm's past, current and future environmental management activities and performance"</i> .	Berthelot, Cormier and Magnan, (2003; p. 2).
14	A <i>"subset of the corporate social responsibility, which includes information regarding waste management, recycling programs, and environment control"</i> .	Ahmad Hassan, and Mohammad, (2003, p. 69).
15	The <i>"accountant's contribution towards environmental sensitivity in the organisation"</i> .	Lodhia, (2003 p. 717)
16	A <i>"broader term that relates to the provision of environmental-performance related information to stakeholders both within, and outside, the organisation"</i> .	Deegan (2003, p. 10).
17	ED is the <i>"information relating to a corporation's activities, aspirations and public image concerning environmental, community, employee and consumer issues"</i> .	Gray et al. (2001; p. 329).
18	The <i>"disclosures that relate to the impact of company activities have on the physical or natural environment in which they operate"</i> .	Wilmshurst and Frost, (2000, p. 16)

This table shows the meaning of environmental disclosure from previous studies.

Source: Developed by the researcher.

The current study adopts Burgwal and Vieira's definition of environmental disclosure (2014, p. 62): *"provision of public and private information, financial and non-financial information, and quantitative and non-quantitative information regarding the organisation's management of environmental issues"*. The definition means that stakeholders (both internal and external) have the right to be informed about the effect of a company's economic activities on the environment. The information includes financial, quantitative, narrative, and non-narrative disclosure. Financial disclosure includes information such as, lawsuits, contingent liabilities and the cost of research on new methods of production or service to reduce environmental pollution (Eltib, 2012). On the other hand, non-financial quantitative disclosure includes sulphur dioxide emissions spoilage of toxic chemicals. Conversely, narrative disclosures are information such as environmental audits (Eltib, 2012).

Environmental disclosure constitutes part of corporate social responsibility disclosure (Alkayed, 2018). Aribi and Gao (2010, p.72) define corporate social responsibility disclosure as the *"provision of financial and non-financial information relating to an organisation's interaction with its physical and social environment, as stated in corporate annual or separate social reports"*.

Environmental disclosure is part of sustainability disclosure. Sustainability disclosure is the *"reporting of the economic, environmental and social aspect of a business as well as governance approaches to manage those aspects"* (Nwobu, 2017; p. 13).

There are variations in regulatory requirements amongst countries. Realising environmental disclosure is mandatory in some countries like Denmark, Canada, (Bhattacharyya, 2016; Abu-Raya, 2012), Italy (Balluchi, Lazzini and Torelli, 2021), Germany (Gerwing Kajüter and Wirth, 2022) and South Africa (Ofoegbu, Odoemelam and Okafor, 2018). Mandatory disclosure *"is compulsory for an information disclosure conducted by a company based on a certain rule or standard"* (Mirfazli, 2008, p. 278). Statutory regulations and listening requirements govern the nature and content of this type of report. Refusing to release the mandatory disclosure attracts a penalty (Edogiawerie and David, 2016). On the other hand, releasing environmental disclosure falls under voluntary disclosure category in other countries, such as Nigeria (Okere et al., 2021; Eneh,

2019; Chijoke-Mgbame and Mgbame, 2018; Ofoegbu, Odoemelum and Okafor, 2018), Ghana (Welbeck et al., 2017); Saudi Arabia (Boshnak, 2021); India (Chandok and Singh, 2017) and Jordan (Reboredo and Sowaity, 2022). Voluntary disclosure is the "*information disclosure overweigh minimum requirement from the rules*" (Mirfazli, 2008, p. 278).

The concept of EDQ attracts debate in the accounting literature. The reason is that the disclosure quality "*varies widely across companies since the disclosure content is not strictly regulated*" (Aerts, Cormier and Magnan, 2004, P. 6). Previous disclosure literature gives various definitions of disclosure quality. Brammer and Pavelin (2006, p. 1169-1170) define disclosure quality as "*specific actions, quantify environmental impacts, set formal targets, and subject to external audit*". Alkayad (2018, p.102) defines quality as "*the degree of specificity and intensity of information provided*". The information helps the user "*make informed economic decisions*" (Botosan, 2004, p. 290) by interpreting the information without difficulty.

The current study defines EDQ as the disclosure release in financial, quantitative, or non-narrative terms (Alkayed, 2018; Chandok and Singh, 2017; Akrouit and Othman, 2016; Fatima, Abdullah and Sulaiman, 2015; Eljayash, 2012; Mitali, Mukherjee and Pattanayak, 2011). This is because quantitative and monetary disclosure represent physical and financial information that can be verified (Widiarto, 2009). They are more informative to the users in examining companies' performance such as environmental performance (Raar, 2007; Al-Tuwaijri, Al-Tuwaijri, Christensen and Hughes, 2004). It also considers the importance of climate-related financial disclosure in line with the recent development of the Task Force on Climate-related Financial Disclosures (TCFD) by the Financial Stability Board (e.g., Demaria and Rigot, 2021; D'Orazio, 2021; Edwards et al., 2020; Eccles and Krzus, 2019). While non-narrative disclosures are information disclosed using pictures, graphs, and charts. They are vital communication tools, especially for stakeholders who do not have time to read the complete report word by word (Alkayed, 2018). For example, according to Wilmshurst and Frost (2000), pictures deliver more information than thousands of words.

3.3 Overview of Corporate Governance

The emergence of various accounting scandals worldwide, e.g., the collapse of Enron Corporation (USA), Polly Peck (UK), HIH Insurance Ltd (Australia), and

Saambou Bank and Fidentia (South Africa), has prompted government intervention to protect stakeholders, for example, the Sarbanes-Oxley Act in the USA and corporate governance codes in the UK.

The corporate governance framework arises to describe corporate scandals that increase practice in an institutionalised area of corporate activity. The corporate governance framework depends on laws, regulations and other institutions such as enforcement mechanisms, legal firms and accounting professionals. Table 2 reviews various definitions of corporate governance that were provided from academic literature/professional bodies, which include:

Table 2: Definitions of corporate governance

S/N	Definitions	Source
1	A "set of control mechanisms that are especially designed to monitor and ratify managerial decisions and to ensure the efficient operation of a corporation on behalf of its stakeholders".	Donnelly and Mulcahy (2008, p. 416)
2	It is "considered as an environment of trust, ethics, moral values and confidence – as a synergic effort of 01 all the constituents of society – that is the stakeholders, including government; the general public etc; professional/service providers – and the corporate sector".	Aras and Crowther (2008, p. 2)
3	The "system of checks and balances, both internal and external to companies, which ensure that companies discharge their accountability to all their stakeholders and act in a socially responsible way in all areas of their business activity".	Solomon (2007, p14),
4	A "set of relationships between a company's management, its board, its shareholders and other stakeholders. Corporate governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined".	OECD, (2004; p.11)
5	"Ways in which suppliers of finance to corporations assure themselves of getting a return on their investment" shareholders".	Shleifer and Vishny (1997, p.737)
6	"Manner in which companies are controlled and in which those responsible for the direction of companies are accountable to the stakeholders of these companies".	Dahya Lonie and Power (1996, p. 7)
7	The "relationship amongst various participants in determining the direction and performance of corporations".	Monks and Minow (1995; p. 1)
8	The "system by which companies are directed and controlled. Boards of directors are responsible for the governance of their companies. The shareholders' role in governance is to appoint the directors and the auditors and to satisfy themselves that an appropriate governance structure is in place".	Cadbury Report (1992, p.15)
9	The "process by which corporations are made responsive to the rights and wishes of stakeholders".	Demb and Neubauer (1992: p. 187)

This table provides the corporate governance definitions by previous studies.

Source: Developed by the researcher.

It can be seen from Table 2 that corporate governance meaning can be explain under the following headings:

3.3.1 Shareholders and stakeholder's approach

The corporate governance definition is explained under the shareholder and stakeholder approach (Tran, 2017). The shareholder approach narrows corporate governance into two parties only namely: shareholders and management (Tran, 2017). According to the shareholder's approach, management should protect the interest of the shareholders only as they are business owners. Based on the shareholders' approach, *"well-governed firms are more mindful of their obligation not to mislead shareholders"* (Karamanou and Vafeas, 2005: p. 455).

On the other hand, the stakeholder's approach argues that in addition to shareholders, there are other parties which the business depends on to operate as a going concern. These parties include employees, suppliers, customers, government, and environment (Abu-Raya, 2012). According to stakeholder approach, stakeholders are divided into internal and external stakeholders. Corporate governance structures and formulations demonstrate a basis for solidifying the duties of both internal and external stakeholders. Therefore, companies practising good corporate governance protect the interests of both internal and external stakeholders (Abu-Raya, 2012). The stakeholder approach promotes good governance practices (for example, the Tyson report (2003) in the UK and the King report (2002) in South Africa).

3.3.2 Ownership and Control

The shareholders (principal) are the company owners that are responsible for appointing management (agent). In contrast, the management is responsible for managing the company on behalf of the shareholders. According to agency theory, an agency problem arises when the management acts to protect their interest rather than the interest of their principal. The agency problem may result in the shareholders losing their investment. Corporate governance ensures that management acts according to the interests of the shareholders to address agency problems (Abu-Raya, 2012).

The shareholder approach to corporate governance shows that management is accountable to shareholders only. However, the stakeholder approach to corporate governance broader the concept and explains that management is accountable to

stakeholders in addition to the shareholders (Abu-Raya, 2012). Corporate governance structures and formulations demonstrate a basis for solidifying the duties of both internal and external stakeholders. Therefore, companies practising good corporate governance protect the interests of both internal and external stakeholders (Abu-Raya, 2012). They ensure their trustworthiness, transparency and accountability to internal and external stakeholders (Tran, 2017).

3.3.4 Control process

This ensures that management action is in the stakeholders' interest to maximise the company's value. This control is put in place to reduce management acting according to their self-interest, which moves away from the value maximisation of companies (Kanagaretnam, Lobo and Whalen, 2007). It includes who made the control, how to implement it, and how to undertake risk and return institutional activities.

This study adapts Dahya, Lonie and Power's definition, which defines corporate governance as a "*manner in which companies are controlled and in which those responsible for the direction of companies are accountable to the stakeholders of these companies*" (1996, p. 7). This study focuses on the stakeholder's approach. Corporate governance scope motivates companies to demonstrate ethics, fairness, accountability, and transparency for long-term value maximisation (Tran, 2017). corporate governance's scope increases the significance of corporate social responsibility, which covers environmental responsibility, which is essential for the development of both companies and societies to be not only for profit in the short term but also for long-term value and sustainability (Tran, 2017). The well-being of a community and their environment contribute significantly to the success of companies. Thus, environmental responsibility appears to be part of corporate government (Sharif and Rashid, 2014).

3.4 An overview of ownership structure

Ownership can be classified into two categories, namely, ownership composition and ownership structure (Lin and Nguyen, 2022). Ownership composition explains the constitution of equity concentration ownership, such as public equity ownership and private equity ownership. Equity individual owner types include government, institutional, family, and managerial ownership (Lin and Nguyen, 2022). In contrast, the ownership structure is the "*distribution of equity not only*

in terms of votes and capital but also by the identity of the shareholders" (Dakhli, 2021; p. 565).

Ownership structure is an essential corporate governance tool that influences the incentives of managers and firms. The ownership structure is an effective governance structure that implements strategic directions well, which generates new opportunities for investment to increase the value of an organisation (Sarhan and Al-Najjar, 2023). Ownership structure regulates the identity of companies, which influences the institutional oversight and impacts goals and vision of disclosing information (Ellili, 2023). Various ownership structures might influence the decision-making of firms differently, including environmental decisions. For example, investors might have different environmental orientations compared to those of business managers, which could affect their decision-making on environmental matters (Lin and Nguyen, 2022).

3.5 Theoretical Framework

Accounting theory development is *"a piecemeal process development and error in response to changing social and economic forces"* (Underdown and Taylor, 1985, p. 2). According to the theoretical prediction, good corporate governance is associated with higher credible and transparent disclosure. A review of related literature reveals that studies used different theoretical frameworks to investigate corporate governance and disclosure practices (Bamahros et al., 2022; Kumari et al., 2022; Alkayed and Omar, 2022; Chouaibil, Miladi and Elouni, 2022; Nicolò et al., 2021; Solikhah and Maulina, 2021; Osemene et al., 2021; Mohammed, 2018; Egbunike and Tarilaye, 2017; Nguyen et al., 2017; Oraka and Egbunike, 2016; D'amico et al., 2016).

The current section critically reviews the most common theories used in the literature to investigate the association between corporate governance and environmental disclosure. These theories are agency, signalling, resource dependency, legitimacy, stakeholder, political cost, institutional and voluntary disclosure.

3.5.1 Agency Theory (AT)

An agency is *"a contract under which one or more persons (the principals) engage another person (the agent) to perform some service on behalf of the principal"*

(Jensen and Meckling, 1976, p. 308). This delegation includes the power of using resources and decision-making. According to agency theory, managers, as agents, engage in the day-to-day performance of the business and have full access to all information about their company. In contrast, external providers of funds, the principals, are away from day-to-day business and do not possess the same level of information about their business, which is referred to as the information asymmetry problem (Alkayed, 2018). Management can use voluntary environmental disclosure as a tool to reduce this information asymmetry problem (Abdel-Fattah, 2008).

There may be conflicts of interest between the principal and the agent, called agency conflicts. The agency conflict arose when the agent failed to act in the principal's interest. Therefore, the principal put a monitoring mechanism in place, which to agency costs. Agency cost is "*the cost incurred in order to reduce or eliminate agency conflict*" (Abu-Raya, 2012, P. 148). There are two agency costs: monitoring and bonding costs (Abu-Raya, 2012). A monitoring cost is a cost incurred by the principal to reduce agent actions that are not in the principal's interest (Abu-Raya, 2012). Bonding costs are incurred to ensure the agent does not embark on actions not in the principal's interest. Releasing environmental disclosure is a monitoring device that reduces both costs.

From another aspect, the corporate governance mechanisms reveal that managers are more interested in revealing environmental disclosure than shareholders. The reason is that managers spend on the environment from the shareholder's resources (Alkayed, 2018). They are interested in environmental protection to secure their personal, political and social agendas at the expense of the shareholders cost (Barnea and Rubin, 2010).

However, companies are accountable not only to the shareholders but also to other stakeholders, and agency theory does not focus on other stakeholders, such as the community (Freeman, 2010). Lastly, agency theory assumes that self-interest influences companies' motivation, which is not always possible empirically (Gray, Meek and Roberts, 1995).

3.5.2 Signalling theory (ST)

A signal is an "*action purposefully taken to change other actions or beliefs*" (Przepiorka and Berger, 2017, p. 6). In other words, a signal is "*information cues*

sent by one party to another in order to influence the desired outcome" (Taj, 2016, p. 339). Thus, signalling theory is a *"strategic interdependence in which one actor (the sender) aims at persuading another actor (the receiver) of a fact the receiver does not know or is uncertain about"* (Przepiorka and Berger, 2017, p.1). The theory was based on Akerlof in 1970 and developed in 1973 (Abdel-Fatah, 2009).

The theory comprises four elements: signaller, signals, receiver, and feedback (Bae, Masud and Kim, 2018). A signaller is an insider of the company, such as a manager or executive director, who has a piece of information that outsiders are not knowledgeable about (Przepiorka and Berger, 2017). The signaller develops the type of picture or perception of the company, which influences the decision of external parties. Signal is the flow of information that signaller sends (Bae, 2018), such as stock price and dividends. The signal is produced deliberately through strategic action by the signaller (Przepiorka and Berger, 2017). The type of signal can be either good or bad. A good signal is a positive signal that can increase the company's performance and value. On the other hand, a bad signal is a negative signal that can reduce product demand and stock price. Companies prefer sending a good signal and intentionally hiding the bad one (Przepiorka and Berger, 2017).

A receiver is *"generally an outsider who possesses limited information regarding the organisation and is willing to receive it"* (Taj, 2016, p. 339). According to Connelly (2011), the receiver's attention and interpretation are part of the characteristics of an efficient and effective signalling process. Due to this reason, the receiver ignores the signal he is not looking for, which creates a weak signal. Receivers can wrongly interpret the signal differently from what the sender means. Lastly, feedback is the *"sending of counter signals by the receiver of the signal"* (Taj, 2016, p. 340). Feedback shows whether the receiver has interpreted the signal correctly.

Signalling theory recognises the separation of ownership and control, similar to agency theory (Abdel-Fatah, 2008). In line with disclosure, signalling theory views managers as having more information about the company than shareholders. Signalling theory predicts that managers send information to shareholders and other interested parties as a signal to reduce information asymmetry (Taj, 2016). Moreover, to differentiate themselves from other companies that are not disclosing. This type of signal can go through releasing environmental information.

The signalling theory predicts that companies disclose good and bad environmental news (Abu-Raya, 2012). Good news *"signal quality and bad information is a signal to reduce reputation cost incurred for non-disclosure"* (Abu-Raya, 2012 p. 146). Companies with good environmental performance have nothing to hide; they disclose environmental information as a signal to differentiate themselves from those with bad environmental performance. On the other hand, companies with no environmental performance may disclose environmental information to differentiate themselves from those with bad environmental performance (Abdel-Fatah, 2008). Meanwhile, companies with bad environmental performance also disclose environmental information as a signal to *"avoid worst interpretation for non-disclosure"* (Abu-Raya, 2012, p. 146).

In conclusion, the assumption that managers always act in their interest is one of the shortcomings of the signalling theory (Abel-Fatah, 2008). Apart from that, non-disclosure of environmental disclosure does not always mean bad environmental performance in a highly competitive environment (Abdel-Fatah, 2008). The reason is that some companies hold good news to protect against adverse consequences. Beside institutions exercise power over individuals, those assumption of equal power distribution is another limitation of signalling theory.

3.5.3 Resource dependency theory (RDT)

Resource dependence theory is a framework in organisational theory that focuses on how organisations rely on external resources and how these dependencies influence their behaviour and decision-making (Pfeffer and Salancik, 2003). It provides a lens to understand how corporate governance mechanisms influence environmental disclosure by examining how organisations manage their dependencies on stakeholders, including those concerned with environmental issues. These mechanisms help companies balance their resource dependencies and maintain their legitimacy and competitiveness by responding to stakeholders' demand for transparent and responsible environmental reporting. For example, according to this theory, boards are used to connect the company with the external world to maximise the required resources (Tyrowicz et al., 2020). Diversity promotes more effective experts in different fields that help the company, including environmental decision-making, resource access, etc. (Reguera-Alvarado et al., 2017).

In line with resource dependency theory, there is competition amongst companies using different approaches to attract capital at the lowest possible cost (Meek et al., 1995). Based on that, disclosing only mandatory information is insufficient to raise the cheapest capital through shares or loans (Core, 2001). Hence, one alternative approach to raise the lowest capital is through voluntary disclosure of information, such as environmental disclosure.

Resource dependency theory, like other theories, is subject to limitations. The theory fails to consider other reasons companies hold information, such as protecting against adverse consequences in a strategic business environment (Abdel-Fatah, 2008).

There are differences amongst agency, signalling and resource dependence theories. According to agency theory, companies disclose environmental information to reduce information asymmetry, monitoring, and bonding costs. While in signal theory, companies disclose good and bad environmental information. Good environmental information is a signal of environmental performance. Nevertheless, to avoid the worst interpretation, companies release bad environmental information. On the other hand, according to the resource dependency theory, companies release environmental disclosure to connect to external and raise capital at a low cost.

3.5.4. Stakeholder theory (ST)

A stakeholder is *"any group or individual who can affect or is affected by the achievement of an organisation's objectives"* (Freeman, 2010, p. 46). According to Gray, Owen and Adams (1996; p. 33), a stakeholder is *"any human agency that can be influenced by, or can itself influence, the activities of the organisation in question"*.

In stakeholder theory, there are two types of stakeholders: primary and secondary (Ibrahim, 2015). Primary stakeholders are those whose participation and cooperation are necessary for the survival of companies, such as employees and providers of funds. They have a direct and financial relationship with companies. For example, employees expect income to compensate for their human resources through skills given to the company. Creditors finance the company through borrowing and overdrafts, while customers are the company's revenue source. Secondary stakeholders are those who affect or are affected by the company's

policies, decisions, practices, or goals but do not have a direct and financial relationship with the company (Okere et al., 2021). For example, the general public (taxpayers) supplies the national infrastructure. At the same time, the media persuades public perception regarding companies' environmental commitment. Stakeholder theory relates to both types of stakeholders and expects effective corporate governance to address environmental concerns and engage in transparent environmental reporting practices (Okere et al., 2021). Hence, environmental disclosure is used as a tool to manage stakeholders' expectations (Harrison et al., 2019). Furthermore, companies fulfil social, moral, and ethical obligations to function efficiently and earn maximum cooperation (Strand and Freeman, 2015). This includes information on environmental achievement, environmental risk/ return, environmental cost and liabilities.

There are two branches of stakeholder theory: normative (ethical) and managerial stakeholder (Ibrahim, 2015). The normative or ethical branch of stakeholders is associated with the principle of fairness and moral responsibility between companies and their stakeholders (Phillips, 2003). According to Gray, Owen and Adams (1996, p. 38), companies have the *"duty to provide an account of those activities for which are held responsible"*. Therefore, society has the right to information about how companies address the environmental impact (Deegan, 2000). However, normative stakeholders fail to consider a business that aims to protect the owners' interest (Deegan, 2009). On the other hand, for managerial stakeholders, there is interdependence between companies and their stakeholders in allocating resources (Islam, 2009). Based on that, stakeholders are unequal; some are more powerful than others. Stakeholders' power relates to their ability to use resources to make an event happen. According to stakeholder theory, stakeholders have various powers and influences, especially those controlling firms' resources to continue operation for foreseen future (Boshnak, 2022). For example, powerful stakeholders control companies' required resources to survive. The government is another influential stakeholder because of its political power to make new laws and regulations or act that help/against the company. According to the managerial approach, companies only respond to powerful stakeholders' demands. Therefore, companies release environmental information to manage relationships with influential stakeholders and obtain support (Abu-Raya, 2012; Islam, 2009).

3.5.5 Legitimacy theory (LT)

Legitimation is the *"framework through which something is viewed as right and proper"* (Tyler, 2006, p. 376). Lindblom (1994, p. 2) defines legitimacy as *"a condition or status which exists when an entity's value system is congruent with the value system of the larger social system of which the entity is a party"*. In other words, Suchman (1995, pp.574) defines legitimacy as a *"generalised perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs and definitions"*. The legitimacy theory explains that companies *"continually seek to ensure that they operate within the bounds and norms of their respective societies"* (Deegan, 2000: p. 253). Legitimacy shows how a firm's actions and operations are appropriate to the beliefs, values and norms of society's perception (Li, Haque and Chapple, 2023).

Adams (2011) classifies legitimacy theory into pragmatic, moral, and cognitive (strategic) legitimacy. Pragmatic legitimacy entails how firms consider economic, political, and social interests of important stakeholders, such as shareholders, when making decisions (Islam et al., 2022). To illustrate, firms may not compensate for damages made to the environment without legal action because it can affect shareholders' financial interests (Islam et al., 2022). Moral legitimacy uses value systems constructed by society to assess whether business activities promote welfare effectively (Islam et al., 2022). To illustrate, firms compensate for damages made to the environment before taking any legal action based on ethical and moral reasoning (Islam et al., 2022). This shows that firms are not expected to participate in unethical activities such as environmental damage to meet society's expectations. Lastly, cognitive legitimacy is the type of inevitable legitimacy in firms based on society's cultural backing (Adams, 2011).

According to legitimacy theory, companies associate themselves with moral and ethical standards to gain societal support and avoid penalties (Egbunike and Tarilaye, 2017). Thus, companies are accountable for their activities based on social contracts (Dyduch and Krasodomska, 2017; Haque and Deegan, 2010). Deegan (2000, p. 254) defines a social contract as a *"multitude of implicit and explicit expectations that society has about how the organisation should conduct its operations"*. They are rules, values and models accepted (legitimate) by society. These values are amongst the basis of society's decision-making

(Zimmerman and Zetiz, 2002). Thus, legitimacy cannot be directly recognised but instead perceived from the social appraisal of acceptance appropriateness (Zimmerman and Zetiz, 2002).

Legitimacy theory explains how companies react to public expectations, including the environment's relationship (O'Donovan, 2002). According to this theory, companies disclose environmental information to legitimise their behaviours, influence society's perception, and comply with societal values (Dyduch and Krasodomska, 2017). Refusal to comply with societal norms creates a legitimacy gap, indicating the difference between an organisation's actions and societal expectations (Deegan, 2002). It leads to a negative image that affects the survival or operation of companies (Milne and Patten, 2002). Therefore, gaining legitimacy enables a company to accumulate financial and non-financial resources that help it survive and grow (Zimmerman and Zetiz, 2002).

Empirically, legitimacy theory is the dominant theory used in studying environmental disclosure. Companies release environmental disclosures mainly to respond to social pressure through the awareness of environmental and economic markets. Legitimacy theory treats society as part of the company's stakeholders (Campbell, Craven and Shrives, 2003) by emphasising the importance of complying with society's expectations. Therefore, companies should satisfy the average expectations of all the stakeholder groups within society. In other words, companies disclose environmental information to legitimise their behaviours, influence society's perception, and comply with societal values (Dyduch and Krasodomska, 2017). Good corporate governance practice defines how companies respond to pressure by balancing economic, social, and environmental responsibilities. Therefore, environmental disclosure is used as an instrument for pressure management (Kelton and Young, 2008).

There is a difference between the resource dependency theory and the legitimacy theory. Resource dependency theory considers legitimacy as a resource for the companies. While on the other hand, legitimacy theory accounts for legitimacy as an essential factor for survival.

3.5.6 Political cost theory (PCT)

The political cost is a *"cost for continuing operations and business units, according to legal requirements, common life and economic environment"* (Emadzadeh et

al., 2012, p. 357). Political atmospheres such as the role of government, conflict of power, and inequalities affect the business environment directly and indirectly. The political sector influences transfer of resources amongst organisations. Therefore, companies' management adopts accounting policies such as environmental disclosure to reduce regulatory intervention (Abdel-Fattah, 2008). The damages related to pollution, toxic chemicals, and carbon release by companies can attract a legal cost. Thus, a disclosure made regarding positive or negative impacts on the environment can be a technique to reduce legal costs (Abdel-Fattah, 2008).

There are differences between stakeholder, legitimacy and political cost theories. Stakeholder theory indicates that managers disclose environmental information to satisfy the needs of various company stakeholders. On the other hand, legitimacy theory argues that companies use environmental disclosure to legitimise their activities and to reduce societal pressure. In contrast, political cost theory indicates companies use environmental disclosure to avoid political cost.

3.5.7 Institutional theory (IT)

Institutional theory is the *"organisation's interaction with the institutional environment, the effect of social expectations on the organisations and the incorporation of these expectations as reflected in organisational practices and characteristics"* (Dacin and Martinez, 1999, p. 76). In other words, institutional theory examines *"how institutionalise norms and pressure affect social change amongst organisations"* (Islam, 2009 p.64). It explains how the interdependent relationship between companies and the environment has similar characteristics. In institutional theory, companies need social and environmental acceptance in addition to economic gain. Similar organisations have norms and beliefs for environmental acceptance, which increases external pressure by powerful groups of external stakeholders to meet the expectations of society in order to gain, maintain or repair legitimacy (Haque and Islam, 2015). This pressure arises from the external environment, such as the industry member's influence (Islam, 2009). This type of external pressure is called institutional isomorphism.

Institutional isomorphism is the pressure faced by the homogeneity process between structural companies within the same business environment (Eltib, 2012). The degree of their homogeneity is the institutional force for companies to become similar over time. Besides, homogeneity significantly changes companies'

decision-making, including the disclosure of information (Ioannou and Serafeim, 2012). Three mechanisms are responsible for institutional isomorphism: coercive, mimetic, and normative (Haque and Islam, 2015; Islam, 2009).

Coercive isomorphism refers to the *"similarity within a population of organisations, which is a response to political influence and a search for organisational legitimacy"* (Islam, 2009, p.66). It is a cultural reasoning that stresses ideas comprising the reality of social nature and constructed structures to form meaning (Hassan et al., 2023). It is from the consequences of formal and informal pressure that have similar cultural expectations within the society in which it operates within the broader social context to change its structure or implement specific policies and practices (Haque and Islam, 2015). This policy can improve a company's legitimacy level. It arises when cultural and societal expectations impact the social system of companies. There are two reasons for coercive isomorphism: socio-cultural expectation and organisational relationship (Haque and Islam, 2015; Islam, 2009). Socio-cultural expectations arise as a result of an attempt to comply with the expectations of external stakeholders. It includes norms and values to gain legitimacy for survival (Haque and Islam, 2015), which leads to a social contract between the company and the environment in which it operates (Haque and Islam, 2015; Islam, 2009). On the other hand, regarding the organisational relationship, companies face external pressure from other related companies (Haque and Islam, 2015), such as dominant companies within the industry. Therefore, companies must comply with the mandates and policies of dominant companies within the sector, such as disclosure of information.

Secondly, mimetic isomorphism is where companies identify and use similar processes or solutions to address pressures that arise due to uncertainty, unsatisfied technology, or unclear goals (Eltib, 2012). Under mimetic isomorphism, companies identify processes or solutions similar to those practised by leading players in the field. The leading players can be other companies with similar characteristics, such as size or successful companies in the same industry (Islam, 2009). Over time, the process or solution will become institutionally accepted and continuously applied to gain legitimacy.

Thirdly, normative institutional isomorphism shows similarities due to the rise of professional industry development (Islam, 2009). Companies can increase their

professionalism in different ways, such as implementing international standards, personnel skills, qualifications and professional development. This can improve the company's service to lead the industry and may force competitors to provide similar services. For example, accounting practices in different companies are guided by the accounting profession's standards. So, if a lead company releases environmental disclosure, it will force other companies within the same industry to provide similar services to gain legitimacy.

The above discussion shows how different external pressures from institutions guide the behaviour of companies within the business environment. The theory focuses on mandates and norms that explain the interdependent relationship between institutional organisations and environments. One of the merits of institutional theory is that it explains the difference in considering the company's local context (Frynas and Yamahaki, 2016) to gain legitimacy. The theory studies environmental disclosure as a societal institution and a method of governance within a broader economic and governance system (Frynas and Yamahaki, 2016). It shows how earning legitimacy is necessary for a company's survival within the environment in which it operates. Therefore, there is a link between institutional, legitimacy, and stakeholder theory, whose objective concerns how a company responds to pressure to maintain legitimacy in a dynamic environment. However, difference exists between institutional, legitimacy and stakeholder theories. The institutional theory explains how companies incorporate institutionalised values and norms to maintain legitimacy. In contrast, legitimacy theory explains how companies meet social expectations to gain legitimacy. On the other hand, stakeholder theory explains how companies satisfy the needs of influential stakeholders to maintain legitimacy (Islam, 2009).

There are differences between resource dependency theory and institutional theory. Resource dependency allows companies to make active and influential decisions (Frynas and Yamahaki, 2016). However, according to institutional theory, companies comply with the norms imposed on them for institutional decision-making (Tran, 2017).

3.5.8 Voluntary disclosure theory (VDT)

Voluntary disclosure is *"information disclosed based on the firm's free will and decision, which can be financial or non-financial, disclose over and above the mandatory requirements"* (Oluwagbemigai, 2014, p. 265). Allegrini and Greco

(2013, p. 187) define voluntary disclosure as information *"release to the outside, deriving from the management's insider knowledge of the company, which is not required to published in regulated reports"*. In other words, *"voluntary disclosures are attempts to remove informational asymmetries between the firm and external agents, primarily agents in the investment community"* (Brammer and Pavelin, 2008, p.122).

The theory predicts that managers decide whether to release or hold information based on the cost and benefit of disclosure. Thus, managers release environmental information because the potential benefits could be higher than the cost (Hassan, 2018). The reason is that companies spend part of their income to prepare disclosure. Disclosure costs are classified into direct and indirect (Abdel-Fatah, 2008). Direct cost is the value of resources spent on gathering, possessing and communicating the disclosure (Abdel-Fatah, 2008). In contrast, indirect cost is the opportunity cost incurred due to non-disclosures, such as litigation and proprietary costs (Abdul-Fateh, 2008). Litigation cost is the legal reaction incurred by the company due to disclosing misleading information or hiding bad information from the user (Abdel-Fatah, 2008). In contrast, a proprietary cost of making strategic decisions by the competitor using the information available, such as future earnings forecast (Abdel-Fatah, 2008). On the other hand, disclosure benefits are derived from reducing indirect disclosure costs, such as opportunity costs (Abdel-Fatah, 2008). There are two types of disclosure benefits: external and internal (Verrecchia, 2001). External benefits include attracting liquidity and increasing business investment, while internal benefits include increasing reputation, reducing political and agency costs and increasing share value (Verrecchia, 2001).

The theory argues that although mandatory regulation exists in disclosing specific information, companies can disclose additional information for accountability and transparency. According to Abdel-Fattah (2008), companies with good news differentiate themselves from those with bad news to avoid the adverse selection problem. In line with environmental disclosure, companies with good environmental information willingly disclose environmental information to differentiate themselves from those with bad environmental information. On the other hand, those companies with low environmental information will be silent to be judged as average performing (Clarkson et al., 2008).

Voluntary disclosure theory explains the impact of companies' activities on the natural environment and shows the environmental programs used to address the impact. These increase the company's competitive advantage (Burgwal and Viera, 2014) because some investors prefer to invest in companies with minimum environmental liabilities (Clarkson et al., 2008). Voluntary disclosure theory reduces agency costs, a product of information asymmetry (Oluwagbemigai, 2014). However, voluntary disclosure theory failed to consider the external pressure which makes companies release voluntary disclosure.

3.5.9 The Current Study

The section explains most dominant theories used in literature to examine the association between corporate governance and environmental disclosure. The discussion shows that no one theory comprehensively explains governance and disclosure practices. Reviewing these theories indicates that each theory looks at corporate governance and environmental disclosure from a particular angle. Agency, signalling, and resource dependency theories aim to maximise profit and focus only on shareholder's and management's interests. The theories assume that self-interest motivates parties to disclose environmental information for economic benefit only. On the contrary, legitimacy, stakeholder, and political cost theories explain that economic activities and the flow of resources arise from the collaboration of the country's societal, economic, and political institutions. The theories consider other parties, such as government and society, as well as the economic aspect. Thus, companies release environmental information to achieve political and economic benefits. This is because companies are answerable to various stakeholders who can affect or be affected by their actions. While institutional and voluntary disclosure theories examine the economic system as a sub-system of cultural, social, and institutional surroundings, The theories assume that companies are answerable to cultural and institutional values where they operate.

This study used a multi-theoretical framework, namely legitimacy, stakeholder, agency, signalling and resource dependency theories, to examine the association between corporate governance and environmental disclosure. These theories can be competing for example, agency theory (positive accounting theory) and signalling theory (theory of regulation) are very distinct from legitimacy and stakeholder theories (system-oriented theories/ Bourgeois political economy

theories) with different focus and assumptions. However, this study views these theories as complementary rather than mutually exclusive. The complementary aspect comes because the theories are fundamentally different. This enables an examination of determinants of environmental disclosure using multifocal lenses rather than limiting it from only one angle.

The complementary aspect provides a better understanding of motivations for environmental disclosure. Regarding agency theory, companies release environmental disclosure to reduce shareholders' and managers' conflicts of interest, which results in information asymmetry and agency problems. According to signalling theory, companies are motivated to release environmental disclosure to signal their environmental performance and attract competitive advantage. According to legitimacy theory, companies are motivated to release environmental disclosure and associate their activities with societal values and norms to obtain a social licence and approval. While in line with stakeholder theory, companies are motivated to release environmental disclosures to demonstrate environmental responsibilities and stakeholder engagement.

The complementary aspect shows various purposes for disclosing environmental information. Both agency and signalling theories use environmental disclosure as a strategy for balancing disclosure mechanisms. Regarding agency theory, companies use environmental disclosure to improve transparency and prove managerial accountability and competence. In terms of signalling theory, companies release environmental disclosure to differentiate themselves from competitors and improve market perception. However, according to legitimacy and stakeholder theories, companies release environmental disclosure to establish social trust and approval. In terms of legitimacy theory, firms disclose environmental disclosure for public perception of management and associate their behaviour with the expectations of society. Based on stakeholder theory, companies release environmental disclosure to address stakeholders' trust and concerns.

The complementary aspect provides a holistic importance of environmental disclosure. Regarding agency theory, environmental disclosure assists companies to associate shareholders and management interests, which minimises agency issues and demonstrates accountability. In terms of signalling theory,

environmental disclosure helps to signal their environmental procedures, which can attract investment and to differentiate from their competitors. Regarding legitimacy theory, environmental disclosure helps companies maintain legitimacy by maintaining societal values and norms needed for survival. According to stakeholder theory environmental disclosure helps to address various stakeholders' concerns and demonstrate corporate accountability, which builds trust.

The complementary aspect shows the economic and political economic benefits of environmental disclosure. Based on agency and signalling theories, companies release environmental information to respond to economic and market pressure from investors. According to legitimacy and stakeholder theories, companies release environmental information to respond to societal and stakeholder expectations, demonstrating commitment to environmental responsibility.

Lastly, the complementary aspect overcomes the limitations of using one theory. For example, agency theory does not focus on other stakeholders, such as the community (Freeman, 2010). Legitimacy theory does not consider changes in the value system, which impacts on how companies relate themselves to society (Campbell, Craven and Shrives, 2003).

The rationale for selecting these theories is according to legitimacy theory and based on Nigeria's codes of governance, 2011 and 2018, there is a social contract between firms and society (Amaeshi et al., 2016). Therefore, listed Nigerian companies release environmental disclosures to fulfil their social contract. Nigerian listed companies release environmental disclosures to meet societal norms and expectations on environmental sustainability and responsibility for societal acceptance. To manage the perception of public expectations and maintain and gain legitimacy, Nigerian listed companies release environmental information looking at the history of Nigerian environmental issues, especially environmentally sensitive industries. Nigerian listed companies release environmental information to respond to international and local activists such as communities and NGOs to demonstrate their societal values and reduce legitimate threats of legitimacy.

According to stakeholder theory, listed companies on the Nigerian stock exchange are expected to address the environmental information needs of key stakeholders who affect or are affected by environmental practices (Okere et al., 2021).

Nigerian listed companies release environmental information to demonstrate their accountability to stakeholders, such as local communities, investors, regulators, employees, and international groups. Nigerian listed companies release environmental information to create trust and maintain good associations with key stakeholders, especially those who suffer from environmental degradation. Nigerian listed companies disclose environmental information to meet stakeholders' expectations, such as higher international and local investors' demand for international practice transparency.

According to agency theory, companies face substantial agency problems between shareholders and managers. Thus, Nigerian listed companies release environmental information to demonstrate how their actions align with the interests of shareholders. Nigerian listed companies disclose environmental information, which shows a picture of their sustainability risk and effort to reduce asymmetry of information problems between investors and managers. Nigerian listed companies disclose environmental information to demonstrate a practice of good governance, which boosts shareholders' confidence.

Based on signalling theory, Nigerian listed companies release environmental disclosures to demonstrate their environmental commitment as a positive signal to market for long-term sustainability (Bamahros, 2022). Nigerian listed companies release environmental information to demonstrate their environmental transparency and differentiate themselves from their competitors, which can attract more conscious environmental investors. Nigerian listed companies release environmental disclosures to signal their compliance with international and national environmental standards, which increases their reputation. Nigerian companies release environmental information to signal their sustainability performance, which enhances their brand image and market value to achieve competitive advantage.

Based on resource dependency theory, Nigerian listed companies release environmental disclosure to ensure environmental sustainability for internal and external benefits. Nigerian listed companies rely on various external resources such as capital, raw materials, and market access. Environmental disclosure can help secure these resources by demonstrating sustainability practices to resource providers. Nigerian listed companies release environmental disclosures to manage

critical stakeholders, such as international investors who may be interested in environmental performance. Nigerian listed companies use environmental disclosure to establish strategic alliances with other companies that prioritise environmental sustainability, thus ensuring the necessary flow of resources.

The study did not use institutional, political cost and voluntary disclosure theories to investigate the association between corporate governance and environmental disclosure. Institutional theory concentrates on the institutional environment and ignores conflict of interest between shareholders and managers which is crucial to governance problems. The theory needs to explain more adequately how internal forces impact environmental disclosure decisions. Institutional theory pays less attention to market forces, investor demand, and competitive pressure, which significantly influence corporate decisions, including EDQ, instead of adapting only to institutional norms. Institutional theory discusses the homogeneity of a company's use of related practices to maintain legitimacy. Contrarily, it cannot explain clearly how specific board characteristics, ownership structure, management incentives, and market structures drive environmental disclosure, especially in Nigeria, which has diverse and dynamic structures. In summary, institutional theory has three pillars: regulations, industry standards and cultural values. In terms of regulations, both 2011 and 2018 codes are voluntary (FRCN, 2018; SEC, 2011; Phillips, Somuyiwa and Olajide, 2019). Similarly, environmental disclosure is also voluntary in Nigeria (Okere et al., 2021; Eneh, 2019; Chijoke-Mgbame and Mgbame, 2018; Ofoegbu, Odoemelam and Okafor, 2018; Egbunike and Tarilaye, 2017; Eze, Nweze and Enekwe, 2016). Industry standards provide limited scope, which is inefficient for understanding broader reasons that motivate environmental disclosure, such as investor relations, social responsibilities, and corporate reputation. Industry standards increase homogeneity levels amongst sectors, motivating companies to use similar practices. In contrast, corporate governance and environmental disclosure factors such as ownership structure, management philosophy, and company size differ within companies within an industry. Lastly, industry standards lack clear factors that explain governance practices and their association with environmental disclosure practices, which may not uniquely explain market demand, societal factors and stakeholder requirements which impact corporate actions in Nigeria. Institutional norms and values are used to gain legitimacy, but in Nigeria, obtaining legitimacy comes from

managing stakeholders' perceptions to address the legitimacy gap for long-term sustainability.

Political cost theory explains how companies use their financial disclosure to avoid political costs such as penalties, taxes, and fines. Corporate governance and environmental disclosure are mostly broadly explained through non-financial disclosure, including social responsibility and ethical responsibility management of stakeholders, which are above political cost. Apart from that, both the 2011 and 2018 Corporate Governance Codes are voluntary. Similarly, environmental disclosure is also voluntary in Nigeria (Okere et al., 2021; Eneh, 2019; Chijoke-Mgbame and Mgbame, 2018; Ofoegbu, Odoemelum and Okafor, 2018).

Voluntary disclosure theory concentrates on disclosure consequences which do not capture external pressure, such as communities, a major reason Nigerian companies release environmental information. Lastly, voluntary disclosure narrowly explained how corporate governance elements (such as board size and board independence) influence EDQ, which is the main aim of this study.

3.6 Empirical literature review

This section is divided into three sub-sections, namely, empirical review on measuring environmental disclosure and its association with firm characteristics (3.6.1). Empirical literature review on the association between board characteristics and environmental disclosure (3.6.2). Lastly, an empirical literature review on the association between ownership structure and environmental disclosure (3.6.3).

3.6.1 Empirical review on measuring environmental disclosure and its association with firm characteristics.

This section reviews prior studies on measuring environmental disclosure and its association with firm characteristics in developed countries 3.6.1.1., developing countries 3.6.1.2 and Nigeria 3.6.1.3. The section concludes by explaining the identified literature gaps in 3.6.1.4.

3.6.1.1 Prior studies in developed countries

This study follows the United Nations' definition of developed countries in 2022 (United Nations, 2022).

A review of empirical literature shows that environmental disclosure studies in developed countries started in the 1970s (e.g., Barnett and James, 1974; Dilley and Weygandt, 1973; Mobley, 1970). During that period, the literature was underdeveloped and not precise (Eltib, 2012). For example, the methodology is based on “yes” or “no” analysis, which fails to reveal detailed information (Eltib, 2012). In the 1980s, the literature focused on improving the methodology, which reduced the subjectivity in measuring the volume of environmental disclosure and increased the consistency of the content analysis (e.g., Cowen et al., 1988; Guthrie and Mathews, 1985; Rockness, 1985). However, studies on environmental disclosure in the 1980s gave little attention to a theoretical framework; only a few studies were concerned with theoretical framework (e.g., Logsdon, 1985; Mathews, 1984). In the 1990s, studies on environmental disclosure improved significantly by focusing on different theories such as stakeholder, legitimacy and political economy theory (e.g., Hackston and Milne, 1996; Roberts, 1992; Patten, 1991).

From the 2000s to date, researchers’ interest on environmental disclosure has increased. For example, Eltib (2012) found increased environmental disclosure amongst the leading accounting journals. There are more studies on new areas, such as measuring the quality of environmental disclosure and examining environmental performance (Clarkson, Richardson and Vasvari, 2008; Hughes, Anderson and Golden, 2001).

The empirical literature review shows that most studies in developed countries measure environmental disclosure quantity (e.g., Zhang, 2022; Danisch, 2021; Miklosik and Evans, 2021; Sutantoputra, 2022; Rosa Portella and Borba, 2020; Cong, 2020; Chiang, Wachtel and Zhou, 2020; Mura et al., 2019; Burgwal and Vieira, 2014). However, coding the disclosure practice of a company based on different aspects of disclosure, such as quality and quantity, could lead to different rankings and inferences (Hassan and Marston, 2019). While the quantity of disclosure considers whether an item of information is disclosed or not, the quality of disclosure focuses on the nature of disclosed information.

In contrast, fewer studies examine environmental disclosure quality (Marwa, Salhi and Jarboui, 2020; Bhattacharyya, 2016; D’Amico et al., 2016; Echave and Bhati, 2010; Brammer and Pavelin, 2008; Van-Staden and Hooks, 2007) with mixed

findings. Some studies found that sample companies release higher environmental information. To demonstrate, in France, Marwa, Salhi, and Jarboui (2020) explore the relationship between environmental quality and environmental audits amongst French companies from 2012 to 2017. Their study measures EDQ using an unweighted disclosure index. The study found that French companies release higher environmental disclosure quality. Echave and Bhati (2010) examined the corporate CSR quality practices of Spanish firms in 2010. Their studies are based on agency, legitimacy, and stakeholder theories assumptions and used annual reports of forty-one observations. The CSR quality was measured using a weighted disclosure index, and findings reveal that Spanish companies release higher quality CSR disclosure and product, and quality disclosure have the highest information release followed by environmental information. Brammer and Pavelin (2008) examine patterns in the quality of corporate social responsibility disclosure amongst forty Portuguese companies in 2003 based on legitimacy and resource-based theoretical assumptions. The result shows that sample companies release higher-quality corporate social responsibility disclosure, but social information is higher than environmental information.

Other studies find that sample companies release low-quality environmental information. To illustrate, Bhattacharyya (2016) examined the quality of social and environmental disclosure amongst Australian companies from 2006-2007 of forty-seven observations based on institutional and legitimacy theories assumptions. The social and environmental disclosure was measured based on a weighted disclosure index, assigning more weight to quantitative and non-narrative disclosure. Findings show that Australian companies' extent and quality of social and environmental disclosure were low, and larger transport industry released more quality of social and environmental disclosure quality than chemical, forestry and paper, industrial engineering and mining industries. D'Amico et al. (2016) examined the factors influencing environmental disclosure quality amongst Italian-listed companies from 2006 to 2009 using two hundred and twenty-nine observations. Their studies measured quality of environmental disclosure using weighted disclosure index, assigning more weights to complete environmental information which is comprehensive, systematic and clear. Findings show that Italian companies release low EDQ.

To conclude findings from these studies cannot be applicable to Nigeria due to environmental awareness and attitude advancement differences between developed countries and developing countries. Developed countries are financially capable of investing in broad environmental disclosure and management practices. Developed countries have more modern and advanced environmental accountability and stakeholders' expectations. Developed countries have more rigorous and stringent environmental laws and compliance pressure. Developed countries face higher competition in environmental practices to maintain market position and reputation. Developed countries have advanced infrastructure for easier access, storage and data processing, simplifying environmental disclosure practices. Developed countries have more solid and influential institutions like regulatory bodies and non-governmental organisations that protect environmental sustainability. Lastly, developed countries have more public awareness of environmental matters. Appendices 3 and 4 provides a summary table of previous studies that measure environmental disclosure amongst developed countries.

3.6.1.2 Prior studies in developing countries.

This study follows the United Nations' definition of developing countries in 2022 (United Nations, 2023).

The empirical literature review finds few studies from emerging markets, which mainly focused in Asian and Middle East countries (See Appendix 4) due to data availability. Similar to developed countries, most previous environmental disclosure studies in developing countries focus on measuring the quantity of environmental information (e.g., Reboredo and Sowaity 2022; Ntui, Mzenzi and Chalu, 2021; Boshnak, 2021; Ifada et al., 2021; Ramba, Joseph and Said, 2021; Hussain et al., 2020; Fahad and Nidheesh, 2020; Nguyen et al., 2017; Welbeck et al. 2017; Khalid, Kouhy and Hassan, 2017; Juhmani 2014). However, there are fewer environmental disclosure quality studies in developing countries, such as Vietnam (Nguyen et al., 2017), India (Chandok and Singh, 2017) and Malaysia (Fatima Abdullah and Sulaiman, 2015. In Vietnam, Nguyen et al. (2017), examine how corporate characteristics could influence the quality of corporate environmental disclosure amongst a sample of 296 companies in Vietnam. The study measures environmental disclosure using a weighted self-disclosure index, assigning more weight to information released in both qualitative and quantitative

forms. The result shows that the level of environmental disclosure quality released by construction companies is increasing. Firm size, listing in the stock market, profitability and BIG4 audit firms have positive and significant associations with environmental disclosure. In contrast, leverage has a negative and significant association with environmental disclosure. Fatima Abdullah and Sulaiman (2015) examined the quality of environmental disclosure quality of listed environmentally sensitive industries amongst one hundred and sixty-four observations of Malaysian companies in 2009. Their studies measure the quality of environmental disclosure using a self-weighted disclosure index, which assigns more weight to monetary or quantitative environmental disclosure items. The result reveals an increase in the quality of environmental disclosure, and most companies release quantitative environmental information. Also, firm size and leverage have a positive and significant association with the quality of environmental disclosure. While profitability has no association with environmental disclosure quality. On the contrary, Chandok and Singh (2017) examine the status of corporate environmental disclosure on the websites and annual reports of one hundred observations of selected Indian companies for companies. The study used a weighted self-disclosure index assigning more weight to environmental disclosure release in monetary terms. The result shows that Indian companies release low-quality environmental information. Independent audit committee proportion and the commissioner's educational background are positively and significantly associated with environmental disclosure. While audit committee size, industry type and firm size have no association with environmental disclosure.

Findings from these studies could be less applicable to the Nigerian context due to differences in the richness of natural resources and the severity of environmental issues between the countries. For example, Nigeria has more natural resources and suffers a higher severity of environmental damage compared to Malaysia. Nigeria has more oil and less gas than that of India but releases higher gas flaring and has a higher climate risk for children compared to India.

Focusing on African markets in particular, a review of environmental disclosure shows that there are extremely very limited studies, and those studies mostly measure the quantity of environmental disclosure (e.g., Ntui, Mzenzi, and Chalu, 2021; Aboagye-Otchere, Simpson, and Kusi, 2020; Welbeck et al., 2017; Barako,

2007; Barako, Hancock, and Izan, 2006). On the contrary, Eljayash (2015) examines the quality of environmental disclosure amongst North African countries based on stakeholder, legitimacy, and political economy theories. Their study investigates annual reports of thirty-six observations of oil and gas companies in Egypt, Libya and Tunisia. The quality of environmental disclosure was measured using the weighted self-disclosure index, which assigns more weight to environmental disclosure release in financial terms. The findings show that Arab countries release low environmental information, but amongst the countries, Egyptian oil and gas companies release higher quality environmental information, followed by Libyan and lastly Tunisian companies. Nigeria has more natural resources and suffers a higher severity of environmental damage compared to Libya, Egypt, and Tunisia.

In conclusion, a literature review found extremely limited studies on environmental disclosure quality in the African market, which focus on North Africa. Thus, examining the quality of environmental disclosure in Saharan Africa, especially Nigeria, which has abundant natural resources, is important. Appendices 5 and 6 provide a summary table of previous studies that measure environmental disclosure amongst developing countries.

3.6.1.3 Prior Studies in Nigeria

The nature of previous studies in Nigeria follows a similar pattern to that of both developed and developing countries, where the majority concentrate on measuring environmental disclosure quantity (e.g. Mohammed, 2018; Oraka and Egbunike, 2016; Ohidoa et al., 2016; Dibia and Onwuchekwa, 2015; Adekanmi et al., 2015; Odia, 2015; Akanno et al., 2015; Umoren et al., 2015; James and Gbalam, 2013). Findings from these studies shows that companies disclose little environmental quantity information, especially for studies that use data for the fiscal years prior to 2011 (e.g., Oyadonghan and Eze, 2013; Uwuigbe and Jimoh, 2012; Uwigbe, 2011; Owalobi, 2008). In 2011, the Nigerian Securities and Exchange Commission set up a committee to review the 2003 corporate governance code. The revised code aims to increase transparency, accountability, and good governance by recommending that *"Companies should pay attention to the interests of their stakeholders such as its host community, consumers and the general public"* (Code of Corporate Governance, 2011, p. 34). It further explains, *"The board should report annually on the nature and extent of its environmental*

policies and practices” (Code of Corporate Governance, 2011, p. 34). After implementing the new Nigerian corporate governance code in 2011, prior studies revealed mixed results on the extent of corporate environmental disclosure. Some studies find that companies disclose low levels of environmental disclosure (e.g., Odera, Scott and Gow, 2016; Oraka and Egbunike, 2016; Odia, 2015; Umoren, 2015; Innocent et al., 2014), while others document improvement in environmental disclosure after the implementation of the new Nigerian corporate governance code (Ohidoa et al., 2016; Akkano et al., 2015).

However, only limited studies investigate the quality of environmental disclosure in manufacturing and oil and gas industries (Egbunike and Tarilaye, 2017; Odera, Scott and Gow, 2016; Innocent, Okafor and Egolum, 2014). Egbunike and Tarilaye (2017) examine the association between firm characteristics and voluntary environmental disclosure quality amongst forty observations of manufacturing companies based on legitimacy theory. Their study measured environmental disclosure using the Global Reporting Index. The findings show that sample companies release higher environmental disclosure quality. The OLS regression shows a significant positive relationship between environmental disclosure quality and each of leverage, firm size, earnings per share, and the number of independent directors. Based on political economy theory, Odera, Scott and Gow (2016) examine the quantity and quality of social and environmental disclosures (SEDs) of thirteen Nigerian oil companies. Their study used a number of counting of number of sentences to measure the quality of social and environmental disclosure. Findings reveal Oil companies release low social and environmental information. Amongst the released disclosures, employee information dominates the information, while environmental information is extremely low. Innocent, Okafor and Egolum (2014) assess the extent, nature, and quality of environmental disclosure practices of three manufacturing firms in Nigeria listed firms. The environmental disclosure was measured by counting the number of sentences. The findings of the study show that sample manufacturing companies release low environmental disclosure, and environmental disclosure of firms contains little or no quantifiable data.

To conclude, these limited Nigerian studies (Egbunike and Tarilaye, 2017; Odera, Scott and Gow, 2016; Innocent, Okafor and Egolum, 2014) that investigated the quality of environmental disclosure focus on a subset of industries, did not

consider environmental information released on websites and sustainability reports and used few observations. Appendices 7 and 8 provide a summary table of previous studies that measure environmental disclosure in the Nigerian market.

3.6.1.4 The current study

A review of related literature shows that there are more studies on environmental disclosure in developed countries compared to developing countries. Most studies in developed and developing countries concentrated on measuring the quantity of environmental disclosure. while studies on the quality of environmental disclosure are limited.

For Nigeria in particular, most of prior literature measures the quantity of corporate environmental disclosure. However, different inferences can be drawn from different dimensions or aspects of disclosure. For example, the quantity and quality of the same type of disclosure could lead to different rankings for the same sample of companies (Hassan and Marston, 2019). In addition, voluminous disclosure could adversely affect the readability of the information and increase its complexity, hence reducing its usefulness for decision-making (e.g., Guay et al., 2016; Filzen and Peterson, 2015;). This, in turn, the current study focusses on the quality aspect of corporate voluntary environmental disclosure rather than quantity.

Prior Nigerian studies examine quality of environmental disclosure in oil and gas and manufacturing industries (Egbunike and Tarilaye, 2017; Odera, Scott and Gow, 2016; Innocent, Okafor and Egolum, 2014). The reason is that the oil and gas and manufacturing businesses harms the environment through oil spills and gas flaring (Eze, Nweze and Enekwe, 2016). Additionally, disposal of industrial waste by manufacturing companies also negatively affects the environment. However, the adverse impact of the corporate sector on the natural environment is not limited to manufacturing and oil and gas industry. Other industries could also harm the natural environment. For example, use of extensive cabling and mast erection by the Nigerian telecommunications industry affects the natural environment; applying modern chemicals to seeds in agricultural businesses results in habitat loss for plants and animals. Therefore, focusing on manufacturing and oil and gas industries only provides a limited picture of the environmental damage caused by the corporate sector in Nigeria.

Prior Nigerian studies only measure environmental disclosure released from annual reports (e.g., George and Ukpong, 2023; Egbunike and Efionayi, 2021; Ivungu et al., 2021; Okere et al., 2021; Osemene et al., 2021; Eneh, 2019; Odoemelam and Okafor, 2018; Mohammed, 2018; Egbunike and Tarilaye, 2017; Oraka and Egbunike, 2016; Ohidoa et al., 2016; Odera, Scott and Gow 2016; Dibia and Onwuchekwa, 2015; Odia, 2015; Adekanmi et al., 2015; Akanno et al., 2015; Umoren et al., 2015), which means that environmental information released in companies' websites or sustainability reports were ignored. This, in turn, creates a limited view of the corporate environmental disclosure practice.

Prior Nigerian studies typically use textual analysis to measure environmental disclosure (Mohammed, 2018; Oraka and Egbunike, 2016; Ohidoa, Omokhudu and Oserogho 2016; Odera, Scott and Gow, 2016; Odia, 2015; Akanno et al., 2015; Innocent, Okafor and Egolum, 2014), while others use disclosure index ranging from ten to thirty-six items (e.g., George and Ukpong, 2023; Egbunike and Efionayi, 2021; Ivungu et al., 2021; Okere et al., 2021; Osemene et al., 2021; Eneh, 2019; Odoemelam and Okafor, 2018; Umoren, Udo and George, 2015; Victor-Chiedu and Fodio, 2012; Uwuigbe and Olusanmi, 2011; Ofoegbu, Odoemelam and Okafor, 2018). However, relying on the frequency of words or sentences in isolation of their context could yield a distorted disclosure measure (Hassan and Marston, 2019). Besides, textual analysis does not consider information released in a non-textual format, such as figures, pictures, graphs, and charts, which affects the completeness of the disclosure measurement (Unerman, 2000). Few Nigerian studies measure environmental disclosure using disclosure indexes, (George and Ukpong, 2023; Osemene et al., 2021; Eneh, 2019; Odoemelam and Okafor, 2018; Umoren, Udo and George, 2015; Victor-Chiedu and Fodio, 2012; Uwuigbe and Olusanmi, 2011) but they only include a few items of environmental information. Thus, those indexes do not fully capture the richness of environmental information released by Nigerian companies.

In conclusion, this study contributes to the literature by measuring EDQ for listed companies on an emerging market, which made one of the top 20 per capita emissions worldwide for the year 2022, in several disclosure vehicles, namely: annual reports, sustainability reports, and companies' websites, which provides a more comprehensive view about corporate environmental disclosure practices. Moreover, this study investigates corporate environmental disclosure practices for

all listed companies on the NSE using a disclosure index containing 57 disclosure items.

3.6.2 Prior studies on the association between board characteristics and environmental disclosure

This section aims to provide reviews of prior studies on the association between board characteristics and environmental disclosure in developed countries 3.6.2.1, developing countries 3.6.2.2, and Nigeria 3.6.2.3. Lastly, the section concludes by explaining the identified literature gaps in 3.6.2.4.

3.6.2.1 Prior studies in developed countries

A review of relevant literature shows that most studies that examine the association between board characteristics environmental disclosure focus on the United States (Albitar, Abdoush and Hussainey, 2022; Feng, Groh and Wang, 2020; Giannarakis Andronikidis and Sariannidis, 2020; Manita et al., 2018; Rupley, Brown and Marshall, 2012; Post, Rahman and Rubow, 2011; Marshall, Brown and Plumlee, 2011; Boesso and Kumar, 2007). A review of the literature found other studies conducted in other countries, such as the United Kingdom (Tingbani et al., 2020; Al-Qahtani and Elgharbawy, 2020; Liao, Luo and Tang, 2015; Abu-Raya, 2012; Hassan, 2010; Brammer and Pavelin, 2008); Italy (De-Masi et al., 2021; Cucari, Esposito De Falco and Orlando, 2018) Australia (Arif et al. 2020; Nadeem, Zaman and Saleem 2017; Kathy Rao, Tilt and Lester, 2012); France (Khairiddine et al. 2020; Chebbia Aliedanb and Mohammed, 2020).

A review of relevant literature shows that most studies in developed countries focus on examining the association between board characteristics and environmental disclosure quantity (Chand et al., 2022; Raimo, De Nuccio and Vitolla, 2022; Khalid et al., 2022; Chouaibi, Miladi and Elouni, 2022; Albitar, Abdoush and Hussainey, 2022; Nicolò et al., 2021; Arif et al., 2020; Khairiddine et al., 2020; Feng, Groh and Wang, 2020; Tingbani et al., 2020; Giannarakis, Andronikidis and Sariannidis 2020; Manita et al. 2018; Ben-Amar, Chang and McIlkenny, 2017; Nadeem, Zaman and Saleem, 2017; Post, Rahman and Rubow, 2011; Hassan 2010).

In contrast, few studies examine the association between board characteristics and EDQ in developed countries (Chand, et al., 2022; Gerwing Kajüter and Wirth, 2022; Chouaibi et al., 2022; Baalouch et al., 2019; Abu-Raya, 2012; Cormier Ledoux and Magnan, 2011; Rupley et al., 2012; Marshall et al., 2011). The findings show that what constitutes better board characteristics on environmental disclosure quality is context dependent. To demonstrate, Chand et al. (2022) investigates determinants of social and environmental disclosure quality amongst three hundred and fifty observations in New Zealand companies from 2011 to 2017. The results show EDQ has a positive and significant association with firm size, profitability, board size, and the presence of female directors on the board. Similarly, Baalouch, Damak Ayadi, and Hussainey (2018) investigate the factors that impacted environmental disclosure quality of five hundred and seventy observations in France from 2009 to 2014. Findings show that environmental disclosure quality has a positive and significant association with environmental audit, gender diversity, Big4 and environmental performance. While board independence has a negative and significant association with environmental disclosure quality. This shows that better board characteristics should have a higher proportion of female directors on the board amongst New Zealand and French companies. On the contrary, Gerwing Kajüter and Wirth (2022) investigate the association between corporate governance and sustainability disclosure quality amongst five hundred forty observations of German companies from 2014 to 2017. The findings, amongst others, show that gender diversity, executive board level and firm size have no association with sustainability reporting quality. This shows that better board characteristics have no relationship with a higher or lower proportion of female directors on the board.

Chouaibi, Miladi and Elouni (2022) investigate the impact of board characteristics level of environmental disclosure by European firms amongst two hundred and twenty European firms for the year 2015. The result shows that board size and board independence have positive and significant association with environmental disclosure quality. While CEO duality has no association with environmental disclosure quality. This result shows that in terms of environmental disclosure quality better board characteristics should have larger boards and higher number of independent directors on the board while CEO duality does not determine better board characteristics. Contrary, Abu-Raya, (2012); investigate the association

between corporate governance with quality and quantity of environmental disclosure amongst two hundred and twenty-nine observation of UK listed companies from 2004-2007. The results show a significant positive association between board meetings and cross-directorship with environmental disclosure quality. While each of board independence, board size, CEO duality, institutional ownership, and ownership concentration have no association with environmental disclosure quality. From the findings it can be concluded that in terms of environmental disclosure quality board size, board independence and CEO duality are not determinants of better board characteristics. Therefore, board size, board independence and CEO duality reveal mixed findings on their association with quality of environmental disclosure in developed countries.

To conclude, findings on the association between board characteristics and EDQ are contextual factors. Besides, developed countries have higher governance standards that promote higher supervision and environmental accountability. Developed countries have better mechanisms for board evaluation and accountability compared to developing countries. Lastly, boards in developed countries are more diverse and may have more environmental expertise members than in developing countries. Based on that, findings cannot be applicable to the Nigerian market. Appendices 9 and 10 provide a summary table of previous studies investigating the association between board characteristics and environmental disclosure amongst developed countries.

3.6.2.2 Prior studies in developing countries.

A review of the literature finds that majority of studies in developing countries focus on examining the association between board characteristics and corporate environmental disclosure quantity similar to developed countries (Ghosh Pareek and Sahu, 2023; Kumari et al., 2022; Handayati et al., 2022; Bamahros et al., 2022; Alkayed and Omar, 2022; Issa et al., 2022; Nuskiya et al., 2021; Zahid et al., 2020;; Kilincarslan, Elmagrhi and Li, 2020;; Rabi, 2019; Ismail and Latiff, 2019; Naseer and Rashid, 2018; Roy and Ghosh, 2017; Ezhilarasi and Kabra 2017; Wuryani et al., 2017; Trieksani and Djajadikerta, 2016; Habbash, 2015). Contrary, review literature finds fewer studies that examine the association between board characteristics and quality of environmental disclosure in developing countries like Jordan (Alkayed and Omar, 2022; Gerged, 2021; Alkayed, 2018), Indonesia (Solikhah, and Maulina, 2021), Malaysia (San-Ong,

2019), Iran (Alipour et al., 2019), Saudi Arabia (Alotaibi, 2016) India (Kumari et al., 2022) and China (Agyemang et al., 2020).

Similar to developed countries, what constitutes better board characteristics amongst developing countries is a context dependent. In Jordan, Alkayed and Omar (2022) examine the determinants of quality and extent of corporate social responsibility disclosure using six hundred and seventy-five observations from 2010-2015. Findings show that sample companies release higher CSR quantity compared to quality. Also, there is a positive and significant association between CSR disclosure quality with board independence, board size, foreign members on the board, age of firm, number of board meetings, the presence of audit committees, Big 4, government ownership, size of firm and industry type. , There is no association between CSR quality and each of presence of women on the board, institutional investors and ownership concentration. Contrary, in Saudi Arabia, Alotaibi (2016) examined the determinants and consequences of quantity and quality of CSR disclosure amongst one hundred and seventy-one observations. The result shows that CSR disclosure quality has a positive and significant association with board size. While board independence has a negative and significant association with CSR disclosure quality. This shows that a higher number of non-executive directors contributes positively to better board composition amongst Jordan companies but negatively affects better board composition in Saudi Arabian companies.

In Jordan, Gerged (2021) investigates how corporate governance variables had an impact on EDQ from 2010-2014 using five hundred non-financial observations. The result shows board independence, CEO duality, board size, and firm size leverage; big4 has a positive significance association with environmental disclosure quality. This means that better board composition should have larger boards, a higher number of non-executive directors and CEO duality in Jordan. Contrarily, CEO duality, higher or lower board independence and gender diversity do not account for better board characteristics in India. Kumari demonstrates this et al. (2022), which examine the impact of board characteristics on sustainability for environmentally sensitive and non-sensitive firms in India using one thousand one hundred and fifty-eight observations. The findings show a positive and significant association between the frequency of board meetings, board size, presence of sustainability committees, and firm size with sustainability disclosure

quality of both environmentally sensitive and non-sensitive companies in India. In contrast, CEO duality, gender diversity, board independence, and profitability have no association with the quality of sustainability disclosure for both sensitive and non-sensitive environmental industries in India. In Malaysia, San-Ong (2019) investigated the impact of corporate governance on the quality of environmental disclosure using five hundred and ten observations. Results show that Malaysian companies release low descriptive and general environmental information. Board independence and separation of CEO duality have a positive and significant association with EDQ. While board size and have no association with EDQ. This shows that board size does not form a better board composition amongst Malaysian listed companies, which contradicts findings from Jordan that show large boards contribute to better board composition.

Lastly, Agyemang et al. (2020) examine the effect of board characteristics on environmental disclosure quality for listed mining companies in China using six hundred and forty-six observations. The findings show that board size, board independence, board meetings, and CEO duality reveal a positive and significant association with environmental disclosure quality. While gender diversity and foreign nationality reveal no association with environmental disclosure quality. The findings contradict (Alkayed and Omar (2022), who documented that the presence of foreign members on the board has a positive and significant association with environmental disclosure quality.

Thus, findings from these studies could be less applicable to the Nigerian context due to differences in the richness of natural resources, severity of environmental issues and weak governance systems between the countries⁵. Nigeria has more natural resources, suffers a higher severity of environmental damage and has a weak governance system compared to Jordan and Malaysia. Nigeria has more oil and gas, releases higher gas flaring, has a higher climate risk for children, and has a weak governance system compared to Indonesia. Nigeria has less oil and more gas than Iran. Nigeria has a higher climate risk, poor environmental performance and a weak governance system compared to Iran. Nigeria has fewer natural resources but suffers a higher severity of environmental damage and weak governance system compared to Saudi-Arabia. Nigeria has more oil and less gas

⁵ See appendix 1 and 2.

but releases higher gas flaring, has a higher climate risk for children, and weak governance system compared to India. Nigeria produces more gas and low oil than China, but Nigeria release higher gas flaring, has a higher climate risk for children and poor environmental performance than China. Furthermore, Nigeria has a weak governance system compared to China.

When focusing on African markets, it becomes evident that there are fewer studies that examine the association between board characteristics and environmental disclosure, which focus on quantity disclosure (e.g., Osemene et al., 2021; Kilincarslan, Elmagrhi and Li, 2020; Alnabsha et al., 2018). However, it's important to note that the quality and quantity of the same information could lead to different conclusions, as explained in the motivation. Therefore, there is a clear need for further research to investigate the association between board characteristics and environmental disclosure quality in African countries. Appendices 11 and 12 summarise previous studies investigating the association between board characteristics and environmental disclosure in developing countries.

3.6.2.3 Prior studies on Nigeria

A review of relevant studies in Nigeria found that most studies examine the association between board characteristics and environmental disclosure quantity (George and Ukpong, 2023; Okere et al., 2021; Ndal, Ibanichuka and Ofurum, 2021; Osemene et al., 2021; Jeroh, 2020; Eneh, 2019; Ofoegbu, Odoemelam and Okafor, 2018; Odoemelam and Okafor, 2018; Oscar and Juliet, 2015; Uwuigbe, Egbide and Ayokunle, 2011).

However, the focus on the association between board characteristics and EDQ is scarce and limited to oil and gas industry only (Ivungu et al., 2021; Victor-Chiedu and Fodio, 2012). Ivungu et al., (2021) examine the association between corporate governance and environmental disclosure quality amongst eighty observations in oil and gas companies listed in the Nigerian capital market from 2011-2020. The result shows a positive and significance association between environmental disclosure with board independence and board ownership. While board size has negative and significance association with environmental disclosure. Also, Victor- Chiedu and Fodio (2012) using twenty-five observations of manufacturing companies. The findings shows that presence of foreign member

on board, board independence firm size, and financial slack have positive significance association with EDQ quality of ED. While board size has negative association with quality of EDQ. In contrast gender diversity have no association with quality of EDQ. These studies examine the association between board characteristics and EDQ in subset of industry using few observations. Additionally, they did not consider other variables.

In terms of variables used previous Nigerian studies mostly used board size, board independence, presence of foreign member on the board to investigate the association between board characteristics and EDQ (Ivungu et al., 2021; Victor-Chiedu and Fodio 2012). Thus, they did not examine the association between each of gender diversity, CEO Duality, board meeting, board experience with EDQ. These variables are important because CEO duality provides self-servicing opportunities, which affects a decision to release information, including environmental information (Alotaibi, 2016). Experience directors serving in more than one board had experience with environmental reporting policies and practices of the different boards they serve (Rupley et al., 2012). Frequent board meetings can lead to higher communication and coordination costs, spreading the board agenda to various formal meetings without adequately addressing environmental issues (Giannarakis, Konteos and Sariannidis, 2014). Women ensure more perspective issues are deliberated in decision-making, including environmental disclosure (Fernandez-Feijoo et al., 2014). Based on that, a study is important to examine how each gender diversity, CEO Duality, board meeting, and board experience have an association with EDQ. Appendices 13 and 14 show the previous studies on the association between board characteristics and EDQ in Nigeria. Appendix 8 summarises previous studies that investigate the association between board characteristics and environmental disclosure amongst developing countries.

3.6.2.4 The Current Study

A review of literature finds more studies that investigate association between board characteristics and environmental disclosure quantity compared to EDQ in developed and developing countries.

Like studies in developed and developing countries, most Nigerian studies examined the association between board characteristics and environmental

disclosure quantity. However, coding a company's disclosure practice based on various disclosure characteristics, such as quality and quantity, could indicate different rankings and conclusions (Hassan and Marston, 2019). Thus, a review of the literature in Nigeria finds only two studies (e.g., Ivungu et al., 2021; Victor-Chiedu and Fodio, 2012) that investigate the association between board characteristics and EDQ in Nigeria.

Moreover, previous Nigerian studies on board characteristics and EDQ focus on oil and gas and manufacturing industries, while other industries that affect the environment were ignored. For example, most Nigerian companies' reliance on modular electric power-generating plants adversely impacts the environment. Additionally, previous Nigerian studies did not consider gender diversity, CEO Duality, board meetings and board experience in examining the association between board characteristics and EDQ.

This study contributes to the current literature by examining the association between board characteristics and EDQ for all listed Nigerian companies. This study considers gender diversity, CEO duality, board meetings, and board experience board meetings in addition to board size, board independence and the presence of foreign members on the board to examine the association between board characteristics and EDQ.

3.6.3 Prior studies on the association between ownership structure and environmental disclosure

This section aims to provide reviews of prior studies on the association between ownership structure and environmental disclosure in developed countries 3.6.3.1, The association between corporate governance and environmental disclosure in developing countries 3.6.3.2 and Nigeria 3.6.3.3. Lastly, the section concludes by explaining the identified literature gaps in subsection 3.6.3.4.

3.6.3.1 Prior studies in developed countries

A review of the literature found many studies examine the association between ownership structure and environmental disclosure quantity (Zouari and Dhifi, 2022; Aluchna et al., 2022; Ghachem et al., 2022; Acar et al., 2021; Dakhli, 2021; Tingbani et al., 2020; Giannarakis et al., 2016; García-Meca and Pucheta-Martínez, 2018; Liao, Luo and Tang, 2015; Kathy Rao, Tilt and Lester, 2012; Rd

and District, 2012; Cormier, Ledoux and Magnan, 2011; Tagesson et al., 2009). Ranking of disclosure of company practices on different aspects, such as quantity and quality, can vary in scoring and interpretation (Hassan and Marston, 2019). Quantity of disclosure examines whether is omitted or provided, while disclosure quality concentrates on the depth and nature of disclosed information.

In contrast, few studies examine the association between ownership structure and EDQ (Gerwing et al., 2022; Dragomir, Dumitru and Feleaga, 2022 Kim and Garanina, 2022; Abu-Raya, 2012). However, what constitutes a better ownership structure is a context dependent amongst developed countries. To demonstrate, Gerwing Kajüter and Wirth (2022) investigate an association between corporate governance and environmental disclosure amongst German companies from 2014-2017. The findings show that blockholder ownership has a positive and significant association with EDQ. Dragomir, Dumitru and Feleaga (2022) investigate the association between ownership structure and EDQ amongst Romanian companies for the year 2018. Findings show that blockholder ownership has a negative and significant association with EDQ. Abu-Raya (2012) investigates the association between corporate governance and EDQ amongst two hundred and twenty-nine observation-listed companies from 2004-2007. Findings show that blockholder ownership has no association with blockholder ownership environmental disclosure quality. This demonstrates that a better ownership structure should have higher blockholder ownership in Germany, while in Russia, a better ownership structure should have lower blockholder ownership. In contrast, a better ownership structure does not consider higher or lower blockholder ownership in the United Kingdom.

To conclude, findings show that the association between ownership structure and environmental disclosure quality varies between countries in developed countries. Investors in developed markets have higher environmental transparency expectations. They ask for more comprehensive environmental disclosure than developing countries. Markets in developed countries are more advanced and sophisticated, increasing market pressure on environmental disclosure compared to developing countries. Appendices 15 and 16 show the previous studies on the association between ownership structure and EDQ in developed countries.

3.6.3.2 Prior studies in developing countries.

Many developing countries' studies investigate the association between ownership structure and environmental disclosure quantity (Wang, Fan and Zhuang, 2023; Al Amosh and Mansor, 2020; Fuadah et al., 2022; Dong, Dong and Lv, 2022; Al-Fadli et al., 2022; Boshnak, 2022; Alkayed and Omar, 2022; Gerged, 2021; Lavin and Montecinos-Pearce, 2021; Zaid, Abuhijleh, and Pucheta-Martínez, 2020; Rabi, 2019; Viana and Crisóstomo, 2020; Amidjaya and Widagdo, 2020; Nurleni and Bandang, 2018; Naseer and Rashid, 2018; Ezhilarasi and Kabra, 2017; Juhmani, 2013; Sufian and Zahan, 2013) which is similar to developed countries.

A review of the literature finds fewer studies on the association between ownership structure and environmental disclosure quality in Jordan (Ananzeh et al., 2023; Ananzeh Bugshan and Amayreh, 2023;), Malaysia (San-Ong, 2019), Saudi- Arabia (Alotaibi, 2016) and Indonesia (Amidjaya, and Widagdo, 2020). These studies' findings provide evidence that better ownership structure differs between developing countries.

Ananzeh, Bugshan, and Amayreh (2023) examine the association between ownership structure and quality of environmental disclosure amongst sixty observations of Jordan companies from 2010-2016. Findings show a negative and significant association between ownership concentration managerial ownership and environmental disclosure quality. Alotaibi (2016) examined the determinants and consequences of quantity and quality of CSR disclosure amongst one hundred and seventy-one observations in Saudi Arabia. The result shows that CSR disclosure quality has a positive and significant association with managerial ownership. Conversely, in Malaysia, San-Ong (2019) investigated the impact of corporate governance on the quality of environmental disclosure using five hundred and ten observations. Results show no association between managerial ownership and EDQ. These findings demonstrated that a higher proportion of managerial ownership increases releasing EDQ amongst Saudi-Arabia companies but decreases amongst Jordan-listed companies. Lastly, managerial ownership does not increase/decrease releasing EDQ amongst Malaysian listed companies.

Amidjaya and Widagdo (2020) investigate how ownership structure has an impact on sustainability reporting quality amongst one hundred and fifty-five

observations from 2010-2016 in Indonesia. Findings show that sustainability disclosure quality has a significant positive association with family and institutional ownership. In contrast, Gerged (2021) investigates whether ownership structure can impact EDQ in Jordan from 2010 to 2014 using five hundred non-financial observations. Findings show that ownership concentration, managerial ownership, and institutional ownership have a significant negative association with environmental disclosure quality. This means that a higher proportion of institutional ownership increases EDQ in Indonesia but decreases EDQ amongst Jordan companies.

Thus, findings from these studies could be less applicable to the Nigerian context due to differences in the richness of natural resources, severity of environmental issues and weak governance systems between the countries. Nigeria has more natural resources, suffers a higher severity of environmental damage and has a weak governance system compared to Jordan and Malaysia. Nigeria has more oil and gas, releases higher gas flaring, has a higher climate risk for children, and has a weak governance system compared to Indonesia. Nigeria has fewer natural resources but suffers a higher severity of environmental damage and a weak governance system compared to Saudi Arabia. Lastly, Nigeria has a higher GDP than Jordan and Malaysia and a lower GDP⁶ compared to Indonesia, India and Saudi Arabia.

Focusing on African studies, a literature review finds extremely limited studies on the association between ownership structure and environmental disclosure quantity (e.g., Alnabsha et al., 2018; Elfeky, 2017) because of difficulties in accessing data. Ranking of disclosure of company practices on different aspects, such as quantity and quality, can vary in scoring and interpretation (Hassan and Marston, 2019). Quantity of disclosure examines whether is omitted or provided, while disclosure quality concentrates on the depth and nature of disclosed information. Thus, there is a clear need for further research to investigate the association between ownership structure and environmental disclosure quality in African countries. Appendices 17 and 18 summarise previous studies investigating the association between ownership structure and environmental disclosure amongst developing countries.

⁶ See Appendix 1.

3.6.3.3 Prior studies on Nigeria

A review of Nigerian studies found that prior Nigerian studies investigate the association between ownership structure and environmental disclosure quantity (Egbunike and Efionayi, 2021; Osemene et al., 2021; Eneh, 2019; Oscar and Juliet, 2015; Uwuigbe and Olusanmi, 2011). Only Ivungu et al. (2021) examine the association between corporate governance and EDQ amongst eighty observations in listed oil and gas companies during 2011-2020. The study finds a positive and significant association between managerial ownership structure and EDQ. This study focused on only oil and gas industry, neglecting other ten industries. This provides incomplete pictures of the whole Nigerian market.

In terms of variables used, previous Nigerian studies only used managerial ownership structure to investigate the association between ownership structure and EDQ (e.g., Ivungu et al., 2021). Thus, they did not examine the association between each of institutional and blockholder ownership structure with EDQ. These variables are important because institutional ownership can increase or decrease motivations for EDQ. It increases EDQ when institutional ownership considers environmental issues as a means of long-term value creation. In contrast, it decreases motivations for environmental disclosure when institutional ownership obtains the required environmental information from alternative sources other than corporate disclosure. In terms of blockholder ownership, blockholders have various access to information they want when they dominate the shareholding structure (Abu-Raya, 2012). Based on that, a new study is important to examine how each institutional and blockholder ownership is associated with EDQ. Appendices 19 and 20 shows the previous studies on the association between board characteristics and EDQ in Nigeria.

3.7.3.4 The current study

A review of literature finds many studies investigate the association between ownership structure and environmental disclosure quantity compared to EDQ in developed and developing countries.

Focusing on Nigeria, previous studies primarily examine the association between ownership structure and environmental disclosure quantity. Although measuring quality is complicated and can have subjective elements, it provides more verifiable information that inspires shareholders' confidence (Alkayed, 2018).

Different ranks are used to measure the quality and quantity of disclosure, which leads to various results and conclusions (Hassan and Martson, 2019).

Previous Nigerian studies on ownership structure and EDQ focus on oil and gas, while ten other industries were ignored, providing an incomplete picture of the Nigerian market. Considering the variables, previous Nigerian studies did not examine the association between institutional and blockholder ownership with EDQ.

Thus, the current study aims to provide a comprehensive view of the Nigerian market by examining the association between ownership structure (institutional managerial and blockholder ownership structure) and EDQ for all listed Nigerian industries.

4.11 Concluding Remarks

This chapter explains three main sections of conceptual framework (concept of environmental disclosure, corporate governance and ownership structure), theoretical framework and empirical review of the literature. This chapter discusses the relevant theories used to examine the association between corporate governance and environmental disclosure. The discussion reveals that no single theory explains environmental disclosure comprehensively. The chapter justifies using a multi-theoretical framework to explain the association between corporate governance and EDQ. Besides, the chapter reviews the literature on the association between corporate governance and environmental disclosure in developed countries, developing countries and Nigeria in particular. It identifies the literature gap which the study aims to fill. The next formulate hypotheses on the association between corporate governance and EDQ.

4.0 FORMULATION OF HYPOTHESES

4.1 Introduction

Chapter 3 discusses literature review on the association between corporate governance and environmental disclosure. It justifies the rationale for employing a multi-theoretical framework. The current chapter aims to formulate hypotheses on the association between corporate governance and EDQ.

The chapter is structured as follows. 4.2 formulate hypotheses on the association between firm characteristics and EDQ. Section 4.3 presents hypotheses on the association between board characteristics and EDQ, followed by 4.4, which formulates hypotheses on the association between ownership structure and EDQ. Lastly, the chapter concludes in 4.5.

4.2 Firms Characteristics

Examining firms' characteristics variables aims to validate the disclosure index and select the control variables according to statistical results. Under the firm characteristics variables, this study investigates how firm structure (size, age, and industry type) affects EDQ. It also examines how financial performance and constraints (measured by firm profitability, liquidity, and gearing) affect EDQ. In addition, it evaluates how a company's conduct, behaviour, and relationship with others in the operational environment (multinationalism and audit firm size) impact EDQ.

4.2.1 Firm Size

Firm size is the most popular variable that was used to explain the extent and quality of disclosure in prior empirical studies. Stakeholder, legitimacy, and agency theories state a positive relationship between firm size and EDQ. According to stakeholder theory, large companies release higher quality environmental disclosure to satisfy the information needs of different stakeholders (e.g., Chithambo et al., 2021; Welbeck et al., 2017; Akanno et al., 2015).

According to legitimacy theory, large companies disclose higher quality environmental information to reduce the legitimacy gap between organisation practices and societal expectations (Deegan, 2002). The legitimacy gap is the expectancy gap, indicating the difference between an organisation's action and society's expectations (Deegan, 2002). Large companies disclose higher quality

environmental information to legitimise their presence and prove their corporate citizenship (e.g., Welbeck et al., 2017; Branco and Rodrigues, 2008; Ghazali, 2007). Also, large companies operating in various branches release higher quality environmental information to gain environmental gratitude for their activities (D'amico et al., 2016). According to agency theory, the information asymmetry problem between management and outside fund providers is more pronounced in large public companies due to the separation between ownership and control (Ho and Taylor, 2007). Hence, they release higher quality environmental information to address the information asymmetry problem between the management and external providers of funds.

Likewise, prior empirical studies often document a positive association between firm size and environmental disclosure (e.g., Gerged, 2021; Marwa, Salhi and Jarboui, 2020; Nguyen et al., 2017; Bhattacharyya, 2016; Fatima, Abdullah and Sulaiman, 2015). Larger companies have more complex operations to report on and more resources to afford the costs of releasing higher quality of environmental information.

In conclusion, both theoretical framework and empirical reviews support a positive association between firm size and EDQ. Therefore, the study draws the following null hypothesis:

H₁: Larger firm has no association with EDQ.

4.2.2 Firms Age

According to D'Amico et al. (2016), operating in a market for an extended period is associated with higher quality disclosure practices. Stakeholder theory predicts a positive relationship between age and environmental disclosure. It suggests long age as evidence of satisfying financial, social, and environmental obligations (Liu and Anbumozhi, 2009; Roberts, 1992).

Legitimacy theory offers two conflicting views on the association between age and environmental disclosure. It argues that companies use age to build up a reputation. When companies mature, their environmental protection and involvement become more valuable. Therefore, older companies are expected to release higher quality environmental disclosure to maintain their legitimacy (Welbeck et al., 2017). Alternatively, intense competition affects new companies;

therefore, new companies release various types of information, including environmental disclosure, to gain legitimacy.

Prior empirical studies also report mixed results for the association between firm age and environmental disclosure. While scholars find a positive relationship between firm age and environmental disclosure (e.g., Gerwing Kajüter and Wirth, 2022; Alkayed and Omar, 2022), as older firms are more aware of current issues and have better knowledge of environmental disclosure benefits. Other studies, such as Aboagye-Otchere, Simpson and Kusi (2020) and Clarkson et al. (2008), document a negative relationship between firm age and environmental disclosure. They argue that new firms are equipped with the latest technology and are looking for environmental acceptance; hence they release more environmental information compared to older ones.

In conclusion, theoretical and empirical reviews document mixed results between the firm's age and environmental disclosure. Hence, the study draws a null hypothesis for the association between firm age and EDQ as follows:

H₂: There is no association between firm age and EDQ.

4.2.3 Profitability

According to stakeholder theory, more profitable companies have a higher financial capacity to afford providing higher quality environmental disclosure to satisfy the information needs of their stakeholders, specifically those interested in environmental commitments (e.g., Nguyen et al., 2017; Andrikopoulos and Kriklani, 2013). According to agency theory, more profitable companies reveal higher quality environmental information to show their superior performance, earn a reputation, justify management compensation packages, and reduce the information asymmetry problem between the management and external providers of funds (Barako, 2007). In line with resource dependency theory, profitable companies release higher quality environmental information to benefit from their environmental success by attracting risk-averse investors (Fatima, Abdullah and Sulaiman, 2015). Based on signalling theory, profitable companies release higher quality environmental information to signal their environmental commitment (Fatima, Abdullah and Sulaiman, 2015). Thus stakeholder, agency, signalling and resource dependency all predict a positive association between profitability and environmental disclosure.

However, legitimacy theory provides two competing views regarding the relationship between firm profitability and environmental disclosure. More profitable companies attract public and political attention and pressure to engage in more transparent environmental practices. Hence, it predicts a positive relationship between profitability and EDQ. Meanwhile, less profitable companies might also disclose higher quality environmental information to repair, gain or enhance their legitimacy (Danisch, 2021). Thus, legitimacy theory suggests that companies use environmental disclosure as a legitimacy tool irrespective of firm profitability.

Empirical studies reveal mixed results on the relationship between profitability and environmental disclosure. Some studies report a positive relationship (e.g., Chand et al., 2022; Gerwing Kajüter and Wirth, 2022; Nguyen et al., 2017) because profitable companies use part of their profit to fund the cost of environmental activities. Other studies document that less profitable companies reveal higher environmental disclosure (Chandok and Singh, 2017; Burgwal and Vieira, 2014; Andrikopoulos and Kriklani, 2013) to show commitment to corporate environmental responsibility. Others find no relationship between profitability and environmental disclosure (e.g., Bhattacharyya, 2016; Fatima, Abdullah and Sulaiman, 2015; Abu-Raya, 2012) to repair, gain, or enhance their legitimacy.

As both theoretical frameworks and previous empirical reviews reveal mixed views on the association between profitability and environmental disclosure, this study formulates a null hypothesis as follows:

H₃: There is no association between firm profitability and EDQ.

4.2.4 Gearing

Gearing refers to the extent of long-term debt which a company uses to fund its assets. Debt is a liability, and companies pay interest in addition to the principal they borrow, which increases their exposure to financial risk. External stakeholders such as lenders pay attention to environmental disclosure when dealing with environmentally sensitive companies to gauge their risk exposure (Ohidoa, Omokhudu and Oserogho, 2016; Clarkson et al., 2008; 2011). Furthermore, high gearing attracts more demand for better performance, including environmental performance (Clarkson et al., 2008; 2011). Therefore, companies release higher quality environmental disclosure to document their

environmental performance to their current and potential debt investors to raise funds. Accordingly, stakeholder theory predicts a positive relationship between gearing and environmental disclosure. Also, transferring wealth from debt holders to shareholders increases monitoring and agency costs (Ortas, Gallego-Alvarez and Álvarez Etxeberria 2015). Thus, management releases higher quality environmental disclosure to reduce monitoring and agency costs. Therefore, agency theory predicts a positive relationship between environmental disclosure and gearing.

On the contrary, it is difficult for high-leverage companies to meet environmental disclosure costs (Nguyen et al., 2017) because they have to prioritise their resources to meet principal and interest payments. Low budget on environmental commitment leads to lower quality environmental information, which does not show a good signal of their environmental commitment (Abdel-Fattah, 2008). Hence, signalling theory predicts a negative association between leverage and EDQ.

However, legitimacy theory provides two competing views regarding the relationship between gearing and environmental disclosure. Firstly, highly geared companies disclose higher quality environmental disclosure to show their level of commitment to the environment as a way of legitimising their activities (Liu and Anbumozhi, 2009). On the other hand, companies with low levels of financial gearing disclose higher quality environmental disclosure to maintain their legitimacy (Habbash, 2015). Thus, according to legitimacy theory, companies use environmental disclosure as a legitimising tool for their activities regardless of the extent of gearing.

Prior empirical studies report mixed results on the relationship between gearing and environmental disclosure. Some studies report that highly geared companies reveal higher environmental disclosure to meet the expectations of creditors on environmental matters (e.g., Chandok and Singh, 2017; Egbunike and Tarilaye, 2017; Habbash, Hussainey and Awad, 2016). Other studies document that highly geared companies have insufficient financial resources to invest in environmental matters and reveal less environmental disclosure (Nguyen et al., 2017; D'Amico, et al., 2016; Brammer and Pavelin 2008). Others find that companies release

environmental disclosure regardless of their gearing status (Mohammed, 2018; Dibia and Onwuchekwa, 2015).

In conclusion, the theoretical and prior empirical reviews reveal mixed results on the association between leverage and environmental disclosure. Hence, this study formulates a null hypothesis as follows:

H₄: There is no association between gearing and EDQ.

4.2.5 Liquidity

Liquidity refers to the ability of companies to meet their short-term obligations using short-term assets. Stakeholder theory suggests that more liquid companies release higher quality environmental disclosure to show their ability to meet stakeholders' obligations (such as environmental responsibility) when they fall due (Abu-Raya, 2012). However, according to legitimacy theory, companies need to gain legitimacy to survive within the society in which they operate. Thus, it considers environmental disclosure as a legitimacy tool regardless of its liquidity status (Alotaibi and Hussainey, 2016).

Prior empirical studies document mixed results on the association between environmental disclosure and liquidity. Some scholars find a positive association between environmental disclosure and liquidity (Alnabsha et al., 2018; Alotaibi, 2016). They interpret this association as more liquid companies are in a better position to afford the cost of their environmental commitment. Other studies (e.g., Abu-Raya, 2012; Ho and Taylor, 2007; Naser, Alkhatib and Karbhari, 2002) find a negative significant association and explain it as companies with low liquidity release higher environmental disclosure to show how the cost of environmental responsibilities affects their liquidity position. However, other studies, such as Mohammed (2018) and Barako, Hancock and Izan (2006), find no association between liquidity and environmental disclosure. They argue that companies release more environmental disclosure to gain legitimacy regardless of their liquidity position.

Therefore, the theoretical framework provides mixed views; previous empirical works reveal mixed results between liquidity and environmental disclosure. Thus, the following null hypothesis was developed:

H₅: There is no association between liquidity and EDQ.

4.2.6 Multinationalism

Multinationalism in economics refers to an increase level of involvement in international markets (Susman, 2007). According to stakeholder theory, companies which operate in more than one country could have different reporting standards to comply with. They might have to disclose additional information, such as environmental information, to satisfy the information needs of various stakeholders from different geographical locations. Therefore, stakeholder theory predicts a positive relationship between multinationalism and environmental disclosure.

Legitimacy theory supports a positive relationship between multinationalism and environmental disclosure. Multinational companies face significant social and political pressure from societies at home and abroad (Dyduch and Krasodomska, 2017). Therefore, they disclose higher quality environmental disclosure in response to social and political pressure, which maintains/improves their reputation.

Multinational companies have various shareholders globally, which increases monitoring costs (Reverte, 2009). One way to reduce monitoring costs is to release higher quality environmental information voluntarily. Hence, agency theory predicts a positive relationship between environmental disclosure and multinationalism.

Previous empirical studies also report a positive relationship between multinationalism and environmental disclosure (e.g., Dyduch and Krasodomska, 2017; Hassan, 2010; Reverte, 2009). Multinational companies apply foreign disclosure patterns to differentiate themselves from those operating locally.

In conclusion, both theoretical and empirical evidence supports a positive association between multi-nationality and environmental disclosure. Therefore, the study formulates the following null hypothesis:

H₆: Multinational status is not associated with EDQ.

4.2.7 Audit firm

Although this study considers voluntary environmental disclosure, which might imply that there is no need for assurance by the external auditor, the disclosure

index includes financial environmental information reported in the financial statements of the company, hence such information is subject to external audit. According to legitimacy theory, big4 audit firms have a higher reputation to maintain and are more independent than smaller ones (Welbeck et al., 2017; Elfeky, 2017). Big4 audit firms incurred a higher risk of tarnishing their brand name and attract higher litigation costs (Bhattacharyya, 2016). Therefore, they request more explanation to ensure client's information disclosure and protect their integrity (Welbeck et al., 2017).

Big4 audit firms have more resources to employ highly skilled personnel and to provide relevant and sufficient training. This, in turn, improves their ability to provide high-quality assurance of corporate disclosure. According to stakeholder theory, stakeholders such as financial analysts and investors have more confidence in the quality of disclosure that was audited by big4 firms (Elfeky, 2017).

According to agency theory, one of the objectives of auditing is to reduce conflict of interest between management and investors. Larger audit companies provide high-quality audit and thus are associated with low levels of accounting manipulation. Hence, agency theory predicts a positive association between big4 audit firms and disclosure quality.

Prior empirical studies document mixed results for the association between Big4 firms and environmental disclosure. Some studies report a negative association between Big4 firms and environmental disclosure (e.g., D'Amico et al., 2016). They argue that companies which are audited by Big4 firms disclose extensive financial information but neglect environmental disclosure (D'Amico et al., 2016). However, other studies document a positive association between Big4 audit firms and environmental disclosure (Gerged, 2021; Baalouch, Ayadi and Hussainey, 2018; Nguyen et al., 2017). They argue that big audit firms do not rely on one customer and are not afraid of asking for more information (Wallace and Naser, 1995). Others find no association between Big4 audit firms and environmental disclosure (e.g., Welbeck et al., 2017; Bhattacharyya, 2016). They argue that factors such as time limitation will limit the scope of the audit to mandatory disclosure only (Alsaeed, 2006).

In conclusion, the theoretical framework predicted a positive association, while empirical evidence reveals a mixed association between big4 and environmental disclosure. Therefore, the study formulates the following null hypothesis:

H₇: There is no association between being audited by Big4 firms and EDQ.

4.2.8 Industry type

Different industries have various environmental impacts. Scholars classify industries into environmentally sensitive and non-sensitive (Burgawal and Viera, 2014). The literature provides various definitions of environmentally sensitive industries. Environmental-sensitive industries are *"Companies whose activities affect the environment directly"* (Welbeck et al., 2017, p. 4). In other words, they are *"those companies that are environmentally damaging and, therefore, face greater pressures from their stakeholders related to environmental concerns"* (Monteiro and Aibar-Guzmán, 2010, p 188). Additionally, they are *"companies that have a high environmental impact"* (Brammer and Pavellin, 2008; p.123). Moreover, they are *"companies who are primarily driven by the potential (or actual) impact that the firms operating in a given industry may have (or have had) on the environment"* (Garcia-Ayuso and Larrinaga, 2003, p. 19). In line with Halme and Huse (1997 p. 142), they are *"companies whose activities have caused emission and visible environmental degradation"*. Lastly, they can also be defined as *"those with consumer visibility, a high level of political risk, or concentrated, intense competition, and suggests prior studies which include industry may have captured a systematic relationship between such characteristics and social responsibility activities"* (Roberts, 1992, p. 605).

According to the current study, environmentally sensitive industries are *"environmentally damaging and face greater pressures from their stakeholders related to environmental concerns"* (Monteiro and Aibar-Guzmán, 2010, p. 188). These negative impacts arise from releasing toxic chemicals hydrocarbons and disposing of toxic waste products. Environmentally non-sensitive industries have a minimum adverse environmental impact such as financial institutions (Burgwal and Vieira, 2014; Monteiro and Aibar-Guzmán, 2010).

The Nigerian stock market has eleven industries: oil and gas, agriculture, construction, conglomerates, consumer goods, information and communication technology (ICT), industrial goods, natural resources, health care, services and financial services. This study considers 9 out of these 11 sectors to be environmentally sensitive: **Oil and Gas** (Osemene et al., 2021; Welbeck et al., 2017; Odera, Scott and Gow, 2016; Dibia and Onwuchekwa, 2015; Oscar and Juliet, 2015; Burgwal and Vieira, 2014; Monteiro and Aibar-Guzmán, 2010; Haque and Deegan, 2010; Clarkson et al. 2008; Garcia-Ayuso Larrinaga, 2003; Hackston and Milne, 1996); **Agriculture** (Egbunike and Tarilaye, 2017; Ganapathy and Kabr, 2015; Monteiro and Aibar-Guzmán, 2010); **Construction** (Oba and Fodio, 2012; Uwuigbe, 2011); **Conglomerates** (Egbunike and Tarilaye, 2017; Welbeck et al., 2017; Victor Chiedu and Fodio, 2012; Haque and Deegan, 2010); **Consumer goods** (Osemene et al., 2021; Egbunike, and Tarilaye, 2017; Welbeck et al., 2017; Oraka, and Egbunike, 2016; Akroun and Othman, Uwuigbe, 2011; Monteiro and Aibar-Guzmán, 2010; Haque and Deegan, 2010); **Industrial goods** (Osemene et al., 2021; Egbunike and Tarilaye, 2017; Welbeck et al., 2017; Bhattacharyya, 2016; Akroun and Othman, 2013; Victor Chiedu and Fodio, 2012; Monteiro and Aibar-Guzmán, 2010; Haque and Deegan, 2010. Garcia-Ayuso and Larrinaga, 2003; Halme and Huse, 1997); **Information and communication technology** (Osemene et al., 2021; Welberk, 2017; Akbas, 2014); **Natural Resources** (Welbeck et al., 2017; Bhattacharyya, 2016; Burgwal and Vieira, 2014; Akroun and Othman, 2013; Monteiro and Aibar-Guzmán, 2010; Haque and Deegan, 2010; Garcia-Ayuso and Larrinaga, 2003; Clarkson et al., 2008); and **Healthcare** (Osemene et al., 2021; Egbunike and Tarilaye, 2017; Ganapathy and Kabr, 2015; Akroun and Othman, 2013).

According to legitimacy theory, different industries face various levels of environmental disclosure pressure, which depend on the impact of their operations on the natural environment (Frynas and Stephens, 2015). For example, oil and gas industries have visible oil spills that destroy biological and natural resources, which could attract social and political pressure and damage the company's reputation. Also, the disposal of toxic waste by chemical industries affects the natural environment and human health, which impacts the image of these companies and their legitimacy. These industries face social and political pressure to account for their environmental impact. Hence, they are expected to provide

higher quality environmental disclosure to explain how they address the damages caused by their activities (Welbeck et al., 2017).

Stakeholder theory supports a positive relationship between environmentally sensitive industries and environmental disclosure. It suggests that stakeholders expect higher quality environmental disclosure from environmentally sensitive industries to address their environmental concerns; otherwise, stakeholders assume bad environmental performance (Dibia and Onwuchekwa, 2015).

Signalling theory supports the positive relationship between sensitive environmentally industries and environmental disclosure. The theory explains that failure to release higher-quality environmental disclosure serves as a signal to hide bad environmental news (Ho and Taylor, 2007).

Empirical studies report a positive association between environmentally sensitive industries and environmental disclosure (Marwa, Salhi and Jarboui, 2020; D'Amico et al., 2016; Brammer and Pavelin, 2008). Social legitimacy assesses companies through the public, not the market (Alkayed, 2018).

In conclusion, both theoretical frameworks and empirical reviews support a positive relationship between sensitive environmental industry and environmental disclosure. Therefore, the study draws the following null hypothesis:

H₈: Environmentally sensitive industries are not associated with EDQ.

4.3 Board characteristics

Board composition is variations in board structure (Songini et al., 2021). The board is the main institution of a company that is liable to the different interests of stakeholder groups (Songini et al., 2021). The board's function includes supervising companies to operate in an environmentally responsible manner (Halme and Huse, 1997). In addition, the board of directors leads to higher monitoring, resulting in the release of higher voluntary disclosure, including environmental disclosure.

Board diversity refers to the different features of board members regarding age, religion, educational background, knowledge, ethnicity, gender, learning style, personality, skills and expertise (Songini et al., 2021). Board diversity improves global connections, increases leadership efficiency and problem-solving

techniques and produces different ideas (Songini et al., 2021). This study will investigate the association between EDQ with board size, CEO duality, board independence, the presence of women on the board and the presence of a foreign member on the board.

4.3.1 Board size (BZ)

According to Stout (2003), the director's primary function is to check management activities. Board members are trusted to supervise whether the executives properly manage business conduct (Mallin, Michelon and Raggi, 2013).

The Nigerian Code of Corporate Governance 2011 (section 4.2) states that board size should not be less than five members. However, the 2018 code of corporate governance did not specify a minimum number of board members. Both the 2011 and 2018 Codes of corporate governance did not identify a maximum number of board members but stated that the board should be of adequate size in relation to the operation of the company.

According to legitimacy, stakeholder, and resource dependency theories, larger boards are expected to be associated with higher quality environmental disclosure. This is because larger boards are likely to have greater diversity in terms of experiences, skills, and knowledge, which are needed for an environmentally responsible and transparent business (Ellili, 2023; Chouaibil, Miladi and Elouni, 2022; Ntim and Soobaroyen, 2013; Laksmana, 2008).

However, agency theory predicts two conflicting views between board size and EDQ. According to the agency, large boards are an efficient tool for controlling agency problems through effective monitoring capabilities (Alotaibi, 2016). Thus, the theory supports a positive association between board size and EDQ. On the other hand, boards suffer monitoring and agency conflicts because of minimum coordination amongst large members, which can reduce board efficiency and decrease the effectiveness of decision-making processes (Abu-Raya, 2012). Thus, to some extent, agency theory also supports a negative association between board size and EDQ.

Prior empirical studies documented mixed associations between board size and environmental disclosure. While some prior studies reveal a positive relationship between board size and environmental disclosure (Alkayed and Omar, 2022; Gerged, 2021; Kilincarslan, Elmagrhi and Li, 2020; Agyemang et al., 2020)

because companies with large boards are mostly larger companies which the public expects higher environmental accountability (Victor Chiedu and Fodio, 2012), other studies find a negative association (Ivungu et al., 2021; Elzahar and Hussainey, 2012) because larger boards face communication and coordination problems (Abu-Raya, 2012).

To conclude, the theoretical framework provides mixed views, and prior empirical reviews reveal mixed results between board size and environmental disclosure. Therefore, the study develops the following null hypothesis:

H₉: There is no association between board size and EDQ.

4.3.2 CEO duality (CEO)

CEO duality is when the firm's chief executive officer is also the chairman of the board.

Both the 2011 and 2018 codes of corporate governance recommend the separation of the two positions to prevent power concentration and improve supervision. Additionally, both codes differentiate the responsibilities of the chairman from those of the CEO. While the chairman should ensure effective board operation to achieve the strategic goals of the companies, the CEO participates in the firm's day-to-day activities and supervises the management team.

Stakeholder theory supports a negative relationship between CEO duality and environmental disclosure quality. The reason is that duality gives power and autonomy to dominate the decision of disclosure of information. Also, CEO duality motivates companies to disclose only positive information (Chau and Gray, 2010) and withhold unfavourable information to reach the stakeholders (Ho and Wong, 2001).

According to agency theory, combining the role of CEO and chairman position is likely to be ineffective in monitoring the management, affecting the higher disclosure transparency level, which leads to weak monitoring ability (Haniffa and Cooke, 2002). Jensen (1993) states that the combination of both the chairman and CEO roles increases agency problems because leadership and power are given to one person. Also, CEO duality has a higher risk of information asymmetry problems (Alotaibi, 2016). Thus, the theory predicts a negative association between CEO duality and EDQ.

Prior empirical studies document a negative relationship between environmental disclosure and CEO duality (e.g., Nuskiya et al., 2021; Tingbani et al., 2020; Ismail and Latiff, 2019; Husted and De- Sousa-Filho, 2019; Abu-Raya, 2012). The reason is that CEO duality provides self-servicing opportunities, which affects a decision to release information, including environmental information (Alotaibi, 2016).

In conclusion, both theoretical frameworks and empirical reviews support a negative association between CEO duality and environmental disclosure. Hence, the study draws the following null hypothesis:

H₁₀: CEO duality is not associated with EDQ.

4.3.3 Board independence (BI)

Both the 2011 and 2018 codes of corporate governance state that the board should consist of executive and non-executive directors, where executive directors are those who participate in the daily activities and manage the company, while non-executive directors are independent and do not hold more than 0.1% of the paid-up share capital of the company either directly or indirectly. Both codes also suggest that non-executive directors should form most of board members and require that independent directors do not have an association with management that affect their independent judgement. Additionally, the independent directors should provide independent judgement and assessment of the actions and activities of the executive directors and management. Moreover, independent directors should have knowledge about board matters, maintain integrity and accountability and implement good corporate governance practices. Furthermore, independent directors should be given a conducive atmosphere to discharge their duties effectively (FRCN, 2018; SEC, 2011).

Legitimacy theory supports a positive relationship between independent directors and environmental disclosure quality. This is because independent directors are interested in how companies meet social and environmental responsibilities to obtain credibility (Alkayed and Omar, 2022). They improve corporate ethics and adherence to environmental disclosure (Alkayed and Omar, 2022). Stakeholder theory supports a positive association between board independence and environmental disclosure quality. This is because independent directors protect the financial and non-financial interests of different stakeholders (Bowrin, 2013).

Also, the existence of many experienced independent directors on the board promotes higher corporate transparency and disclosure (Guland, 2004). According to agency theory, non-executive directors help addressing agency conflicts and reducing the hiding of information from shareholders (Bowrin, 2013). According to Haniffa and Cooke (2002), a larger percentage of non-executive directors are more effective in monitoring and supporting higher corporate transparency, which increases the release of voluntary information, including environmental disclosure (Barako, 2007). Based on resource dependency theory, independent directors have different experiences of environmental impact (Johnson, Daily and Ellstr 1996). They ensure the release of environmental disclosure to show company's environmental performance. Thus, it predicts a positive association between board independence and environmental disclosure.

However, prior empirical studies reveal mixed results on the association between board independence and environmental disclosure. Some studies reveal a positive relationship between board independence and environmental disclosure (e.g., Alkayed and Omar, 2022; Gerged, 2021; Agyemang et al., 2020; Osemene et al., 2021) because independent directors improve the comprehensiveness and quality of disclosure, including environmental disclosure (Leung and Horwitz, 2004). Some studies document a negative association between board independence and environmental disclosure (e.g., Baalouch, Ayadi and Hussainey, 2019; Alotaibi and Hussainey, 2016; Ismail and Latiff, 2019) because independent directors are sometimes controlled by the inside managers based on their nature of appointments and tenures (Patelli and Prencipe, 2007). Others find no association between board independence and environmental disclosure (Raimo, De Nuccio and Vitolla, 2022; Rabi, 2019; Habbash et al., 2016; Tauringana and Chithambo, 2015) when independent directors professional judgement is influenced by the executive directors (Raimo et al., 2022).

Conclusively, the theoretical framework predicted a positive association between board independence and environmental disclosure. However, prior empirical evidence documented a mixed association between board independence and environmental disclosure. Based on that, this study formulated a null hypothesis as follows:

H₁₁: There is no association between board independence and EDQ.

4.3.4 The frequency of board meetings

The frequency of board meetings helps the board in the effective control of the business (Brick and Chidambaran, 2010), e.g., establishing environmental policies and strategies, examining environmental issues, evaluating environmental risks, and establishing environmental procedures (Mackenzie, 2007). Companies that conduct frequent board meetings ensure that management follows environmental guidelines and recommendations in releasing environmental information. Both the 2011 (Section 12.1) and 2018 (Section 10.1) codes of corporate governance state that the board of directors should have a minimum of one meeting per quarter to evaluate management performance. This counts to a minimum of four meetings a year.

Legitimacy, stakeholder, agency, resource dependency and signalling theories support a positive association between the frequency of board meetings and environmental disclosure. According to legitimacy theory, a higher frequency of board meetings results in higher pressure on managers to take environmental responsibility and release higher quality environmental disclosure (Rankin, Windsor and Wahyuni, 2011). According to stakeholder theory, frequent board meetings boost the board's effectiveness and transparency (Laksmana, 2008). It builds collective board strength, facilitates a better flow of information, and dedicates more time to issues regarding environmental responsibilities. According to resource dependency theory, the frequency of board meetings promotes more chances to present board skills, knowledge and expertise that improves the release of environmental information (Wincent, Anokhin and Örtqvist, 2010). Agency theory argues that frequency of board meetings is part of strong corporate governance tools that reduce information asymmetry and conflict of interest (Alkayed and Omar, 2022). According to resource dependency theory, the frequency of board meetings promotes more chances to present board skills, knowledge and expertise and improves the release of environmental information (Wincent et al., 2010). According to signalling theory, a higher number of board meetings is *"evidence of proactive corporate governance to guide the organisational long-term strategy towards a more carbon-constrained future"* (Rankin, Windsor and Wahyuni 2011, p. 1047). The theory explains that frequent board meetings signal to the stakeholders that more time is allocated for

environmental commitment and thus encourage the release of environmental information (Alotaibi, 2017).

However, previous studies document mixed results regarding the association between the frequency of board meetings and environmental disclosure. Some studies find a positive association (e.g., Alkayed and Omar, 2022; Kumari et al., 2022; Nuskiya et al., 2021; Khaireddine et al., 2020; Alnabsha et al., 2018) because infrequent board meetings can delay critical and significant decisions on environmental issues and results in releasing low environmental information (Kumari et al., 2022). However, more board meetings can lead to higher communication and coordination costs, spreading the board agenda to various formal meetings without adequately addressing environmental issues (Giannarakis, Konteos and Sariannidis, 2014). Hence, other studies find a negative association between the frequency of board meetings and environmental disclosure (e.g., Nicolò et al., 2021; Giannarakis, Konteos and Sariannidis, 2014). Furthermore, there are a few studies document no association between the frequency of board meetings and environmental disclosure (e.g., Al-Qahtani and Elgharbawy, 2020; Ofoegbu, Odoemelam and Okafor 2018). Bamahros et al. (2022) explain that some meetings concentrate on discussions of work done instead of corporate structure and policies that improve environmental disclosure and performance.

In conclusion, the theoretical supports a positive association, while empirical reviews reveal mixed results between board meetings and environmental disclosure. This study formulates a null hypothesis.

H₁₂: There is no association between the frequency of board meetings and EDQ.

4.3.5 Board experience

Experienced directors guide and counsel management regarding various issues, such as environmental responsibility and disclosure (Abu-Raya, 2012). Directors who serve on more than one board at a time are more experienced than those who serve on one board only. Both the 2011 and 2018 codes of corporate governance support multiple directorships but do not specify a maximum or a minimum number of multiple directorships. However, the codes advise the shareholders to be cautious in nominating directors who serve on too many boards to avoid obstruction of their ability to perform duties effectively.

Legitimacy theory states that board members serving on more than one board are more concerned about disclosure policies and practices to align with competitors as a strategy for obtaining legitimacy (Haniffa and Cook, 2005). Stakeholder theory expects directors serving on more than one board to have more experience and understanding of various responsibilities concerning stakeholders, including environmental responsibilities. More experienced directors are expected to encourage releasing higher quality environmental information as evidence of their environmental responsibilities to earn stakeholders' support. Resource dependency expects members serving on more than one board to gain practical knowledge and experience from interaction with other members on other boards (Rupley et al., 2012). More experienced directors can guide the management in different areas to attract new investors, including releasing high quality environmental information to attract risk-averse investors (Weir et al., 2002). Multiple directorships use their capabilities to increase information transparency by releasing various types of information to signal their experiences (Rupley et al., 2012). Thus, legitimacy, stakeholder, agency, resource dependency and signalling theories all support a positive association between cross-directorship and environmental disclosure quality.

Likewise, empirical review documents a positive association between cross-directorship and environmental disclosure (e.g., Rao and Tilt, 2016; Abu-Raya, 2012; Rupley, Brown and Marshall, 2012; Haniffa and Cooke, 2005; 2002) because directors serving in more than one board had experience with environmental reporting policies and practices of the different boards they serve (Rupley et al., 2012)

As both theoretical and empirical evidence supports a positive association between board experience and environmental disclosure, this study draws the following null hypothesis:

H₁₂: There is no association between board experience and EDQ.

4.3.6 Gender diversity

Globally, there is an increase in women's participation in all activities for gender representation and equality. Both the 2011 and 2018 codes of corporate governance promote diversity of boards of directors across various qualities such

as age, gender, knowledge, experience, and skills. However, both codes are silent about the minimum and maximum number of women on the board.

Legitimacy theory supports a positive association between the presence of women on the board and environmental disclosure. It expects female directors to improve board efficiency and effectiveness on policies regarding the environment (Chebbia, Aliedanb and Mohammed, 2020). This is because women have a different role in society compared to men, which makes them take a different approach to environmental issues (Liao, Luo and Tang, 2015). They are more empathic, supportive, and concerned with the welfare of others (Riadh et al., 2018). Therefore, a company with a higher number of women on the board performs more duties regarding social and environmental responsibilities (Nicolò et al., 2021) to legitimise their activities and to avoid social pressure.

Stakeholder theory explains that women are more socially oriented than men (Webb, Mohr and Harris, 2008). They develop more effective stakeholder decisions and support their position than their male counterparts, who are more concerned with economic and shareholder interests (Gerwing, Kajüter and Wirth, 2022). Women increase open discussion amongst the board members. The discussions enable the assessment of different stakeholders' needs, including environmental disclosure. Thus, it increases the board's ability to address environmental disclosure as part of the stakeholders' need for information. Therefore, stakeholder theory supports a positive relationship between the presence of women on the board and environmental disclosure.

Agency theory predicts that a higher proportion of female directors on the board increases the board's greater diligence and commitment, including monitoring management activities (Dakhli, 2021). Also, female directors establish a good atmosphere within the board that covers corporate social responsibilities, ethics and environmental issues, differentiating them from their male counterparts (Raimo et al., 2022). Thus, agency theory supports a positive relationship between the presence of women on the board and environmental disclosure.

Women are not always allowed to express their opinions in developing countries' deliberations (Riadh et al., 2018). Therefore, to overcome these issues, women ensure more perspective issues are deliberated in the decision-making process, including environmental disclosure, to signal their presence. Based on that,

signalling theory supports a positive relationship between the presence of women on the board and environmental disclosure.

However, resource dependency theory expects skills, knowledge, and experiences to guide directors towards strategic decisions on environmental responsibilities rather than their gender (Kilincarslan, Elmagrhi and Li, 2020). Hence, it predicts no relationship between gender diversity and environmental disclosure.

Prior empirical studies also report mixed results for the association between gender diversity and environmental disclosure. Some studies find a positive association (e.g., Nicolò et al., 2021; De-Masi et al., 2021; Fernandez-Feijoo, Romero and Ruiz-Blanco, 2014) gender diversity and environmental disclosure. This is because women ensure more perspective issues are deliberated in decision-making, including environmental disclosure (Fernandez-Feijoo et al., 2014). However, Husted and Sousa-Filho (2019) and Cucari, Esposito De Falco and Orlando (2018) find a negative association between gender diversity and environmental disclosure because when there is an insignificant number of women on the board, they are not always given a chance to express their opinions in deliberating issues (Husted and Sousa-Filho, 2019). On the contrary, Alkayed and Omar (2022), Riadh et al. (2018), and Konrad Kramer and Erkut (2008) document no association between gender diversity and environmental disclosure.

Therefore, the theoretical framework provides mixed views, and previous empirical reviews reveal mixed results between gender diversity and environmental disclosure. Thus, this study draws a null hypothesis as follows:

H₁₄: There is no association between gender diversity and EDQ.

4.3.7 Presence of foreign members on board

Both the 2011 and 2018 codes of corporate governance promote diversity of membership across different cultures. However, both codes do not specify on the minimum and maximum number of foreign members on the board.

The benefit of the presence of foreign directors on the board includes familiarity with foreign corporate governance systems and global best practices (Sullivan, 1994). Legitimacy theory supports a positive association between the presence of foreign members on the board and environmental disclosure because foreign members hold separate views about the environment due to different environmental regulations and practices. The presence of foreign directors on the

board increases board diversity because of culture, life experience, behaviour, and language differences that improve strategic decision-making, including higher quality environmental disclosure to obtain legitimacy (e.g., Alkayed and Omar, 2022; Agyemang et al., 2020). Likewise, stakeholder theory supports a positive association between the presence of foreign members on the board and environmental disclosure. It promotes social capital networks connecting foreign members to key stakeholders (Ramaswamy and Li, 2001). Additionally, based on different cultural backgrounds, foreign members are familiar with foreign disclosure patterns, guiding them to address the information needs of various stakeholders, including environmental disclosure.

In agency theory, foreign members are more involved in improving environmental transparency and decreasing information asymmetry. Thus, agency theory supports a positive association between foreign members' presence on the board and environmental disclosure. Also, resource dependency theory predicts a positive association between the presence of foreign members on the board and environmental disclosure. Foreign directors come from different demographics with different insights, expertise, ideas, and experiences supporting high-quality environmental disclosure to attract international investors.

In signalling theory, foreign members serving on board encourage the release of environmental information to differentiate themselves from other companies implementing similar disclosure patterns (Abdel-Fattah 2008). Thus, signalling theory supports the positive relationship between the presence of foreign members on the board and environmental disclosure.

Prior empirical studies document a positive association between the presence of foreign members on the board and environmental disclosure (e.g., Alkayed and Omar, 2022; Ibrahim and Hanefah, 2016; Alshareef & Sandhu, 2015; Khan, 2010) because foreign members have different experiences, innovations, and ideas that support high-quality environmental disclosure (Alshareef and Sandhu, 2015).

Hence, both theoretical and empirical evidence expect a positive association between the presence of foreign members on the board and environmental disclosure. This study draws the following null hypothesis:

H₁₅: There is no association between foreign members and EDQ.

4.4 Ownership Structure

The current study examines the association between ownership structure and EDQ, looking at how releasing environmental information is voluntary in Nigeria. The study is interested in finding out whether ownership structure can influence EDQ. The study used institutional ownership, managerial ownership, and blockholder ownership because they are the variables that have the data available in the Nigerian reports.

4.4.1 Institutional ownership structure

Institutional ownership means part of shares owned by "*parties in the form of institutions such as foundations, banks, insurance companies, investment companies, pension funds, limited liability companies and other institutions*" (Nurleni and Bandang, 2018, p. 981). There are two types of institutional ownership: active and passive (Habbash, 2017). Active institutional owners are those who invest for long-term benefits (Alkayed, 2018). They are motivated by releasing information such as environmental disclosure and monitoring management activities (Ntim and Soobaroyen, 2013). On the other hand, passive institutional owners are motivated by the short-term interest of the company (Ntim and Soobaroyen, 2013).

Both legitimacy and stakeholder theories support a positive association between institutional ownership and environmental disclosure. According to legitimacy theory, a higher proportion of institutional ownership puts more social pressure on management, motivating them to release higher-quality disclosure (Abu-Raya, 2012). This is because institutional investors promote environmental disclosure to integrate environmental matters into the business (Wen, 2009). Furthermore, institutional investors consider the long-term objectives of their investments and view environmental responsibility as integral to long-term sustainability (Abu-Raya, 2012). Additionally, institutional investors seek higher transparency, accountability and promote higher corporate standards for the natural environment (Osemene et al., 2021). Thus, companies release environmental information to sustain stewardship and obtain institutional investors' support (Alnabsha et al. 2018). Based on stakeholder theory, institutional investors consider good corporate governance practices with high accountability and transparency amongst their investment criteria (Welford, 2007). They supervise

and influence management to act in favour of the information needs of stakeholders, such as disclosing environmental information (Cornett et al. 2007).

However, agency theory provides two conflicting views on the association between institutional ownership and environmental disclosure. On the one hand, the higher the institutional ownership, the more likely these institutions will rely on their in-house to monitor corporate policies, values, and disclosure patterns compared to retail investors (Nurleni and Bandang, 2018). On the other hand, the lower the institutional ownership, the higher the demand for quality environmental disclosure to mitigate the information asymmetry problem between management and external providers of funds, and reduce monitoring costs (Ellili, 2023; Gerged, 2021).

Likewise, previous empirical studies also documented a mixed result on the association between institutional ownership and environmental disclosure. Some documented a positive association between institutional ownership and environmental disclosure (Zouari and Dhifi, 2022; Dakhli, 2021; Naseer and Rashid, 2018). This is when institutional investors consider environmental issues as a means of long-term value creation (Prado-Lorenzo, Gallego-Alvarez et al., 2009). However, institutional investors can obtain the required information from alternative sources other than corporate disclosure (Kathy Rao et al., 2012). Other studies (e.g., Gerged, 2021; Abu-Raya, 2012) found a negative association between institutional investors and environmental disclosure. In contrast, Alkayed and Omar (2022), Boshnak (2022) and Alkayed (2018) documented no association between institutional investors and environmental disclosure when there is limited stakeholder engagement, which reduces institutional ownership participation and influence on corporate disclosure practices.

In summary, both the theoretical framework and prior empirical reviews reveal mixed results on the association between institutional ownership and environmental disclosure. Hence, the study formulates the following null hypothesis:

H₁₆: There is no association between institutional ownership and EDQ.

4.4.2 Managerial ownership structure

Managerial ownership is defined as the *"percentage of ordinary shares held by the CEO, executive directors and includes their deemed interests"* (Eng and Mak, 2003, p. 33).

Legitimacy theory predicts two conflicting views on the associations between managerial ownership and environmental disclosure. Higher managerial ownership has the possibility of listening to various societies' cries about their negative environmental impact to obtain legitimacy (Ivungu et al., 2021). Thus, they release higher quality environmental information to show how their environmental policies and strategies meet expectations, norms and contribute to the environment in which they operate (Ivungu et al., 2022). Thus, legitimacy theory predicts a positive association between managerial ownership and environmental disclosure. However, management can be less interested in managing legitimacy threats and public expectations (Al Fadli et al., 2022). They decide to release low environmental disclosure, which increases the legitimacy gap (Al-Fadli et al., 2022). Thus, the theory supports a negative association between managerial ownership and environmental disclosure.

Similarly, according to agency theory, the association between managerial ownership and environmental disclosure depends on long-term and short-term management goals (Lin and Nguyen, 2022). In terms of long-term goals, the theory supports a positive and significant association between managerial ownership and environmental disclosure. This is because managers can focus on participating in environmental commitment as part of achieving long-term value (Dakhli, 2021), which reduces agency problems (Dakhli, 2021). However, managers can focus on short-term goals; in this instance, higher managerial ownership gives them high power to protect their interests (Lin and Nguyen, 2022). They can choose to reduce participation in environmental commitment to maximise their wealth for short-term goals (Lin and Nguyen, 2022). Based on that, they release less environmental information, increasing information asymmetric problems (Gerged, 2021). Hence, the theory predicts a negative association between managerial ownership and environmental disclosure.

In contrast, stakeholder theory supports negative association between managerial ownership and environmental disclosure when managers own substantial

shareholding, they dominate the ownership structure, and external stakeholders might find it hard to control management action and decision-making processes, including disclosure of information (Nurleni and Bandang, 2018).

Likewise, previous studies documented a mixed result on the association between managerial ownership and environmental disclosure. Some found a positive association between managerial ownership structure and environmental disclosure (Elili, 2023; Alotaibi, 2016). Managers release higher environmental information to reduce pressure from majority shareholders when management owns minor shares of the company. In contrast, other studies documented a negative association between managerial ownership structure and environmental disclosure (Gerged, 2021; Tingbani et al., (2020). This is because managerial ownership can create conditions that are favourable for their entrenchment, thus neglecting to finance environmental issues (Kelton and Yang, 2008).

To conclude, both the theoretical framework and prior empirical reviews reveal mixed results on the association between managerial ownership and environmental disclosure. Hence, the study formulates the following null hypothesis:

H₁₇: There is no association between managerial ownership structure and EDQ.

4.4.3 Blockholder ownership structure

Ownership can either be " *concentrated amongst a few investors or spread out across a broader network of investors*" (Ananzeh et al., 2023, p. 60). Dispersed ownership is when a high proportion of shares are owned by various shareholders (Abu-Raya, 2012). In contrast, blockholder ownership is when few shareholders own a high proportion of company shares (Abu-Raya, 2012).

Stakeholder and legitimacy theories support a negative association between blockholder ownership and environmental disclosure. According to legitimacy theory, blockholder face less public pressure for accountability, which reduces motivations for voluntary disclosure, including environmental disclosure (Ntim and Soobaroyen, 2013). According to stakeholder theory, a high proportion of blockholder ownership gives more attention to powerful stakeholders and reduces the demand and expectations of minority stakeholder groups (Tran, 2017).

blockholder ownership focuses more on financial performance than environmental accountability (Tran, 2017). This will lead the company to give little incentive for environmental accountability because the benefit is lower than the cost (Muttakin and Subramaniam, 2015).

Contrarily, agency theory supports both positive and negative associations between blockholder ownership and EDQ. On one hand, blockholder ownership promotes low information asymmetry, reducing agency conflict between managers and owners (Zouari and Dhifi, 2022). This, in turn, decreases demand for releasing additional information on environmental matters (Abu-Raya, 2012). On the other hand, based on the efficient monitoring hypothesis, blockholder ownership monitors management activities effectively to ensure activities align with shareholders' interests (Juhmani, 2013). Thus, management releases various disclosures to reduce monitoring and agency costs arising from conflicts of interest between shareholders and managers. Thus, agency theory supports a positive association between blockholder ownership and EDQ.

Previous studies documented a mixed association between blockholder ownership and environmental disclosure. Some found a positive association between blockholder ownership and environmental disclosure (Gerwing, Kajüter and Wirth, 2022; Liu, 2015; Oh, Chang, and Martynov, 2011). Blockholders are concerned about ensuring management releases environmental disclosure to manage reputational damages and environmental risk effectively (Oh, Chang, and Martynov, 2011). However, other studies documented a negative association between blockholder ownership and environmental disclosure (Gerged, 2021; Abu-Raya, 2012; Roy and Ghosh, 2017). Blockholders have various access to information they want when they dominate the shareholding structure (Abu-Raya, 2012; Abdel-Fattah, 2008).

To conclude, the theoretical framework supports negative association while prior empirical reviews reveal mixed results on the association between blockholder ownership and environmental disclosure. Therefore, the study develops the following non-directional hypothesis:

H₁₈: There is no association between blockholder ownership structure and EDQ.

Table 3: Summary of each independent variable and associated theories, the underlying assumptions and relationships made by each theory, and the empirical evidence.

Variables	Prediction	Theories					Empirical evidence		
		Legitimacy	stakeholder	Agency	Signalling	Resource Dependence	Positive	Negative	No association
Firm size	Positive	Large companies disclose higher-quality environmental information to reduce the legitimacy gap between organisation practices and societal expectations.	Large companies release higher-quality environmental disclosure to satisfy the information needs of different stakeholders.	Large companies release higher-quality environmental information to address the information asymmetry problem between the management and external providers of funds			companies have more complex operations to report on and more resources to afford the costs of releasing higher-quality environmental information.		

Firm age	Positive/negative	Older companies are expected to release higher-quality environmental disclosure to maintain legitimacy. Companies release various types of information, including environmental disclosure, to gain legitimacy.	Long age is evidence of satisfying financial, social, and environmental obligations.				Older firms are more aware of current issues and have better knowledge of environmental disclosure benefits.	New firms are equipped with the latest technology and are looking for environmental acceptance; hence, they release more environmental information compared to older ones.	
Profitability	Positive/negative	profitable companies attract public	More profitable companies have a	More profitable companies reveal	profitable companies release higher-	profitable companies release higher-	profitable companies use part of their profit to	Less profitable companies release	

		<p>and political attention and pressure to engage in more transparent environmental practices.</p> <p>Less profitable companies might also disclose higher-quality environmental information to repair, gain or enhance their legitimacy specifically those</p>	<p>higher financial capacity to afford to provide higher quality environmental disclosure to satisfy the information needs of their stakeholders.</p>	<p>higher quality environmental information to show their superior performance, earn a reputation, justify management compensation packages, and reduce the information asymmetry problem between the management and external</p>	<p>quality environmental information to signal their environmental commitment.</p>	<p>quality environmental information to benefit from their environmental success by attracting risk-averse investors.</p>	<p>fund the cost of environmental activities</p>	<p>high EDQ to show commitment to corporate environmental responsibility.</p>	
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		interested in environmental commitments.		providers of funds.					
Gearing	Positive/negative	Highly geared companies disclose higher quality environmental disclosure to show their level of commitment to the environment as a way of legitimising their activities. Companies use environmental disclosure as a	Geared companies release higher quality environmental disclosure to document their environmental performance to their current and potential debt investors to raise funds.	Management of geared companies releases higher quality environmental disclosure to reduce monitoring and agency costs.	Geared companies release lower-quality environmental information, which does not show a good signal of their environmental activities.		Highly geared companies reveal higher environmental disclosure to meet the creditors' expectations on environmental matters.	Geared companies have insufficient financial resources to invest in environmental matters and reveal less environmental disclosure.	Geared companies release environmental disclosure regardless of their gearing status.

		legitimising tool for their activities regardless of the extent of gearing.							
Liquidity	Positive/negative/No	Companies need to gain legitimacy to survive within the society in which they operate.	Liquid companies release higher quality environmental disclosure to show their ability to meet stakeholders' environmental obligations when they fall due.				Liquid companies are in a better position to afford the cost of their environmental commitment.	Low liquidity releases higher environmental disclosure to show how the cost of environmental responsibilities affects their liquidity position.	Companies release more environmental disclosures to gain legitimacy regardless of their liquidity position.
Multinational	Positive	Multinational companies face significant	Multinational companies disclose environmental	Multinational companies have various			Multinational companies apply foreign disclosure patterns to		

		t social and political pressure from societies at home and abroad.	ntal information to satisfy the information needs of various stakeholders from different geographical locations.	shareholders globally, which increases monitoring costs. One way to reduce monitoring costs is to release higher-quality environmental information voluntarily.			differentiate themselves from those operating locally.		
Big-4 audit firm	Positive/negative	Big4 request more explanation to ensure client's information disclosure and protect	Stakeholders such as financial analysts and investors have more confidence in the quality of disclosure	Big4 audit companies provide high-quality audits and thus are associated with			Big4 audit firms do not rely on one customer and are not afraid of asking for more information.	Companies that are audited by Big 4 firms disclose extensive financial information but neglect environm	Factors such as time limitation will limit the scope of the audit to mandatory disclosure only.

		their integrity.	that big4 firms audited.	low levels of accounting manipulation.				ental disclosure .	
Industry type	positive	Environmental sensitive industries provide higher quality environmental disclosure to explain how they address the damages caused by their activities to respond to social pressure and account for their environm	Stakeholders expect higher quality environmental disclosure from environmentally sensitive companies to address their environmental concerns; otherwise, stakeholders assume bad environmental performance.		Environmentally sensitive industries release higher-quality environmental information because failure to release higher-quality environmental disclosure serves as a signal to hide bad environmental news.		To demonstrate how they address their negative environmental impact for environmental sustainability.		

		ental impact.							
Board size	Positive/Negative	A board with many directors could include directors interested in improving the company's reputation, such as environmental reputation, so they ensure that the company respond to environmental pressure for a better reputation	Larger boards will likely represent broader groups of stakeholders who are interested in environmental attention, disclosure, and policies.	A large board reduces the director's workload, enhancing monitoring management activities. Boards suffer monitoring and agency conflicts because of minimum coordination amongst large members, which can		Larger boards are more likely to have members with different knowledge, skills, and experience.	Companies with large boards are mostly larger companies for which the public expects higher environmental accountability.	Larger boards face communication and coordination problems, which affect their disclosure level.	

		n and image		reduce board efficiency and decrease the effective ness of decision- making processe s.					
CEO Duality	Negative		CEO duality gives power and autonomy to dominate the decision of disclosure of informatio n. Also, CEO duality motivates companies to disclose only positive informatio	Combinin g the role of CEO and chairman position is likely to be ineffectiv e in monitori ng the manage ment, affecting the higher disclosur e transpare ncy level,				CEO duality provides self- servicing opportuni ties, which affects a decision to release informati on, including environm ental informati on.	

			n and withhold unfavourable information to reach the stakeholders.	which leads to weak monitoring ability.					
Board independence	Positive/negative	Independent directors are interested in how companies meet social and environmental responsibilities to obtain credibility.	Independent directors protect the financial and non-financial interests of different stakeholders.	Independent directors help address agency conflicts and reduce the hiding of information from shareholders.		Positive: Independent directors have different experiences of environmental impact; they ensure the release of environmental disclosure to show the company's environmental	Independent directors improve the comprehensiveness and quality of disclosure, including environmental disclosure.	Independent directors are sometimes controlled by inside managers based on the nature of appointments and tenures.	Independent directors' professional judgement is influenced by the executive directors.

						performa nce.			
Frequenc y of board meeting	Positive/nega tive	Higher frequenc y of board meetings results in higher pressure on manager s to take environm ental responsib ility and release higher- quality environm ental disclosur e.	Higher frequency of board meetings builds collective board strength, facilitates a better flow of informatio n, and dedicates more time to issues regarding environme ntal responsibil ities.	Frequenc y of board meetings is part of strong corporate governan ce tools that reduce informati on asymmet ry and conflict of interest.	Higher number of board meetings is "evidence of proactive corporate governanc e to guide the organisati onal long- term strategy towards a more carbon- constraine d future."	Frequenc y of board meetings promotes more chances to present board skills, knowledg e and expertise that improves the release of environm ental informati on.	Infrequent board meetings can delay critical and significant decisions on environment al issues and result in the release of low environment al information.	More board meetings can lead to higher communi cation and coordinati on costs, spreading the board agenda to various formal meetings without adequatel y addressin g environm ental issues.	
Board experien ce	Positive	Board members serving on more than one board are more	Experienc ed directors are expected to encourage		Multiple dictatorshi ps use their capabilitie s to increase	More experien ced directors can guide the manage	Directors serving in more than one board had experience with		

		concerned about disclosure policies and practices to align with competitors as a strategy for obtaining legitimacy.	the release of higher-quality environmental information as evidence of their environmental responsibilities in order to earn stakeholders' support.		information transparency by releasing various types of information to signal their experiences.	ment in different areas to attract new investors, including releasing high-quality environmental information to attract risk-averse investors.	environmental reporting policies and practices of the different boards they serve.		
Gender diversity	Positive/no	Female directors to improve board efficiency and effectiveness on policies regarding the environment	Women increase open discussion amongst the board members. The discussions enable the assessment of different	A higher proportion of female directors on the board increases the board's greater diligence and commitment	Women ensure more perspective issues are deliberated in the decision-making process, including environmental	Skills, knowledge, and experiences of directors, rather than their gender, guide their strategic decisions on	women ensure more perspective issues are deliberated in decision-making, including environmental disclosure.		When there is an insignificant number of women on the board, they are not always given a

			stakeholders' needs, including environmental disclosure.	ent, including monitoring management activities.	disclosure, to signal their presence.	environmental responsibilities			chance to express their opinions on deliberating issues.
Presence of foreign members on the board	Positive	Foreign members hold separate views about the environment due to different environmental regulations and practices.	Based on different cultural backgrounds, foreign members are familiar with foreign disclosure patterns, guiding them to address the information needs of various stakeholders, including environmental disclosure.	Foreign members are more involved in improving environmental transparency, which decreases information asymmetry.	Foreign members serving on board encourage the release of environmental information to differentiate themselves from other companies implementing similar disclosure patterns.	Foreign directors come from different demographics with different insights, expertise, ideas, and experiences supporting high-quality environmental disclosure to attract international investors.	Foreign members have different experiences, innovations, and ideas that support high-quality environmental disclosure.		

Institutional ownership	Positive/negative	Institutional investors promote environmental disclosure to integrate environmental matters into the business	Institutional investors consider good corporate governance practices with high accountability and transparency amongst their investment criteria	<p>The higher the demand on quality environmental disclosure to mitigate the information asymmetry problem between management and external providers of funds and reduce monitoring costs.</p> <p>The higher institutional ownership</p>			Institutional investors consider higher-quality environmental disclosure as a means of long-term value creation.	Institutional investors can obtain the required information from alternative sources other than corporate disclosure.	
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				p, the more likely these institutions will rely on their in-house to monitor corporate policies, values, and disclosure patterns compared to retail investors.					
Managerial ownership structure	Positive/negative	Higher managerial ownership has the possibility of listening to various societies' cries about	When managers own substantial shareholding, they dominate the ownership structure, and	Managers can focus on participating on environmental commitment as part of achieving long-			Managers release higher environmental information to reduce pressure from majority shareholders when	Managerial ownership can create conditions that are favourable for their entrenchment, thus	

		<p>their negative environmental impact to obtain legitimacy.</p> <p>Management can be less interested in managing legitimacy threats and public expectations and decide to release low environmental disclosure, which increases the legitimacy gap.</p>	<p>external stakeholders might find it hard to control management action and decision-making processes, including disclosure of information.</p>	<p>term value, which reduces agency problems.</p> <p>Higher managerial ownership gives managers high power to protect their interests and choose to reduce participation in environmental commitment to maximise their wealth for short-</p>			<p>management owns minor shares of the company.</p>	<p>neglecting to finance environmental issues.</p>	
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				term goals.					
Blockholder ownership.	Positive/negative	Blockholders face less public pressure for accountability, which reduces motivations for voluntary disclosure, including environmental disclosure.	A high proportion of blockholder ownership gives more attention to powerful stakeholders and reduces the demand and expectations of minority stakeholder groups	According to the efficient monitoring hypothesis, blockholder ownership monitors management activities effectively and ensures management activities align with shareholders' interests, including releasing high-quality information. Thus,			Blockholders are concerned about ensuring management releases environmental disclosure to manage reputational damages from environmental risk and increase environmental transparency.	Blockholders have various access to information they want when they dominate the shareholding structure.	

				<p>blockholders supervise management decisions to stick to good corporate governance practices which minimise information asymmetry problems .</p> <p>Blockholder ownership promotes low information asymmetry, reducing agency</p>						
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				<p>conflict between managers and owners, which in turn decreases demand for releasing additional information on environmental matters.</p>					
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4.5 Conclusion

The previous chapter review the literature on the association between corporate governance and environmental disclosure. Thus, the current chapter links theoretical framework and empirical evidence to formulate hypotheses. The chapter formulated hypotheses based on the prediction of the selected multi-theoretical framework and evidence from relevant literature. The hypotheses related to firm characteristics, board characteristics, and ownership structure are divided into sub-hypotheses, which will be tested in chapter eight. The next chapter discusses the methodology and methods employed in the current study.

5.0 RESEARCH METHODOLOGY AND METHODS

5.1 Introduction

This chapter discusses the research methodology and method of this study. It begins with the research philosophy in section 5.2, followed by the research approach in section 5.3. Research method is explained in section 5.4, followed by the research design in section 5.5. The method used to construct the disclosure index is explain in 5.6. The study discusses the source for data collection in 5.7 and justifies the research sample use in section 5.8. Besides, section 5.9 explains the model for the study, followed by techniques for data analysis in section 5.10. Lastly, the chapter concludes in section 5.11.

5.2 Research philosophy

According to Creswell (2014), the philosophical stance taken by any researcher is essential in laying the foundation of the research approach and method. Research philosophy refers to the principles and expectations of knowledge development (Saunders, Lewis, and Thornhill, 2009). In other words, research philosophy refers to the method used in gathering, analysing and utilising data (Collis and Hussey, 2009). One of the important aspects of research philosophy is that it provides clarifications on the rationale, theoretical, and logical knowledge of research (Creswell and Poth, 2018; Campbell, Taylor and Mcglade, 2016; Bryman, 2016). Additionally, understanding a research philosophy helps the researcher in four major areas (Isa, 2021): guides the researcher to understand his philosophical role in the study research via collection and interpretation of data; initiates a clear research design, which is significant for contribution to the study area; addresses unexpected issues within the study area; and trains the researcher to develop a research model beyond previous research studies.

Regarding social science research, to understand the social world, research philosophy emphasises examining people's records, actions and words (Alkayed, 2018). It was first implemented in 1830 by Auguste Comte, a philosopher from France (Alshaer, 2022). It results in various debates amongst social science research philosophers in understanding the social world. Research philosophies are divided into three based on their assumptions, namely ontology, axiology and epistemology (Saunders, Lewis, and Thornhill, 2019).

5.2.1 Ontology research philosophy

Ontology examines the "*assumptions about the nature of reality*" (Saunders, Lewis, and Thornhill, 2019, p. 132). It explains about nature of investigated entities (Creswell and Poth 2018; Campbell, Taylor and Mcglade 2016). It answers the question of what the nature of investigated phenomenon is. Or what will be known about the investigated phenomenon? (Isa, 2021). Ontology explains social world's nature and approach to examining truth or reality by asking "What *kinds of things really exist in the world?*" (Tran, 2017, p. 155). The point underlying the ontology deliberations is whether there is objective social phenomenon exist outside social players or whether the social entities are subjective realities developed from the actions and perceptions of social players (Alshaer, 2022). Ontological research philosophy is divided into two, namely Constructivism (subjective) and objectivism (Alshaer, 2022; Creswell and Poth, 2018).

Constructivism's philosophical assumption explains that the actions of social actors and interactions interpret social phenomena (Isa, 2021). This implies that individual beliefs, experiences and opinions are the basis for understanding the environment and attributes of people. This assumption creates multiple reality opinions and supports qualitative research (Isa 2021; Creswell and Poth 2018; Campbell, Taylor and Mcglade, 2016).

On the other hand, objectivism ontological states that there is the existence of reality in the social world above the influence and extent of social phenomena (Isa, 2021; Campbell, Taylor and Mcglade, 2016). According to objectivism, firms are tangible entities with mission and vision statements, methods, regulations, and rules that aim to accomplish a set of objectives that separate them from social players through the people appointed. Thus, firms have an external reality for their people (Bryman, 2016). This philosophical stance concludes that truth can only be discovered because all reality knowledge is understandable. One of the major differences between constructivism and objectivism is that objectivism indicates that firms exist independently from social players, i.e., the social world is not influenced by social players. While based on constructivism, a social incident occurs from actions and perceptions of social players (Alshaer, 2022; Isa, 2021).

5.2.2 Axiology research philosophy

Axiology examines *"the role of values and ethics within the research process"* (Saunders, Lewis, and Thornhill, 2019, p. 132). The philosophical concern of axiology research is ethics and values during the research process. Accordingly, the axiology research philosophy denotes how the researcher's and the participant's ethics and values manage the research within a research period (Isa, 2021). In line with Biddle and Schafft (2015), axiology research philosophy plays an important role in formulating, selecting and attracting the interest of the researchers in research areas by connecting research community norms and dedication of the researcher (Isa, 2021). It emphasises that the value demonstrated by researchers at all research stages plays a significant role in credible research results at all levels of the research process (Alshaer, 2022).

5.2.3 Epistemology research philosophy

Epistemology is the *"assumptions about knowledge, what constitutes acceptable, valid and legitimate knowledge, and how we can communicate knowledge to others."* (Saunders, Lewis, and Thornhill, 2019, p. 132). Epistemology concentrates on establishing valid, acceptable knowledge about a specific study field and how to communicate the knowledge (Isa, 2021). The epistemological philosophical assumption assists the researcher in comprehending the proper procedure of enquiring about the social world (Isa, 2021; Creswell and Poth, 2018; Bryman, 2016). Accordingly, epistemology relates to how to collect the study knowledge through theoretical assumption and justification of the outcomes to validate whether the result is true or otherwise (Isa, 2021). Epistemology research philosophy can be categorised under positivism, interpretivism and pragmatism (Alshaer, 2022; Tran, 2017).

Positivism epistemology philosophy uses the context of natural science to study the social world (Isa, 2021; Creswell and Poth, 2018). According to Positivism research philosophy knowledge should be verified scientifically by testing, observing, and measuring (Saunders, Lewis, and Thornhill, 2009). It follows a scientific approach to the hypotheses using meaningful theories (Bryman. 2016). The result obtained can either support or contradict the tested hypotheses.

Positivism research philosophy further explains that by using the scientific method, the result is measured objectively and can be generalised. This is because

it accepts only results obtained from verified scientific knowledge through testing and observing and rejects any result that does not fit the verified steps (Alkayed, 2018). Positivism philosophical assumptions maintain that objective and independent reality is the only technique to know the truth about reality (Isa, 2021). Thus, the external environment is a source of obtaining knowledge. Therefore, independence exists between the researcher and the external world. Most positivist philosophy uses a deductive approach and quantitative research method (Isa, 2021). However, one of the shortcomings of positivism is that it neglects to consider the researcher's experience, perception, and behaviour (Saunders, Lewis, and Thornhill, 2009).

Secondly, interpretivism research philosophy argues that researchers have different experiences in the world. Therefore, social phenomena should be verified based on different individual experiences (Bryman and Bell, 2007). Social phenomena are examined through subjective action using various logic, which increases the human uniqueness and intellectual reality of the research method (Bryman, 2016). Knowledge is not acquired from an external environment but instead acquired through individual personal experience. Therefore, applying various logic is probably discovering unforeseen surprising results beyond a specific investigation context (Bryman, 2016). This is so because people's attributes and designs are subjective based on interaction with others. Therefore, individual interpretation differs according to their experience instead of acquired external environment knowledge. Thus, knowledge is obtained from the personal experience of an individual (Alkayed, 2018). This type of research philosophy uses a qualitative research method. However, the result obtained using interpretivism philosophy cannot be generalised as individuals have different experiences and interpretations in the social world (Brayman and Bell, 2007).

Thirdly, pragmatism research philosophy (post-positivism) is a "*method utilised by researchers in knowledge development*" (Alotaibi, 2016, p. 113). Pragmatism views no single best way of undertaking social research (Saunders, Lewis, and Thornhill, 2012). It further explains that research questions and hypotheses are the determinants of research philosophy (Saunders, Lewis, and Thornhill, 2012). Therefore, it integrates both the researcher's function and the nature of the study phenomenon (Alotaibi, 2016).

In conclusion, this study examines the association between corporate governance and EDQ. Positivism research philosophy is adopted in this study because it investigates an existing phenomenon, which is examining the association between corporate governance and EDQ for Nigerian listed companies, not the perception and views about the phenomenon. The study uses existing theories to formulate and test the hypotheses so that the results can show whether to reject or confirm the hypotheses. This is done through positivist research philosophy. Lastly, the study uses a deductive research approach and quantitative research method, which supports a positivist research philosophy (Isa, 2021).

5.3 Research approach

There are three types of research approaches, namely inductive, deductive and abductive (Isa, 2021; Creswell and Poth, 2018).

An Inductive approach is *"a process where we observe certain phenomena and, on this basis, arrive at conclusions"* (Sekaran 2003: p. 27). It examines the practices and forms a general theory that suits the practice. The inductive approach starts by collecting and analysing data and, lastly, developing a theory in line with the result obtained from the collected data analysis (Creswell and Poth, 2018). This indicates no basis for theoretical assumptions before collecting the data. Instead, conclusions are made according to the collected data. Inductive research is suitable for qualitative research that centered on understanding research participants' views and ideas.

A deductive approach is *"the process by which we arrive at a conclusion by a logical generalisation of a known fact"* (Sekaran 2003: p. 27). It begins by formulating the theory and develops philosophies and methods to test the hypotheses. The result is used to accept or reject the hypotheses based on the theoretical assumption. The deductive approach refers to the relationship between theory and research in which research is underpinned by existing theory rather than inferred research ideas. Deductive research approach features include ensuring validity through applying control scientific measures, dependence on research results by the researcher, result from generalisation and collection of quantitative data (Isa, 2021; Creswell and Poth, 2018; Bryman, 2016). However, a deductive approach does not consider researchers' viewpoints in interpreting the research data (Isa, 2021)

One of the differences between inductive and deductive methods is that the inductive method is related to interpretivism research philosophy. On the other hand, a deductive method follows a positivist research philosophy (Brayman and Bell, 2007). Additionally, an inductive method is driven qualitatively, while a deductive method is driven quantitatively. Lastly, an inductive research method allows researchers views, while deductive research follows a scientific method (Isa, 2021).

Abductive research method is an approach that involves formulating hypotheses to explain research observations that may not be explained adequately by existing theories (Tavory and Timmermans, 2014). It involves moving between the theoretical framework and data collection for an intensive understanding of complicated phenomena (Bryant and Charmaz, 2019). This approach is used in qualitative research to create new theories that explain observation adequately. Abductive research method is used where an inductive and deductive approach cannot provide a comprehensive explanation. One difference between inductive, deductive and abductive research methods is that an inductive research method starts from collecting specific data to broader theoretical generalisation. Deductive research approach starts with a general theory to test specific observations. Abductive research approach uses incomplete observations to find credible explanations, resulting in the revising of existing theories or developing new ones.

Research aim determines the basis for selecting research method. The current study aims to examine the association between corporate governance and EDQ for Nigerian listed companies. Therefore, this study uses a deductive approach. This is because it involves hypotheses development, variable selection and measurements to have a well-recognised role in the existing literature and theories (Creswell and Poth, 2018; Bryman, 2016). The stages of the deductive approach are (1) considering the theory that is appropriate to the research topic, (2) narrowing this theory to specific hypotheses, (3) collecting observations, and (4) testing hypotheses (Hassan 2010). The study used a deductive research approach to formulate research hypotheses based on well-established theoretical assumptions to see whether the theories can be applied to the Nigerian context. It begins with testing observations to see the logical links between theoretical assumptions and empirical data (Bryman, 2021). The stated hypotheses are clear and concentrate on predicting precise results according to the expectations of

theoretical framework. The deductive research approach supports quantitative research method to examine and assess the association between corporate governance variables and EDQ (Creswell and Creswell, 2018). This study analysed the data using OLS and stepwise regression to either accept or reject the formulated research hypotheses, which provide theoretical prediction objective testing (Saunders, Lewis and Thornhill, 2019).

5.4 Research methodology

There are three types of research methodology: quantitative, qualitative, and mixed methods (Creswell and Poth, 2018; Bryman, 2016).

A quantitative research method is a "*mathematical model that requires the quantification of collected data*" (Alotaibi, 2016, p. 113). The quantitative method derived meaning from numerical information in a consistent form (Creswell and Poth, 2018). The methods apply diagrams and statistics to reflect and measure social phenomena accurately. Quantitative research measures the subject by testing the hypotheses based on theoretical assumptions. Thus, the results obtained through reliable and valid statistical methods increase the reliability, objectivity and generalisability of the findings (Isa, 2021).

A quantitative research method is mostly connected to the positivism research philosophy and determined through a deductive research approach (Creswell and Poth, 2018; Bryman, 2016). One of the advantages of the quantitative method is that it employs scientific means that minimise the researcher's bias. It also makes the researcher more focused because of observing the aim of the study from the beginning to the conclusion. Additionally, it does not affect the independence of the researcher (Howel, 2013). However, the quantitative method failed to consider latest development during the ongoing research period. The reason is that the "*result is limited to the initial aim of the study*" (Alkayed, 2018, p.88). Besides, it does not consider other surrounding factors, such as participants' viewpoints in investigating the social world (Alkayed, 2018).

The second method is qualitative research method. The qualitative method makes an investigation from the participant's viewpoints. This means that a qualitative research method concentrates on the reality of nature, relationship quality and impact of human behaviour. This is because the qualitative method reports the personal views and experiences of the sample (Isa, 2021).

Qualitative research uses first-hand information on the phenomena through observing individuals' perceptions, experiences, attitudes and behaviours (Isa, 2021). It involves collecting non-numerical data through interviews, focus groups, observations of respondents, case studies, and life stories (Alotaibi, 2016). This indicates that the qualitative research method represents and reports individual experiences within the population study (Isa, 2021). According to scholars, the qualitative method develops results and theories from previously analysed and interpreted data (Creswell and Poth 2018; Bryman 2016). Additionally, qualitative method has no restrictions at the initial stage. Qualitative research is suitable for studies that disclose the why context of the phenomenon. The qualitative method incorporates any changes and new happenings during the research period. A qualitative research method is mostly connected to interpretivism research philosophy and is determined through an inductive research approach (Creswell and Poth, 2018; Bryman, 2016). However, the result obtained from the qualitative research method cannot be generalised because it lacks a laborious scientific method (Creswell and Poth, 2018). Lastly, qualitative research increases the research bias because of its subjectivity (Bryman, 2016).

Mixed-method research is the third approach. It combines qualitative and quantitative methods in a single study (Creswell and Poth, 2018). This method eliminates the weaknesses of using a single research method (Bryman, 2016).

The research objectives, questions, and nature of the research decide the suitability of the research method (Alkayed, 2018; Saunders, Lewis, and Thornhill, 2009). Based on that, this study concentrates on measuring the subject matter, that is, the association between corporate governance and EDQ, rather than interpreting participant views and experiences about the subject matter. Thus, quantitative research method is the most appropriate. Quantitative method answers the question of "what" the phenomenon under study is (Abu-Raya, 2012). This is consistent with the research question of what the association between corporate governance is and EDQ for the emerging market of Nigeria. The study develops hypotheses of independent variables based on existing theories and uses the scientific method to measure the relationship, mainly relying on statistical results. Thus, the quantitative research method is used to archive this (Isa, 2021; Alkayed, 2018; Bryman, 2016). Lastly, the study adopted a positivism research philosophy and followed deductive research approach, which are more related to

a quantitative research method (Creswell and Poth, 2018; Alkayed, 2018; Bryman, 2016).

5.5 Research design

Research design is the *"blueprint that guides the researcher in the research process"* (Egbunike and Tarilaye, 2017, p.4). Research design is a master plan defining the method used for data collection and analysis (Malhotra et al., 2006). One of the important aspects of research design is to ensure that the data obtained will support the researcher to clearly answer the research question (Alotaibi, 2016). The study answers the question of what the association between corporate governance and EDQ for listed Nigerian companies is? It uses a content analysis research design to measure EDQ.

Content analysis is *"an approach to analysing documents and texts that seeks to quantify content in terms of predetermining categories in a systematic and replicable manner"* (Bryman and Bell 2007, p. 304). In other words, according to Harwood and Garry (2003; p. 479), content analysis is a technique that *"enables analysis of open-ended data to structure for diagnosis"*. Content analysis is *"codifying qualitative and quantitative information into predefined categories in order to derive patterns in the presentation and reporting of information"* (Haque and Deegan, 2010, p. 322). Regarding environmental disclosure, content analysis is constructing a classification scheme and establishing a set of decision rules for coding, recording, and measuring data (Alotaibi, 2016). The significant advantages of content analysis are reliability, validity and objectivity (Odera, Scott and Gow, 2016). It provides an understanding of the reasons and motivations for measuring environmental disclosure.

There are three approaches for content analysis: sender, receiver, and third-party approaches (Abdel-Fattah, 2008). Firstly, the sender's approach is preparing and assessing corporate disclosure by management (Abdel-Fathah, 2008). Secondly, the receiver approach is the preparation and assessment of corporate disclosure by financial analysts. Thirdly a third-party approach is the preparing and assessing disclosure by somebody who is not an addressee or addressor. A review of the literature shows that majority of previous studies measure environmental disclosure using receivers and third-party approaches (Wang, Fan and Zhuang, 2023; Bamahros et al., 2022; Chand et al., 2022; Gerwing, Kajüter and Wirth,

2022; Khalid et al., 2022; Kumari et al., 2022; Raimo, De Nuccio and Vitolla, 2022; Zhang, 2022; Alkayed, 2018; Welbeck et al., 2017; Akanno et al., 2016; Alotaibi, 2016; Abdel-Fattah, 2008).

There are two methods of content analysis, namely quantitative and qualitative methods of content analysis (Neuman, 2011). Quantitative content analysis *"uses objective and systematic counting and recording procedures to produce a numerical description of the content in a text"* (Neuman, 2011; p. 361). The quantitative content analysis method is concerned with items disclosed to measure. It assigns numbers to count environmental information (Mohammed, 2018). It is also applicable to quantify text content and documents in a logical and replicable method (Egbunike and Tarilaye, 2017; Bryman, 2016). On the other hand, qualitative content analysis is the *"content reports of cultural objectives or media to communicate social meaning"* (Neuman, 2011; p.362).

The content analysis applies to data collection or analysis methods or for both (e.g. Alkayed, 2018; Nguyen et al., 2017). Data collection content analysis is a *"research approach that attempts to make replicable and valid inferences from gathered data according to their context"* (Tran, 2017, p. 116). The method categorises disclosing information into several items (Akbas, 2016). The system follows specific guidelines for coding and recording the observed text (Milne and Adler, 1999). Content analysis is used for data collection to answer two questions. Firstly, what are the environmental disclosure items and their categories? Secondly, where to find environmental information? (Akbas, 2016). One of the advantages of the data collection method with content analysis is that it reveals the openness of business activities and the environmental impact of the business. On the other hand, the data analysis method of content analysis is an *"approach to the analysis of documents and texts that seeks to quantify content in terms of predetermine categories in a systematic and replicable manner"* (Bryman, 2016, p. 289). It signifies the transparency, flexibility, reliability, validity, and objectivity of the coding system (Odera, Scott and Gow, 2016). Moreover, it explains the disclosure's meaning, reasons, motivations (Aerts et al. 2004) and simplifies longitudinal analysis (Bryman, 2016). Lastly, it is one of the most systematic and objective methods used to score, calculate and measure disclosure, including environmental disclosure (e.g., Nguyen et al., 2017; Akbas, 2016; Odera, Scott and Gow, 2016; Oraka and Egbunike, 2016; Dibia and Onwuchekwa, 2015).

Previous disclosure literature uses two ways to conduct content analysis: computerise and manual systems (Wang and Hussainey, 2013). The computerised system saves time and minimises errors using different software such as the QSR package, MAXQDA, NVIVO etc. However, computerised systems fail to detect the implicit meaning of disclosure (Alotaibi, 2016). On the other hand, the manual system analyses every disclosure item. This method is labour-intensive and time-consuming.

From the accounting literature, there are two dominant units of content analysis used to measure environmental disclosure namely, textual analysis and disclosure index (see Appendices 3,5,7,8,11,13,15,17 and 19). Textual analysis is the examination of the content or body of the information. It is a *"method to draw inferences from texts to the context of their use"* (Hassan and Marston, 2019; p.19). Previous studies have used textual analysis to measure the quality and quantity of disclosure. The method uses counting words, sentences, pages, lines, and paragraphs of proportions of a volume of disclosure. Firstly, taking word count, words are the smallest unit of measurement, which is expected to present a strong result in measuring disclosure (Welbeck et al., 2017). Prior studies used word count to measure environmental disclosure (e.g., Mohammed, 2018; Welbeck et al., 2017; Akanno et al., 2015; Eljayash, 2015; Jariya, 2015). The reason is that words provide a precise amount of detailed description. Words are used to look for specific issues. However, words lack meaning and are ambiguous, leaving the researcher thinking about which words relate to environmental information (Hassan, 2010; Hackston and Milne, 1996). Secondly, a sentence method counts any complete sentence of information regarding environmental disclosure or policy (Haniffa and Cooke, 2005). Prior studies used this method (e.g., Odera, Scott and Gow, 2016; Hassan, 2010; Damak-Ayadi, 2009) to measure disclosure. The rationale is that sentences are counted accurately and convey more meaningful information (Odera, Scott and Gow, 2016). Besides, sentences provide complete and reliable data (Hassan, 2010). Lastly, sentences address the problem of line or page allocation. However, the shortcoming of using sentence method involves different writing styles (Akanno et al., 2015). For example, one-sentence disclosure of information may contain more than five-sentence disclosures. Thirdly, counting number of lines/pages method counts the complete line or page with environmental information. Prior reviews used counting

number of lines/pages to measure disclosure (e.g., Odera, Scott and Gow, 2016; Odia, 2015; Hassan, 2010). The lines/pages are used to identify the space given for environmental information. However, one line/page contains more than one category of disclosure information, making it difficult to categorise the line/page concerning environmental disclosure (Gao, Heravi and Xiao, 2005). Counting lines/pages does not account for page portions since columns, pages, and print sizes differ between annual reports. Thus, it unnecessarily constrains reliability (Milne and Adler, 1999).

The literature did not provide theoretical justification for selecting any type of textual analysis. Therefore, selecting a particular type depends *"around the unit of meaning and the extent to which each unit can legitimately be employed to draw the appropriate inferences"* (Gray et al., 1995, p. 83-84). For example, previous studies (Mohammed, 2018; Welbeck et al., 2017; Akanno et al., 2015; Eljayash, 2015; Jariya, 2015ref?) use words when looking for specific environmental issues. Nevertheless, others prefer counting the number of lines Odera, Scott and Gow, 2016; Odia, 2015; Hassan, 2010) to identify the space given for environmental information. In summary, textual analysis focuses on the format of releasing the information. It does not count disclosure releases in a non-textual format, which did not capture complete information released (Al-Tuwaijri Christensen and Hughes, 2004).

On the other hand, a disclosure index is a *"research instrument used to assess the extent of the information reported in a disclosure vehicle(s) by a specific entity according to a list of selected items of information"* (Hassan and Marston, 2019, p. 14). According to Alkayed (2018, p.98), a disclosure index is *"a list of items that should/ could appear in a firm's reports"*. In other words, a disclosure index is a *"research instrument comprising a series of pre-selected items which, when score, provide a measure that indicates a level of disclosure in the specific context for which the index devise"* (Guthrie and Abeysekera, 2006: p.11). According to Khan, Muttakin and Siddiqui (2013), a disclosure index evaluates the transparency of information disclosed, either quantitative, qualitative, or both. It concentrates on counting the disclosed information instead of its format (Feng, Groh and Wang, 2020). It summarises the company's report on a specific aspect of interest. There are two types of disclosure indexes: existing and self-constructed (Hassan and

Marston, 2019; Haque, Deegan and Inglis, 2016). An existing disclosure index is developed by professional, academic institutions or previous studies such as the Global Reporting Index, Global Environmental Index, and European Federation of Financial Analysts Societies (EFFAS). Previous studies such as Tran (2017), Ganapathy and Kabr (2015) and Bhattacharyya (2016) used existing disclosure indexes to measure environmental disclosure. However, the method failed to consider additional disclosure released (Hassan and Marston, 2019). On the contrary, a self-constructed disclosure index is developed by the user from reviewing previous literature, companies' sources, or both. This type of index is suitable for meeting a specific type of disclosure and country of the study (Hassan and Marston, 2019). Previous studies used a self-constructed disclosure index to measure environmental disclosure (e.g., Chandok and Singh, 2017; Welbeck et al., 2017; Jariya, 2015; Fatima, Abdullah and Sulaiman, 2015; Andrikopoulos and Krikilani 2013; Abu-Raya, 2012; Haque and Degan 2010; Abdel-Fattah, 2008).

To conclude this study adopts content analysis for both data collection and data analysis. The rationale for that is to answer three questions. Firstly, what are the environmental disclosure items and categories? Secondly, where to find environmental information? Thirdly, how to score, calculate and measure environmental information. Data collection content analysis answers the "what" and "where" questions. Other data collection methods, such as interviews or questionnaires, cannot supply the required data. On the other hand, "how" is answered through the content analysis data analysis method. Additionally, previous studies used content analysis for data collection and data analysis (e.g. Alkayad, 2018; Alotaibi, 2016; Dibia and Onwuchekwa, 2015; Odia, 2015; Akanno et al., 2015; Bhattacharyya, 2016). The study adopts a manual system for coding EDQ items. The rationale is manual content analysis simplifies contextual environmental information interpretation (Raimo et al., 2022). Manual context analysis avoids difficulties with words and phrases with several meanings (Raimo et al., 2022). This study also used a self-constructed disclosure index to measure EDQ. This method is deliberately chosen because it considers the information released rather than the frequency of words or sentences in a document (textual analysis), which is commonly employed in prior Nigerian studies (e.g., Mohammed, 2018; Egbunike and Tarilaye, 2017; Oraka and Egbunike, 2016; Ohidoa, Omokhudu and Oserogho, 2016; Odera Scott, and Gow, 2016; Odia,

2015; Akanno et al., 2015; Umoren et al., 2015; Innocent, Okafor and Egolum, 2014; Uwuigbe Egbide and Ayokunle, 2011). Moreover, it identifies and analyses specific environmental disclosure items and considers non-textual information such as figures, graphs, pictures, and charts, which are considered powerful instruments for releasing information (Alkayed, 2018; McMurtrie, 2005; Beattie and Jones, 1992) to stakeholders who do not have time to read each word in the whole reports. Also, the self-constructed disclosure index accommodates new happenings to meet a specific type of disclosure and country of the study (Hassan and Matson, 2019).

5.6 Constructing a disclosure index.

There are three steps to disclosure index construction. Firstly, a potential list of environmental information items should be identified. Secondly, score disclosure items. Thirdly, calculate the total score for each company and the total sample after considering inapplicable items.

5.6.1 Identifying a potential list.

This study started constructing disclosure index by identifying a potential list of information items based on a review of prior indices that were developed in literature, including external professional body and academic institutions (Agyemang et al., 2020; Chebbia, Aliedanb and Mohammed, 2020; Feng, Groh and Wang, 2020; Tingbani et al., 2020; Zahid et al., 2020; Alipour et al., 2019; Ismail and Latiff, 2019; Mura et al., 2019; Rabi, 2019; San-Ong, 2019; Alkayed, 2018; Cucari, Esposito De Falco and Orlando, 2018; Husted and De-Sousa-Filho, 2018; Kouloukoui et al., 2018; Ofoegbu, Odoemelam and Okafor, 2018; Radhouane et al., 2018; Alnabsha et al., 2017; Chandok and Singh, 2017; Elfeky 2017; Elshabasy, 2017; Ezhilarasi and Kabra, 2017; Khalid, Kouhy and Hassan 2017; Nguyen et al., 2017; Nadeem, Zaman and Saleem, 2017; Tran 2017; Wuryani, Kurniawati and Satyanovi, 2017; Akbas, 2016; Bhattacharyya, 2016; D'Amico, et al., 2016; Qiu, Shaukat and Tharyan, 2016; Rao and Tilt, 2016; Eljayash, 2015; Fatima, Abdullah and Sulaiman, 2015; Ganapathy and Kabr, 2015; Habbash, 2015; Liao, Luo and Tang, 2015; Umoren, Udo and George, 2015; Rover, Murcia, and De Souza Murcia, 2015; Giannarakis, Konteos and Sariannidis 2014; Burgwal and Vieira, 2014; Andrikopoulos and Kriklani, 2013; Abu-Raya, 2012; Kathy Rao, Tilt and Lester, 2012; Victor Chiedu and Fodio, 2012; Rupley, Brown, and Marshall, 2012; Cormier, Ledoux, Magnan, 2011; Post, Rahman, and

Rubow 2011; Echave and Bhati, 2010; Monteiro and Aibar-Guzman, 2010; Brammer and Pavelin, 2008; Hossain, Islam and Andrew, 2006).

This list is then refined based on a review of actual disclosure practices of a sample of listed Nigerian companies in 2017 across different disclosure vehicles, namely: annual reports, sustainability reports, and companies' websites. The aim is to ensure the index is designed accurately to meet environmental disclosure practices and environmental challenges in Nigeria. The coding process was a back-and-forth process to ensure the relevance of each item of information included in the disclosure index. This involves multiple rounds of coding each environmental disclosure item in a clockwise direction. For example, if a disclosure item is found in coding report number 100 out of 242 total sample reports. The study revisits the previous 99 reports to check whether that item is present or not. The final disclosure index contains 57 environmental disclosure items. Prior Nigerian studies include fewer items 12 to 36 (e.g., George and Ukpong, 2023; Okere et al., 2021; Ivungu et al., 2021; Osemene et al., 2021; Eneh, 2019; Odoemelam and Okafor, 2018; Umoren, Udo and George, 2015; Victor Chiedu and Fodio, 2012; Ofoegbu, Odoemelam and Okafor., 2018). Their disclosure indices may not fully capture the environmental information released.

The classification under these areas aimed to comprehensively capture environmental disclosure items. Each heading is a separate aspect of environmental management and impact, making sure that the disclosure index is relevant and comprehensive to different stakeholders.

The broad themes of environmental disclosure are presented in sub-sections 5.6.1.1 to 5.6.1.8.

5.6.1.1 Statement of environmental policies

Environmental policy refers to *"public statements of an organisation's philosophy, intentions, and objectives concerning the environment"* (Abu-Raya, 2012, p. 248). Apart from a number of board meetings, one is the maximum score of environmental disclosure released of each item under this subsection. This is because companies release in narrative form each of environmental policies, environmental audits, risks, health safety, environmental committees, environmental goals and objectives and future environmental plans. This section

measures the overall framework of environmental governance and philosophy. It is important to comprehend fundamental procedures and policies that guide companies' environmental actions and strategies.

5.6.1.2 Environmental pollution activities disclosure

Oke (2004; p. 108) defines environmental pollution as "*an unfavourable alteration of our surroundings through direct or indirect effect, resulting in changes in energy patterns, radiation levels, chemical and physical constitution of our environment and abundance of organisms*". The environmental damage has a direct negative effect on biological products, air and land. Causes of environmental damage include environmental pollution, the exploration of natural resources, etc. (Ramamohana, 2017). This section reports environmental activities associated with pollution. It is important because it measures how companies disclose their negative environmental impact.

5.6.1.3 Natural environmental protection activities disclosure

This consists of information on how the company address its negative environmental impact. This section reports the company's efforts in conserving and protecting the natural environment. The aim is to measure active steps taken to address their negative environmental impact.

5.6.1.4 Environmental corporate social responsibility (CSR) disclosure

Aribi and Geo (2010, p.72) define CSR as "*the provision of financial and non-financial information relating to an organisation's interaction with its physical and social environment*". Environmental corporate social responsibility explains the moral duty of companies to the environment in which they operate. This section captured CSR related to the environment. This is important to understand companies' engagement in environmental contribution beyond addressing their environmental impact.

5.6.1.5 Environmental ethical activities disclosure

Environmental ethics is a philosophy that studies the fundamentals of environmental principles and issues regarding how organisational actions, policies and operations protect ecological systems and biodiversity. It comprises values concerning the extent and result of human activities with the natural environment.

This section captured environmental ethical consideration practice. The aim is to improve companies' moral obligation towards the environment.

5.6.1.6 Environmental sustainable development disclosure

Morelli (2011; p.5) defines sustainability as a *"condition of balance, resilience, and interconnectedness that allows human society to satisfy its need while neither exceeding the capacity of its supporting ecosystems to continue to regenerate the services necessary to meet those needs nor by our actions diminishing biological diversity"*. Environmental sustainability focuses on how the flow of material and environmental resources increases the sustainable economy. This section measures long-term sustainability practices. It shows how companies support wider sustainability goals.

5.6.1.7 Environmental product activities disclosure

These are the environmental effects of the goods production. This section measures environmental disclosure related to product development, such as packaging. This is important because it helps understand how companies incorporate environmental factors into their main business.

5.6.1.8 Other environmentally related information

One of the disclosure index shortcomings is that it only assesses selected items of information rather than assessing all disclosed information. This study includes this category to accommodate other environmental disclosure items that were not captured in the disclosure index but released in by the Nigerian listed companies.

Table 4 below presents the disclosure index with 57 specific issues.

Table 4: Disclosure index

	Disclosure index	Explanation	Maximum Disclosure
A	Environmental Policies		
1	Environmental policies	A statement showing the environmental policies of the company	1
2	Environmental audit	A statement of whether the company conducted an environmental audit	1
3	Risk, health safety, and environmental committee	Presence of risk, health safety, and environmental committee in the board	1
4	Risks, health safety, and environmental committee board meeting	A statement or number of risks, health safety, and environmental committee board meeting	2
5	Environmental goals and objectives	Statement showing environmental goals and objectives of the company.	1
6	Future environmental plan	Statement showing the company's future plans regarding environmental matters.	1
B	Environmental Pollution Disclosure		
7	Air pollution	Statement charts, graphs of pollution or emission of CO ₂ and greenhouse gases.	2
8	Water pollution	A company statement, quantity, graphs, charts or pictures of water consumption, production, or discharge.	2

9	Solid waste pollution	A statement, quantity, graph, chart, or picture of solid waste generated such as plastic, rubber, garbage, papers used etc.	2
10	Environmental hazard	A statement, quantity, graph, chart or picture of the discharge of environmental hazards, such as animal and bird's droppings, dangerous trees, and spills on floors.	2
11	Energy consumption	A statement charts the quantity of direct or indirect energy used or amount spent on energy consumption.	2
C	Environmental Protection Disclosure		
12	Air pollution control information	A statement, graph or amount spend on controlling of air pollution or emission such as of carbon and greenhouse gases.	2
13	Water pollution control information	A statement, graph or amount spend quantity, graph, charts or statement of water waste e.g., use of sensor taps, recycle and reuse, Installation of effluent treatment plants (ETPs)	2
14	Solid waste control information	A statement, quantity graph charts or picture or amount on solid waste control such as plastic, rubber, garbage, the paper used etc	2
15	Environmental hazard	A statement, quantity, graph charts or picture, amount on the controlling environmental hazards such as how to address animal and bird's droppings, dangerous trees, spills on floors.	2
16	Energy saving	A statement, amount, picture, charts, or graph shows energy Initiatives that minimise consumption of energy such light bulbs, using equipment that consume low energy	2

17	Environmental fines penalties and compensations	A statement or amount spend on environmental fines, penalties and compensation (if any) e.g., lawsuits against the company	2
18	Environmental impact studies	A statement or amount spend on assessing the firm's program, policy, plan and consequences on environment such as significant effect of project to the environment	2
19	Environmental sanitation	A statement, picture or amount spend on environmental sanitation e.g., dedicating a particular day for environmental sanitation.	2
20	Employees environmental safety	A statement, quantity, amount, chart or graph relating to environmental safety such power cables located either underground or overhead good ventilation, reasonable temperature.	2
21	Employee environmental training and education	A statement, number, amount spend or pictures of employees training regarding environmental protection or safety e.g., certificate in environmental management	2
D	Environmental CSR Disclosure		
22	Supporting anti lighter campaigns	A statement amount or picture showing any program to end dumping rubbish on public places ground.	2
23	Supporting environmental security	A statement, amount or picture showing donation made to security organisation that contribute to the environment, e.g., Donation to Nigerian fire Service	2
24	Donation for environmental disaster	A statement, amount picture showing contribution for disaster victims e.g., flood.	2

25	Donation to environmental organisation	A statement, amount or picture showing contribution made to environmental foundations e.g., Nigerian environmental society	2
26	Sponsoring environmental activities	A statement, amount or pictures that show sponsoring environmental activities, e.g., workshops, conferences, and seminars on environmental awareness	2
E	Environmental Ethical Disclosure		
27	Plantation of trees	A statement, picture or amount spend on plantation of trees.	2
28	Beautification of activities	Statement, amount or picture to beautify the environment, such as round about decoration, landscaping	2
F	Environmental Sustainability Disclosure		
29	Environmental research	A statement picture or amount spend on research for new methods of production or process to reduce environmental pollution	2
30	Recycle of plant or waste products	A statement Picture used to reduce/reuse/recycle plant or waste products	2
31	Conservation of natural resources	A statement picture or amount spend on program used to conserve natural resources e.g., digitalisation to reduce paper use, waste program segregation.	2
32	Pest control	A process uses to manage pest existence and environmental impact. A statement picture or amount spent on pest control e.g., destroying or removing nest, traps to capture pest.	2

33	Energy efficiency	A statement, picture chart or amount spend on energy efficiency such as using solar energy, renewable energy	2
34	Sustainable transportation	A statement, amount, picture on sustainable transportation such as Using companies' official vehicle to transport employees.	2
G	Environmental Product Disclosure		2
35	Environmental Products and product development	A statement, amount, picture on product and product development such as product design that use material efficiently in the process of manufacturing and have minimum harmful to environment.,	2
36	Packaging	Using package materials that have minimum environmental impact	2
H	Other Environmentally Related Information not included in the index		
37	Fire prevention/ fighting equipment's	A statement, picture or amount of fire preventing or fighting equipment, e.g., fire extinguishers cylinders, Fire alarm system, fire blankets, smoke detectors etc.	2
38	Amount of provision on environmental risk	A statement or amount on environmental insurance such for fire insurance	2
39	Collaboration with other companies on environmental matters	A statement, amount, picture showing collaborating with other companies on environmental matters	2

40	Noise pollution	A statement, graph, charts on noise pollution such as construction site, machinery etc.	2
41	Noise pollution control	A statement, graph, charts, or amount spend on controlling noise pollution.	2
42	Other environmental CSR disclosure	A statement, graph, charts or amount spend on other environmental CSR e.g., environmental grants and subsidies	2
43	Suppliers' environmental assessment	A statement, graph, charts proportion of screen suppliers using environmental criteria e.g., proportion of suppliers selected based on environmental criteria	2
44	Environmental investment	A statement, graph, charts, or amount invested in companies that have positive environmental impact.	2
45	Biological hazard	A statement, quantity, graph charts or picture, amount on the control d biological hazards such as tissues that contain blood etc	2
46	Contribution to agriculture	A statement, pictures quantity, or amount contributing to agriculture, including service rendered	2
47	Electronic waste	A statement, pictures, or quantity of electronic waste products such as computers, fax machines, televisions for an extended period.	2
48	Environmental grievances	A statement or number of formal environmental grievances address and resolved.	2
49	Other environmental sustainability	A statement, pictures quantity, or amount of other environmental sustainability n e.g., Wildlife conversation	2

50	Environmental savings	A statement, graphs or amount save as a result of environmental initiatives.	2
51	Equator principles	Equator principle is a "risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making" (Equator Principle, 2015 p.1) Statement or amount of loan given to companies following equator principal.	2
52	Environmental programs and certification	Assessment of business activities by third party. A statement, number, picture on any environmental certification under the environmental management system such as ISO certification.	2
53	Environmental award	A statement, quantity, or picture of environmental award received for environmental excellence and protection	2
54	Dust pollution	A statement, picture of dust pollution as a result of companies' activities such as agriculture-related activities, road dust, vehicular exhaust, power, construction activities,	2
55	Dust pollution control information	A statement, picture or amount on addressing dust pollution activities such as agriculture-related activities, road dust, vehicular exhaust, power plants, construction activities.	2
56	Environmental ozone depletion	A statement, picture chart or amount spend on ozone depletion HCFCs and CFCs in refrigerators and air conditioners	2

57	Department or office or positions for pollution control and safety of environment.	A statement, picture, or amount provided to department or office of pollution control.	2
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Table showing disclosure index used to measure EDQ for listed Nigerian companies.

Source: developed by researcher.

5.6.2 Scoring disclosure items

From the literature review, two main methods are used to score disclosure items: the weighted and unweighted approach (Ofoegbu et al., 2018; Alkayad, 2018). An unweighted approach gives equal importance to all disclosure items. It concentrates on whether or not the company discloses information. It follows a procedure where an item scores one if disclosed and zero otherwise. One of the advantages of un-weighted approach is that it reduces the subjectivity of rating disclosure items. Previous studies mainly used this method to measure the quantity of disclosure (Zhang, 2022; Danisch, 2021; Balluchi, 2021; Cong, 2020; Chiang Wachtel and Zhou 2020; Ofoegbu, Odoemelam and Okafor, 2018; Wuryani, Kurniawati and Satyanovi, 2017; Chandok and Singh, 2017; Alotaibi, 2016; Akroun and Othman, 2016; Eljayash, 2015). On other hand, the weighted approach argues that some disclosure patterns provide more information than others. The weighted approach does not assign equal importance to the released environmental information. For example, financial information sends better information than non-financial information because financial information represents physical and monetary information that can be verified (Mitali, Mukherjee and Pattanayak, 2017). Previous studies mostly used the weighted approach when measuring the quality of disclosure, including environmental disclosure (e.g., Alkayad, 2018; Chandok and Singh, 2017; Akroun and Othman, 2016; Fatima, Abdullah and Sulaiman, 2015).

This study employs a weighted approach to quantify the quality of environmental disclosure of listed companies on the NSE. The rationale is to differentiate the quality of environmental information release because *"quality of environmental disclosure rather than mere quantity has a stronger effect on creating environmental reputation amongst executive and investor stakeholder groups"* (Hasseldine et al. 2005: p. 231).

Prior studies assigned different weights to score disclosure quality, from a 7-point scale to a 2-point scale. Seven-point scale, such as Alkayed (2018) and Raar (2002). Alkayed (2018) assigned (6) to quantitative disclosures with pictures and charts, (5) to quantitative disclosures, (4) to qualitative disclosures with pictures, (3) to qualitative specific disclosures, (2) general disclosures with pictures, (1) general disclosure and (0) for non-disclosure. Six-point scale such as Hasseldine et al. (2005) assigns (5) to published quantified disclosures, (4) unpublished

quantified disclosures, (3) to monitored and implemented disclosures, (2) to specific or intent disclosures, (1) specific disclosure policy; and (0) for a general statement. Five-point scale, such as Dragomir, Dumitru and Feleaga (2022), Nguyen et al. (2017), Fatima, Abdullah and Sulaiman (2015), Hooks and Van-Staden (2017). Fatima Abdullah and Sulaiman (2015) assign (4) items disclosed in quantitative and monetary; (3) items disclosed in quantitative but non-monetary; (2) items are disclosed in specific terms but non-quantitative; (1) items disclosed in general terms and (0) for non-disclosure.

Other studies such as Alawi and Masood (2018), Egbunike and Trailaye (2017), Chandok and Singh (2017), Dyduch and Krasodomska (2016); Eljayash (2015); Zeng et al. (2012) assigned four-point scale. Chandok and Singh (2017) assign (3) to information disclosed in monetary terms, (2) to information disclosed in quantitative terms, (1) to information disclosed in narrative form and zero (0) for non-disclosure. However, assigning a high score to disclosure increases subjective judgment and reduces the reliability of the measurement (Hassan, 2010). Thus, developing a weight system on the lowest possible points can archive reliable results (Hassan, 2010). Based on that, other studies assign a three-point scale to measure the disclosure quality (e.g., Ezhilarasi and Kabra, 2017; D'Amico et al., 2016; Bhattacharyya, 2016; Jizi et al., 2014). For example, Bhattacharyya (2016) assigned (2) for disclosure release in quantitative terms, one (1) for qualitative disclosure and zero (0) for non-disclosure.

The current study applies a three-point scale to measure EDQ. It assigns value of (2) to financial, quantified and non-narrative disclosure (awarded a value of two), followed by (1) to indicate qualitative disclosure (awarded a value of one), and the value of (0) for non-disclosure. This is because the recent development of a Task Force on Climate-related Financial Disclosures by the Financial Stability Board clearly highlights the importance of climate-related financial disclosure (e.g., Demaria and Rigot, 2021; D'Orazio, 2021; Edwards et al., 2020; Eccles and Krzus, 2019). Financial and quantified disclosures represent actual activities (Widiarto, 2009). They also represent physical and monetary information that can be verified (Mitali, Mukherjee and Pattanayak, 2017; Cormier Magnan and Van Velthoven, 2005). They are more informative to the users in performance evaluation, including environmental performance (Raar, 2007), which can differentiate a company from its competitor (Hassan, 2010). They help in rating

the value of information disclosed (Cormier Magnan and Van Velthoven, 2005). At the same time, non-narrative disclosures are a strong and highly effective communication method, especially for stakeholders who do not have time to read each word in the annual reports (Alkayad, 2018). For example, pictures deliver more information than thousands of words (Alkayed 2018). Lastly, previous Nigerian studies (George and Ukpung, 2023; Okere et al, 2021; Ivungu et al., 2021; Osemene et al., 2021; Eneh, 2019; Mohammed, 2018; 2010foegbu, Odoemelam and Okafor., 2018; Odoemelam and Okafor, 2018; Egbunike and Tarilaye, 2017; Oraka and Egbunike, 2016; Ohidoa, Omokhudu and Oserogho, 2016; Odera Scott, and Gow, 2016; Odia, 2015; Akanno et al., 2015; Umoren et al., 2015; Umoren, Udo and George, 2015; Innocent, Okafor and Egolum, 2014; Victor Chiedu and Fodio, 2012; Uwuigbe Egbide and Ayokunle, 2011) failed to consider non-narrative environmental disclosure measurement.

5.6.3 Inapplicable items

Inapplicable items are disclosure items that are not relevant and applicable to some industries or companies. According to Abdel-Fattah (2008), scoring inapplicable items penalises companies for non-disclosure. This results in an over/underscoring of companies' disclosure levels because the item is unrelated to their operation. Thus, it affects the validity and reliability of disclosure (Tran, 2017; Abdel-Fatah, 2008). Abdel-Fatah (2008) recommends that the researcher should read the reports before assigning codes to identify inapplicable items. This step shows whether an item applies to companies or not.

The study classifies the inapplicable items into two categories: general items and industry specific ones. The general inapplicable items include environmental fines, penalties, and compensation, as well as collaboration with other companies on environmental matters and environmental grievances. This is because environmental fines, penalties, and compensation are applicable only to companies which have incurred them. Also, companies can treat environmental issues individually without collaborating with other companies. Meanwhile, some companies treat environmental issues separately without partnering with any company. This reason made this study treat collaboration with other industries amongst inapplicable items. Therefore, companies cannot be penalised for the absence of these items of information.

Industry-specific inapplicable items of information include environmental product disclosure and the equator principle. Environmental product disclosures are inapplicable to service and financial industries. Financial institutions such as banks and insurance companies are servicing companies that do not use raw materials for production (Tran, 2017). Besides, equator principle is a *"risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making"* (Equator Principle, 2015 p. 1). It is a framework of risk management adopted by financial institutions that concentrates on mitigating social and environmental risks associated with project financing and applies only to financial institutions (Emir, 2016).

5.6.4 Calculating EDQ score.

The study uses the formula below to calculate the average disclosure per company.

$$EDQ = \frac{\sum di}{(n-I)}$$

Where:

EDQ=average environmental disclosure quality

$\sum di$ = Total sum of disclosed environmental information

n = Total maximum disclosure

I= Inapplicable items

5.6.4 Reliability and validity assessment

A disclosure index is accurate and reliable only if it passes the reliability and validity assessment (Hassan and Matson, 2019; Abu-Raya, 2012). This subsection explains the procedure used for validity and reliability assessments.

5.6.4.1 Reliability assessment

According to Tran (2017. P. 168), reliability is the *"degree to which the process of content analysis remains unchanged and produces the same results over time"*. In other words, it is the *"ability of a measurement instrument (e.g., a disclosure index) to produce consistent results in repeated trials."* (Hassan and Matson 2019, p. 34). Reliability measurement assesses three main items: consistency, stability

and accuracy (Krippendorff, 2013). Firstly, consistency examines how a set of items are measured (Shekaran, 2003). Secondly, stability examines the ability of the measurement process to remain unchanged and reveal the same result over time (Train, 2017). Thirdly, the accuracy shows how coding performance versus expected results from previous studies of predetermined standards.

There are three reliability test methods: test-retest, internal consistency and inter-coder reliability. Firstly, test-retest reliability is the "*degree to which the process of content analysis remains unchanged and produces the same results over time*" (Tran 2017, p. 168). It measures the stability of the coding process over time from the same instrument that was used for measurement (Hassan and Matson, 2019). The process involves the researcher coding the data more than once, given the time difference between the first and second coding. Correlation analysis between the first and the second coding is usually used to test the reliability of the coding. High correlation shows high reliability and vice versa. Previous studies, such as Tran (2017) and Abdel-Fatah (2008), used this type of test for the reliability assessment of the disclosure index.

Secondly, internal consistency reliability measures the extent to which "*an item in the checklist measures the same construct and hence is internally consistent*" (Tran, 2017, p. 169). Cronbach's alpha can be used for internal consistency assessment. Cronbach's alpha measured the correlation of each item to the subgroup score/total score. Previous studies such as Khan, Muttakin and Siddiqui (2013), Aribi and Gao (2010) and Hassan et al. (2009) use internal consistency to test the reliability of disclosure.

Lastly, inter-coder reliability refers to the "*extent to which content classification produces the same result when the same text is coded by more than one coder*" (Weber, 1990; P. 17). The process involves having more than one person to code the data using the same disclosure index and coding guidelines. At the end of the coding, correlation analysis between the two results tests the reliability. A high correlation shows high reliability and vice versa (Hassan and Matson, 2019). Previous studies such as Baalouch, Ayadi and Hussainey (2019), Alkayad (2018), Tran (2017), Abu-Raya (2012), and Hassan (2010) use this type of reliability test.

In line with Hassan (2010), reproducibility is the strongest and most feasible reliability test since it is measured by an independent person or group apart from

the researcher. Additionally, inter-coder reliability minimises ambiguity and overlapping of meanings or interpretations (Abu-Raya, 2012). Based on that, this study assesses the reliability of EDQ measurement using inter-coder reliability.

5.6.4.2 Validity assessment

Validity refers to the *"instrument, techniques or process used to measure a concept does indeed measure the intended concept"* (Sekaran, 2003, p. 425). Validity certifies if the coding interpretations is supported by the theoretical framework and empirical literature review. Validity addresses the subjective assessment in the construction and use of a disclosure index by examining whether the index measures what it intends to measure, i.e. EDQ. There are three common categories of validity tests: content, criterion and construct validity (Hassan and Matson, 2019).

Content validity measures how adequate items that comprise the disclosure index represent disclosure. There are various ways to conduct content validity, such as carefully defining the research phenomena through an intensive literature review, using a panel of experts to refine the preliminary disclosure index, etc. (Hassan and Matson, 2019). Criterion validity *"measures how well one instrument compares with another instrument or predictor"* (Litwin, 1995, p. 37). It is *"established when the measure differentiates individuals on a criterion expected to predict"* (Sekaran 2003, P.206). There are two types of criterion validity: predictive and concurrent validity (Abdel-Fatah, 2008). Predictive validity refers to the capacity of the measurement to accurately make predictions, while concurrent validity forms *"when the measure discriminates different individuals"* (Abdel-Fatah, 2008, p. 202).

On the other hand, construct validity shows *"how the result obtained from the use of the measure fits the theories around which the test was designed"* (Sekaran, 2003, p. 207). *"It is concerned with the extent to which a particular measure relates to other external measures consistent with theoretically derived hypotheses concerning the concepts (or constructs) that are being measured"* (Carmines and Zeller, 1979, p. 23). It concentrates on the consistency with theoretical prediction and confirmation from literature. Hassan and Matson (2019) provide three stages for measuring construct validity. Firstly, to indicate the theoretical connection between disclosure measurement and independent

variables. Secondly, to empirically test the theoretical connection. Thirdly, to justify how empirical results explain the construct validity assessment of disclosure measurement.

The literature explains three types of validity tests, namely content, criterion and constructs validity. Content validity relies on individual perception, while individuals have different perceptions (Abdel-Fatah, 2008). Hence, this method cannot guarantee validity. On the other hand, social science research does not often use criterion validity (Hassan, 2006). Thus, the study uses construct validity to assess the validity of the disclosure index.

Previous empirical studies examine the relationship between environmental disclosure and different control variables (see Appendices 3, 5 7,9,11,13,15,17 and 19). Some studies revealed mixed results on the association between each of profitability, liquidity, leverage, age, industry type and Big4 with environmental disclosure (e.g., Boshnak, 2021; Ntui, Mzenzi and Chalu, 2021; Aboagye - Otchere, Simpson and Kusi 2020; Chiang Wachtel and Zhou, 2019; Alnabsha et al., 2018; Chandok and Singh, 2017; Nguyen et al., 2017; Elfeky, 2017; Egbunike and Tarilaye, 2017; Habbash, Hussainey and Awad, 2016; D'Amico et al., 2016; Burgwal and Vieira, 2014). On the other hand, firm size and multi-nationality always report a significant positive association with environmental disclosure (e.g., Mohammed, 2018; Egbunike and Tarilaye, 2017; Wuttichindanon, 2017; Chandok and Singh, 2017; Habbash, Hussainey and Awad 2016; Dyduch and Krasodomska, 2017; Hassan, 2010; Reverte, 2009). In line with prior literature (Abu-Raya, 2012; Abdel-Fatah, 2008), construct validity is examined by checking the correlation between each of firm size and multinationalism with EDQ.

5.7 Sources of data

A review of environmental disclosure literature shows that majority of precious studies used annual reports to measure environmental disclosure (see Appendices 3,5,7,8,11,13,15,17 and 19).

An annual report is a *"formal public document produced by companies in response to the mandatory corporate reporting requirements existing in most Western economies"* (Santon and Santon, 2002: p. 478). In other words, it is *"a company business card which reflects that it provides readers with a comprehensive picture*

of publishing organisation" (Daub, 2007, P. 75). The content of annual reports contains both mandatory and voluntary information (Hassan, 2010).

Previous studies explain the importance of using annual reports as a disclosure vehicle. An annual report is a significant document that companies use to build their social and environmental images (Welbeck et al., 2017). An annual report is also a public relations document (Tran, 2017). An annual report is an essential source of information that attracts the attention of stakeholders, especially in developing countries (Nguyen et al., 2017; Oraka and Egbunike, 2016). Besides, an annual report is consistent and credible (Ullah, Hossain and Yakub, 2014). Publishing annual report is statutory (Egbunike and Tarilaye, 2017). Factors such as stock valuation that create environmental conflicts are reported in the annual reports. Therefore, explaining how companies deal with such factors is vital in the same report (Gray, Meek and Roberts, 1995). According to stakeholder theory, an annual report also channels different stakeholders' economic, social, and environmental performance. It is also a medium for communicating how a company protects different stakeholders' interests (Halme and Huse, 1997). The interest includes environmental disclosure to address the environmental concerns of stakeholders. Companies disclose environmental information in annual reports for a capital market benefit (Francis, Nanda and Olsson 2008). Other companies release environmental information in annual reports to address information asymmetry problems and to defend against bad performance (Manita et al., 2018). (Manita et al., 2018).

Contrary, prior literature (e.g., Gerwing, Kajüter and Wirth, 2022; Balluchi, Lazzini and Torelli, 2021; Chithambo et al., 2021; Marwa, Salhi and Jarboui, 2020; Ramba, Joseph and Said, 2021; Chandok and Singh, 2017; Haque and Deegan, 2010; Brammer and Pavelin, 2008) used sustainability reports to measure environmental disclosure. According to Gray (2009), a sustainability report explains how companies support or aim to support the future by improving economic, social, and environmental surroundings on the local or global stage. Therefore, a sustainability report *"is crucial for businesses to show stakeholders that they are effective in meeting their own sustainability goals, future business growth and long-term success"* (Amran and Keat, 2014, p.38). To reduce political costs in the non-capital market, managers disclose environmental information in

separate reports such as sustainability reports (Simnett, Vanstraelen and Chua, 2009).

Due to technological advancements, the internet has become a means through which companies communicate with the external world. Broadband and the internet have made sourcing information from websites more accessible and faster (Alawi and Masood, 2018). This makes the disclosure of information through the internet more available than the traditional method. Internet reporting is information released on companies' official sites. Based on that, some previous studies use companies' websites to measure the quality and quantity of disclosure (e.g., Raimo, De Nuccio and Vitolla, 2022; Zhang, 2022; Danisch, 2021; Rosa Portella and Borba, 2020; Mura et al., 2019; Alawi and Masood 2018; Juhmani, 2014).

The current study measures the quality of environmental disclosure from annual, sustainability and official website reports of Nigerian listed companies to address these previous Nigerian studies' limitations, which are limited to annual reports only. It uses the annual report as the principal data source and focuses on additional environmental information disclosed from sustainability reports and official website. Repeated environmental information within the annual sustainability and website is ignored in the coding process.

5.8 Sample of the study

The study covers all Nigerian listed companies in 2017. The rationale for selecting the period is that 2017 is the most current year during the data collection period.

As was explained in the introduction and literature review chapters, there is a dearth of literature on the association between corporate governance mechanisms and environmental disclosure in sub-Saharan African countries due to issues around data availability. Accessing data in developed countries is easier compared to developing countries. For example, there are at least three sources of accessing secondary data in the UK. Firstly, a request for hard copies from the company's office or soft copies from the website. Secondly, purchase from the commercial database. Thirdly, getting an annual report on demand (report service).

In contrast, in developing countries like Nigeria, data availability and accessibility are disturbing, time-consuming and not easy (Emeka, 2020; Adelopo, 2011). For

example, Nigeria lacks the necessary infrastructure to record, store, and maintain detailed and extensive data, even for listed companies (Emeka, 2020; Adelopo, 2011). Evidence shows that data is usually recorded physically on paper, and after some time, older documents must be burnt to provide space for new ones (Emeka, 2020; Adelopo, 2011). This process makes data availability and accessibility very difficult, which significantly contributes to the limited archival studies on environmental disclosure in Nigeria. The study started data collection at the end of 2019. It first tried to access panel data, however obtaining panel data was impossible for the above reasons. The only available and accessible recent data by then for a sample of all listed companies on the NSE was for the year 2017 resulted in a cross-sectional study. Given that both disclosure and governance variables are sticky variables (Botosan, 1997; Healy and Palepu, 1993), a cross-sectional analysis was thought to be adequate. This is because policies relating to disclosure and governance are constant over time (Botosan, 1997; Healy and Palepu, 1993). Apart from that, 2017 is important in Nigerian corporate governance history because it is the year preceding the implementation of the New Corporate Governance Code 2018. The new Corporate Governance Code 2018 intends to unify different corporate governance codes into a single comprehensive document that can be applied to all sectors. The new code aims to provide emphasis on corporate discussion's long-term impact on sustainability. The 2018 code of corporate governance aim to emphasise the significance of board of directors in management supervision, seeing strategic direction and ensuring accountability.

There were 168 companies listed on the Nigerian stock exchange in 2017. As data was missing for 21 companies, the final sample size dropped to 147 companies. Data that were used to develop the disclosure index were manually collected and coded from 232 reports, which is a labour-intensive and time-consuming process. These include 147 annual reports, 62 websites, and 23 sustainability reports. The 62 websites and 23 sustainability reports are those that contain additional environmental information that was not covered in annual reports. Amongst the three sources of data used website reports are the most easily source. It is worth mentioning that commercial databases, like Refinitiv Eikon for example, only hold environmental information about less than a handful of companies, even though it is not consistent over time. Additionally, to the best of the authors' knowledge,

this is the largest dataset used in a Nigerian study, (George and Ukpung, 2023; Okere et al., 2021; Ivungu et al., 2021; Ndal, Ibanichuka and Ofurum, 2021; Osemene et al., 2021; Jeroh, 2020; Eneh, 2019; Ofoegbu, Odoemelam and Okafor, 2018; Odoemelam and Okafor, 2018; Mohammed, 2018; Egbunike and Tarilaye, 2017; Oraka and Egbunike, 2016; Ohidoa, Omokhudu and Oserogho, 2016; Dibia and Onwuchekwa, 2015; Oscar and Juliet, 2015; Adekanmi, Adedoyin, and Adewole 2015; Odia, 2015; Akanno et al., 2015; Umoren, Udo and George, 2015; Innocent, Okafor and Egolum, 2014; James and Gbalam, 2013; Victor Chiedu and Fodio, 2012; Uwuigbe Egbide and Ayokunle 2011).

Table 5: Sample of the study

S/N	Industries	Total Listed Companies	Missing Reports	Mandatory disclosure source	Voluntary disclosure sources	Total sample
1	Oil and Gas	12	-	12	10	22
2	Agriculture	5	-	5	3	8
3	Conglomerates	6	-	6	3	9
4	Construction/real estate	8	2	6	-	6
5	Consumer good	20	2	18	13	31
6	Financial services	57	10	47	23	70
7	Health service	10	4	6	3	9
8	ICT	7	-	7	2	9
9	Industrial goods	14	-	14	14	28
10	Natural resources	4	-	4	2	6
11	Services	25	3	22	12	34
	Total	168	21	147	85	232

This table show the research sample.

Source: Developed by the researcher

5.9 Model of the study

The study employs multiple regression analysis to measure the association between EDQ and corporate governance. Equation 1 shows the multiple regression model as follows.

$$Y = a + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} \dots \dots \dots \beta_n X_{ni} + e_{it} \text{ (Eq. 1)}$$

Y: the dependent variable.

A: constant

β : coefficient of independent variable

X: independent variable(s).

i: sample companies

e: the error term

Consistent with prior empirical studies (Ntui, Mzenzi and Chalu, 2021; Aboagye-Otchere, Simpson and Kusi, 2020; Mohammed, 2018; Nguyen et al., 2017; Welbeck et al., 2017; Khalid, Kouhy and Hassan, 2017; Oraka and Egbunike, 2016; Bhattacharyya, 2016; Juhmani, 2014; Burgwal and Vieira, 2014) and in line with the research hypotheses, this study investigates the association between various firm characteristics variables (firm size, age, profitability, gearing, liquidity, multinationalism, audit firm, and industry type) and EDQ. The research model is expressed as follows:

$$EDQ_i = \beta_0 + \beta_1 FZ_i + \beta_2 Age_i + \beta_3 ROA_i + \beta_4 GER_i + \beta_5 LIQ_i + \beta_6 MN_i + \beta_7 Big4_i + \beta_8 IND_i + \varepsilon_i$$

(Eq.2)

Firm size (FZ) is measured as the natural logarithm of total assets (e.g., Gerwing, Kajüter and Wirth, (2022) Chouaibil, Miladi and Elouni, 2022; Ntui, Mzenzi and Chalu, 2021; Aboagye-Otchere, Simpson and Kusi 2020; Tingbani et al., 2020), while firm age (Age) indicates number of years from the date of incorporation to the year 2017 (e.g., Ntui, Mzenzi and Chalu., 2021; Aboagye-Otchere, Simpson and Kusi 2020; Welbeck et al., 2017; Khalid, Kouhy and Hassan, 2017). Firm profitability is measured as return on assets (ROA), which is calculated as the ratio of net profits after tax to total assets and expressed as a percentage (e.g., Chand et al., 2022; Danisch, 2021; Ntui, Mzenzi and Chalu, 2021; Aboagye-Otchere, Simpson and Kusi, 2020; Ohidoa, Omokhudu and Oserogho, 2016; Oraka and Egbunike 2016). Gearing (GER) is measured as the ratio of total debt to total assets and expressed as a percentage (e.g., Tingbani et al., 2020; Zhang, 2022; Ntui, Mzenzi and Chalu, 2021; Oraka and Egbunike 2016; Dibia and Onwuchekwa, 2015). Liquidity (LIQ) is measured as current assets minus inventory to current liabilities (Khalid et al., 2022). Multinationalism (MN) is a dummy variable which takes the value of one if the company operates in more than one country and zero

otherwise (e.g., Welbeck et al., 2017; Freedman and Jaggi, 2011). Audit firm (Big4) is a dummy variable which takes the value of one if the audit firm is one of the big4 firms (i.e., Deloitte, PricewaterhouseCoopers, Ernst and Young, and KPMG) and zero if it is not (Nguyen et al., 2017; Welbeck et al., 2017; Alnabsha et al., 2018; Khalid, Kouhy and Hassan 2017; D'amico et al., 2016). Industry type (IND) is a dummy variable which takes the value of one if the company is from an environmentally sensitive industry, namely oil and gas, agriculture, conglomerates, consumer goods, health sector, information and communication technology, industrial goods, construction and real state, and natural resources, and zero otherwise (Chand, et al., 2022; Tingbani et al., 2020; Danisch, 2021; D'amico et al., 2016).

The study investigates the association between board characteristics and EDQ controlling firm size, profitability, multinationalism, and industry type to achieve the third objective. Consistent with prior empirical studies (Ghosh, Pareek and Sahu, 2023; Kumari et al., 2022; Ghosh, Pareek and Sahu 2023; Nuskiya et al., 2021; Okere et al., 2021; Agyemang et al., 2020; San-Ong, 2019; Husted and De- Sousa-Filho, 2018; Alnabsha et al., 2018; Okere et al., 2021) and in line with the research hypotheses the study expresses the model as follows:

$EDQ =$

$$\beta_0 + \beta_1 BC_i + \beta_2 BS_i + \beta_3 CEO_i + \beta_4 BM_i + \beta_5 BE_i + \beta_6 PWB_i + \beta_7 PFB_i + \beta_8 FZ_i + \beta_9 ROA_i + \beta_{10} MN_i + \beta_{11} IND_i + \varepsilon_i \quad (\text{Eq.3})$$

Board size (BZ) is measured by the total number of directors on the board of the organisation (Raimo, De Nuccio and Vitolla, 2022; Chand et al., 2022; Chouaibil, Miladi and Elouni, 2022; Kumari et al., 2022; Tingbani et al., 2020). CEO duality is measured as a dummy variable which takes the value of one if the position of CEO and chairman is occupied by the same person and zero otherwise (Chouaibil, Miladi and Elouni, 2022; Alkayed and Omar, 2022; Kumari et al., 2022 De-Masi et al., 2021; Tingbani et al., 2020). Board independence (BI) is measured as the proportion of non-executive directors to the total number of directors on the board (Alkayed and Omar, 2022; Raimo, De Nuccio and Vitolla, 2022; Osemene et al., 2021; Kumari et al., 2022; Tingbani et al., 2020). Frequency of board meetings is measured by the number of board meetings in a year (Bamahros et al., 2022; Alkayed and Omar, 2022; Kumari et al., 2022; Nuskiya et al., 2021; Tingbani et

al., 2020). Board experience is measured by the proportion of directors serving on more than one board to the total number of directors on the board (Abu-Raya, 2012; Rupley, Brown, and Marshall, 2012). Gender diversity (GD) is measured by the proportion of women on the board (Chand et al., 2022; Kumari et al., 2022; De-Masi et al., 2021; Rupley, Brown, and Marshall, 2012). Presence of foreign members on the board (FM) is measured as a dummy variable, which takes the value of one if there are foreign members on the board and zero otherwise (Alkayed and Omar, 2022; Abdel-Fattah, 2008).

The study investigates the association between ownership structure and EDQ controlling firm size, profitability, multinationalism and industry type, intending to achieve the fourth objective. Based on that, the study formulated an econometrics model below based on the hypotheses prediction and in line with previous literatures (Dragomir, Dumitru and Feleaga, 2022; Zouari and Dhifi, 2022; Ananzeh et al., 2022; Al Fadli et al., 2022; Boshnak, 2022; Acar et al., 2021; Al-Amosh and Mansor, 2020; Zaid, Abuhijleh and Pucheta-Martínez, 2020; Viana and Crisóstomo, 2020; Alnabsha et al., 2018; Juhmani, 2013; Sufian and Zahan, 2013).

$$EDQ_i = \beta_0 + \beta_1 * IO_i + \beta_2 * MO_i + \beta_3 * BO_i + \beta_4 * FZ_i + \beta_5 * ROA_i + \beta_6 * MN_i + \beta_7 * IND_i + \varepsilon_i$$

(Eq.4)

This study measured institutional ownership (IO) as the proportion of ordinary shares owned by institutional investors to the total ordinary shares issued (Ellili, 2023; Zouari and Dhifi, 2022; Boshnak., 2022; Dakhli, 2021; Nurleni and Bandang, 2018). Managerial ownership (MO) is measured by the proportion of ordinary shares owned by management to the total ordinary shares issued (Ellili, 2023; Zouari and Dhifi, 2022; Dakhli, 2021; Al Amosh and Mansor, 2020; Nurleni and Bandang, 2018). Blockholder ownership (BO) is measured by the proportion of ordinary shares owned by substantial shareholders (from 5% and above) to the total ordinary shares issued (Ellili, 2023; Al Amosh and Mansor, 2020; Abdel-Fattah, 2008).

Table 6: Variable definition and measurement

Variables	Measurement
Environmental Disclosure Quality EDQ	Corporate voluntary environmental disclosure quality measured using a weighted self-constructed disclosure index.
Firm size (FZ)	The natural logarithm of total assets.
Age (Age)	The number of years since the company was incorporated till the year 2017.
Profitability (ROA)	Return on assets measured as net profit after tax to total assets and is expressed as a percentage.
Gearing (GER)	Total debt to total assets and is expressed as a percentage.
Liquidity (LIQ)	The ratio of current assets minus inventory to current liabilities.
Multinationalism (MN)	A dummy variable which takes the value of one if the company operates in more than one country and zero otherwise.
Auditor type (Big4)	A dummy variable which takes the value of one if the audit firm is one of the Big4 firms and zero otherwise.
Industry type (IND)	A dummy variable which takes the value of one if the company is from an environmentally sensitive industry (oil and gas, agriculture, conglomerates, consumer goods, health sector, information and communication technology, industrial goods, construction and real state, and natural resources) and zero otherwise.
Board size (BZ)	the total number of directors on the board of the organisation.

CEO Duality CEO)	A dummy variable takes the value of one if the position of CEO and chairman is occupied by the same person and zero otherwise.
Board independent (BI)	A proportion of non-executive directors to the total number of directors on the board.
Frequency of board meeting (BM)	A number of board meetings a year.
Board experience (BE)	Proportion of directors serving on more than one board to the total number of directors on the board.
Gender diversity (GD)	Proportion of women serving on board to the total number of directors on the board.
Presence of foreign member on board (FM)	A dummy variable which takes the value of one if there are foreign members on the board and zero otherwise
Institutional ownership (IO)	The proportion of ordinary shares owned by institutional investors to the total ordinary shares issued.
Managerial ownership (MO)	The proportion of ordinary shares owned by management to the total ordinary shares issued.
Blockholder ownership (BO)	The proportion of ordinary shares owned by substantial shareholders (from 5% and above) to the total ordinary shares issued.

This table shows how independent, and control variables are measured and the hypotheses prediction.

Source: Developed by the researcher.

5.10 Techniques for Data Analysis

The study measures EDQ release by listed Nigerian companies for the whole sample and provides a breakdown of the industry. T-test and Wilcoxon test were used to check whether there were significant differences between the mean and median of EDQ for each industry and that of the total sample. The study used Mann-Whitney test to see whether there is a significant association amongst industries' EDQ. A review of prior literature shows that OLS regression is the commonly used method to investigate the association between firm characteristics and corporate governance with environmental disclosure (e.g., Alkayed and Omar, 2022; Agyemang et al., 2020; Chithambo et al., Danisch, 2021; Gerged, 2021; Kilincarslan et al., 2020; Ntui et al., 2021; Nuskiya et al., 2021). This is because OLS regression minimises the difference between predictive and observed values (Ullah, 2020). Also, OLS regression is strong for models that comprise continuous and dummy variables (Abdel-Fattah, 2008; Hutcheson and Sofroniou, 1999).

OLS regression should meet underlying assumptions to avoid misleading results: normality of residuals, multicollinearity, linearity, and homoscedasticity. Firstly, the normality of residuals assumes the normal distribution of the error term. Graphical and numerical methods are used to check for normality assumptions. The graphical method includes a P-P plot, Q-Q plot and histogram. The P-P plots represent the standard normal probability plots. Meanwhile, the Q-Q plot represents the variable quantile versus the normal distribution quantile. On the other hand, the histogram shows the bell shape of the variable distribution. The numerical method includes skewness, kurtosis, Shapiro-Wilk and Kolmogorov-Smirnov D statistics. The standard skewness and kurtosis show normality distribution when their values are less than two times the standard error (Abdel-Fattah, 2008). In contrast, the Shapiro-Wilk and Kolmogorov-Smirnov test shows normality if the p-value reveals a non-significant result (Tran, 2017; Abdel-Fattah, 2008).

Multicollinearity examines the linear relationship between two or more independent variables. Multi-collinearity occurs when there is a high correlation between two or more explanatory variables in a regression model. The presence of multi-collinearity affects the trustworthiness of the regression because it increases the standard error (Field, 2013). That is why OLS regression assumes perfect multi-collinearity is limited in the regression model (Tran, 2017; Gujarati

and Porter, 2010). Correlation analysis, variance inflation factor and tolerance value are used to test for multicollinearity. Correlation shows the relationship between the variables and shows multicollinearity when the relationship between the variables is 80% and above (Tran, 2017; Field, 2013; Gujarati, 2003). VIF values show how influential linear association is between the variables. The common cut-off value for VIF is 10, corresponding to 0.10 of the tolerance value (Alshaer, 2022; Hair et al., 2018; Field, 2009;). However, other scholars identify a multicollinearity problem if the value of VIF is above 4 (Miles and Shevlin, 2011) or 2.5 (Allison, 1999).

Thirdly, the linearity checks assume a normal distribution of the error term. The test is conducted using either a graphical method or a numerical method. The graphical method examines the relationship of the fitted regression line by plotting each independent variable against the dependent variable. In contrast, the numerical method is used to conduct the Durbin-Waston test. Durbin-Waston tests for the first-order autocorrelation of the mean distribution. Durbin-Waston test value ranges from 0 to 4. Values less than 2 show positive autocorrelation, while values greater than 2 mean negative autocorrelation (Tran, 2017; Brooks, 2008). On the other hand, a value of 2 or closer means that the result has no autocorrelation problem (Tran, 2017; Wooldridge, 2013; Brooks, 2008).

Fourthly, homoscedasticity assumes the constant of the error term, while the non-constant error term is called heteroskedasticity. Homoscedasticity test checks through the graphical and numerical methods. The graphical method examines the spread between the residual plot and predicted value residuals. In contrast, the numerical test conducted by Breusch-Pagan /Cook-Weisberg tests (Brooks, 2008).

For robustness check, the study further runs a stepwise regression to remove the variable(s) that are not statistically significant in explaining EDQ. Stepwise regression is the *"process of each regression model step-by-step by either adding or deleting one variable at a time based on stepping criteria"* (Ruengvirayudh and Brooks, 2016, p.1). In other words, stepwise regression is a *"variation of regular multiple regression that was invented to specifically address the issue of variables that overlap a lot in the information they provide about the Y"* (Fritz and Berger, 2015, p. 257). The stepwise regression is applicable for investigating a complex

association between corporate governance and EDQ for Nigerian listed companies. Stepwise regression is a repetitive method that selects variables with the most statistical significance in the final model. It starts with the original model, which contains all variables, and then follows by adding or removing variables according to specific principles such as p-values. This led to arriving the best model that explains corporate governance determinants of EDQ with few observations which address overfitting and multicollinearity issues (James et al., 2021). Multicollinearity arises when there is a high correlation amongst independent variables, which affects predictors' statistical significance. Using stepwise regression eliminates multicollinearity risk by removing variables which do not increase model significance (Kutner et al., 2020). Stepwise regression enhances the accuracy of the model by only including variables that contribute meaningfully to explaining EDQ. Based on that, it identifies efficient corporate governance variables that have a significant association with EDQ for Nigerian-listed companies. This improves model precision and ensures findings generalisation (Cohen et al., 2020). Lastly, the application of stepwise regression helps to prevent the drawbacks of incorporating too many variables, which can result in overfitting, reduce the predictive power of the model and yield misleading inferences (Harrell, 2019).

The study considered intra-model interaction for additional tests only but did not use inter-model interaction. Using intra-model interactions allows the study to investigate the association of corporate governance variables within a specific area (how the interaction of different board characteristics determines environmental disclosure). This method guides the study to be theoretically precise by testing hypotheses from an established theoretical governance framework without adding cross-domain complexity of interactions. To demonstrate, according to stakeholder theory, a study can focus on whether a larger board size may allow for more experienced and skilled directors and may promote diversity to enhance environmental disclosure. Contrarily, inter-model interactions may result in a conceptual framework's complication, resulting in inconsistencies in the theoretical framework. Regarding hypotheses testing, direct theoretical prediction can be validated using Intra-model hypotheses. For example, a study might formulate a hypothesis on the interaction between foreign directors and female directors to see whether foreign female directors are associated with environmental

disclosure. Based on methodological robustness, using inter-model interactions can increase model interaction terms and variables, leading to multicollinearity issues because the study uses a small sample size. The presence of multicollinearity affects the reliability of inter-model interaction, affecting the reliability of the result. Intra-model interactions lead to simplified research design, making validation and replication of findings easier. This is important in research in developing countries that do not have robust research infrastructure. Findings from intra-model interaction can be compared with previous studies. This is because most studies in developed and developing countries used intra-model interactions. The findings can be used to build on existing knowledge, showing incremental contributions to academic and practical implications.

5.11 Conclusion

The study measures the association between corporate governance and EDQ for Nigerian-listed companies. The study is based on a positivist research philosophy that follows a deductive research approach. The study used a quantitative research method and measured EDQ through a content analysis. The study sampled all the Nigerian listed companies for the year 2017 and considered company's annual report, sustainability report and its official website.

The study explains and justifies the rationale for using the disclosure index to measure EDQ. It also deliberates the method used to develop and score the disclosure index disclosure. The study discusses how it considers inapplicable items in EDQ measurement and explains the validity and reliability assessment methods. Lastly, the chapter explains model selection rationale and model specification. The next chapter is about data presentation, analysis and interpretation.

CHAPTER 6: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

6.1 Introduction

This chapter presents the result of the data analysis to achieve the research objective. Section 6.2 provides the result of measuring EDQ (first objective), followed by investigating the association between firm characteristics and EDQ (second objective) in 6.3. Section 6.4 examines the association between board characteristics structure and EDQ (third objective). The study assesses the association between ownership structure and EDQ (fourth objective) in section 6.5, followed by a robustness check 6.6. Besides, the study discusses the overall results and implications to the Nigerian capital market in section 6.7 and concludes in 6.8.

6.2 Measuring total EDQ.

This section measures EDQ to achieve the first research objective. Table 7 below shows the summary of descriptive statistics for measuring EDQ.

Table 7: Descriptive statistics for measuring EDQ.

Variable	Mean	Median	Maximum	Minimum	Skewness	Kurtosis
EDQ	0.194	0.158	0.544	0.000	0.765	-0.274

Table 7 above shows that the average EDQ is 19.4%, which indicates that Nigerian listed companies release low-quality environmental disclosure. This finding is lower than EDQ released by many developing countries, such as Indonesia, with a mean disclosure of 30.3% (Solikhah and Maulina, 2021), Malaysia with a disclosure mean of 30% (San-Ong, 2019), and 24.80% (Fatima Abdullah and Sulaiman, 2015), China with a disclosure mean of 60% (Agyemang et al., 2020). Contrarily, Nigerian listed companies release higher EDQ compared to India, with a mean disclosure of 16.41% (Kumari et al., 2022), and Iran, with a disclosure mean of 16.19% (Alipour et al., 2019).

Releasing low EDQ could be due to voluntary nature of EDQ and absence of enforcement from Nigerian regulatory bodies (Okere et al., 2021; Eneh, 2019; Chijoke-Mgbame and Mgbame, 2018; FRCN, 2018; SEC, 2011). High EDQ is costly and involves significant resources, while Nigerian companies prefer short-term financial goals compared to long-term sustainability (Adegbite, 2012). Other

reason includes lack of management environmental disclosure benefit awareness (Adegbite, 2012). Apart from that, stakeholders such as societies and environmental activists are not putting enough pressure on high quality environmental accountability (Adegbite, 2012). Data access is another challenge for comprehensive EDQ (FRCN, 2018), as well as inconsistency in environmental disclosure standards (FRCN, 2018).

Low EDQ could reduce environmental transparency amongst Nigerian listed companies, making it difficult for investors to assess companies' environmental risk and reducing investors' confidence. Low EDQ affects investors' decision-making, especially those considering environmental performance as a criterion for investing in Nigerian-listed companies because of their poor environmental performance. Low EDQ affects Nigerian listed companies' reputation in the international market as environmental awareness and concerns are increasing globally. This can result in losing stakeholder trust. Low EDQ released by Nigerian listed companies could result in missing operational improvement opportunities. For example, waste reduction and energy efficiency which increase cost savings.

EDQ ranges from zero to 0.544, meaning none of the listed Nigerian companies disclosed all the environmental information in the disclosure index. A maximum disclosure of 54% is from the consumer goods industry. A minimum value of zero for EDQ indicates that two companies did not release any environmental information in the disclosure index. Each of these companies is from the consumer goods and financial services industries. This could be because environmental disclosure is not mandatory for Nigerian-listed companies (Okere et al., 2021; Eneh, 2019; Chijoke-Mgbame and Mgbame, 2018; Ofoegbu, Odoemelam and Okafor, 2018; Egbunike and Tarilaye, 2017). Chart 1 below shows the ranking of companies using EDQ. Regarding disclosure items, energy consumption is the highest item of EDQ released by listed Nigerian companies, while the equator principle is the lowest EDQ item released by Nigerian listed companies. Chart 2 shows ranking of items of environmental information using quality of disclosure.

Figure 1: Ranking of companies using disclosure quality.

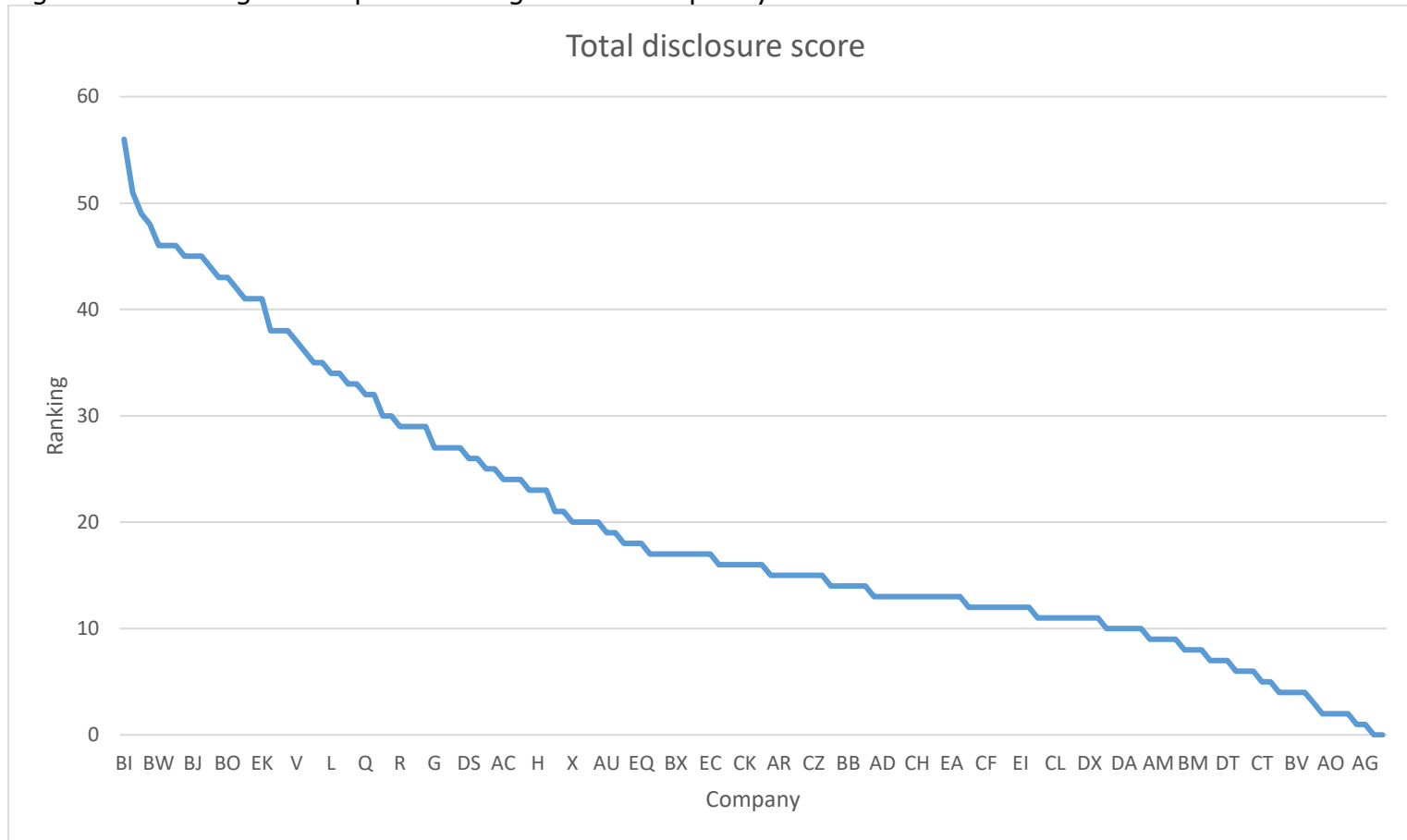
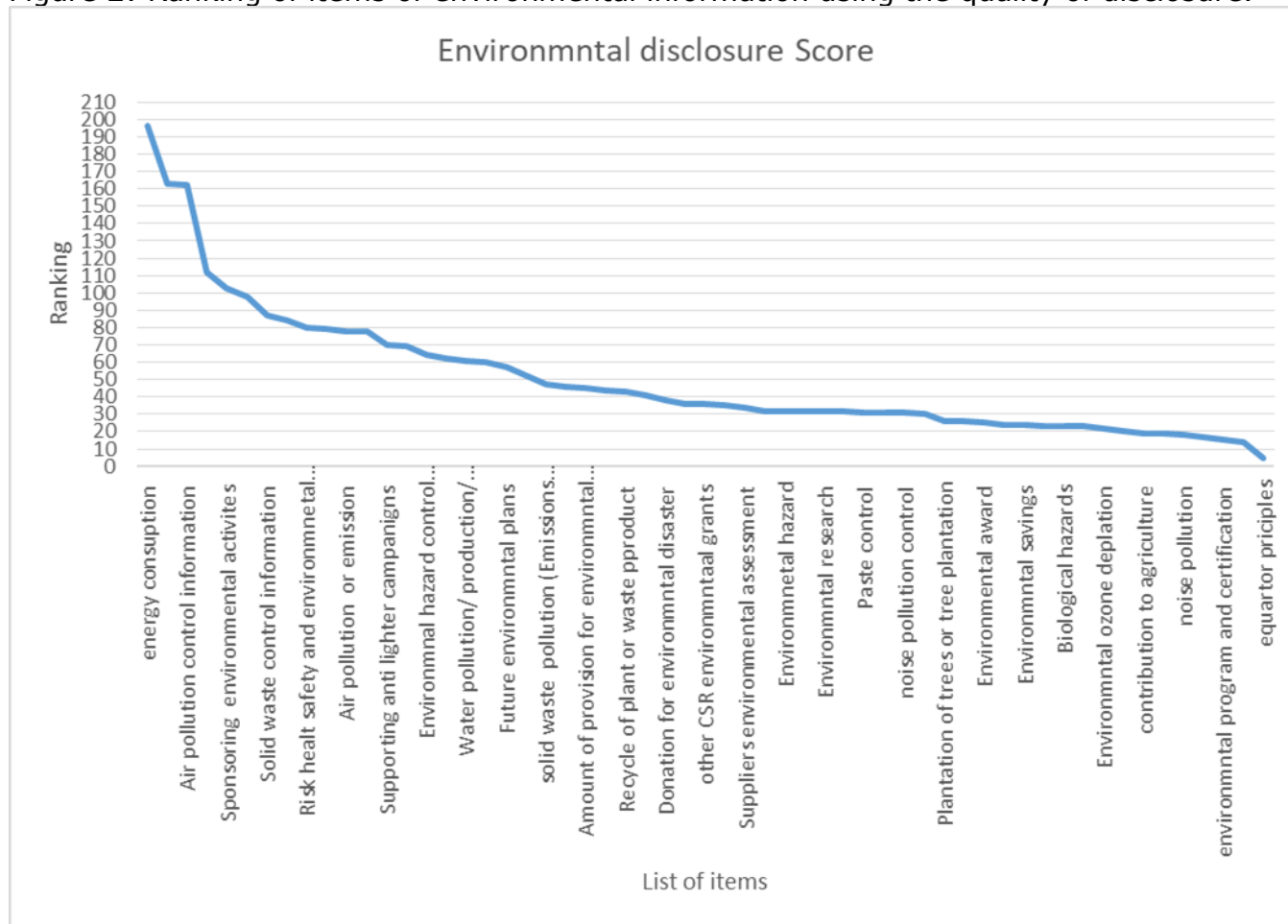


Figure 2: Ranking of items of environmental information using the quality of disclosure.



From Table 7, the skewness and kurtosis for EDQ are not normally distributed. The nature of this study does not allow for the normality of EDQ. For example, EDQ ranges from 0-2, which does not have a negative value (Abdel-Fatteh, 2008). Wilcoxon test is used to explore the disclosure practice per industry compared to that of the entire sample (Oakshott, 2020).

Table 8: Descriptive Statistics of EDQ by industry using the Wilcoxon test.

S/ N	Industries	Environmental sensitive (Yes/No)	No. of firm s	No. of report s	Mean	Media n
1	Oil and Gas	Yes	12	22	0.265	0.297*
2	Industrial Goods	Yes	14	28	0.221	0.178
3	Consumer Goods	Yes	18	31	0.219	0.168
4	Health Care Sector	Yes	6	9	0.218	0.188
5	Agriculture	Yes	5	8	0.215	0.158
6	Conglomerates	Yes	6	9	0.211	0.230
7	Financial Service	No	47	70	0.192	0.139
8	Services	No	22	34	0.153* *	0.150
9	Natural Resources	Yes	4	6	0.145	0.137
10	Construction/R eal Estate	Yes	6	6	0.126	0.129
11	Information and Communication	Yes	7	9	0.124* *	0.126
Total			147	232	0.194	0.158

This table shows the descriptive statistics for the EDQ of each industry. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 level, respectively.

Source: Developed by the researcher

The mean and median of EDQ of each industry are compared to those of the entire sample. Results reported in Table 8 show that services and information and communication industries released significantly lower quality of environmental disclosure compared to the overall sample mean. It is interesting to report that the oil and gas industry, which is an environmentally sensitive industry, released significantly higher quality environmental disclosure compared to the sample median. However, it is only significant at the 10% level of significance.

Table 9: Independent Sample T-Test amongst Industries

Independent T-Test

	Oil and Gas	Agriculture	Conglomerates	Construction	Health care	Information and communication technology	Natural resource	Consumer goods	Industrial goods	Service	Financial
Oil and Gas		0.598	0.437	0.075*	0.606	0.042**	0.145	0.385	0.410	0.042	0.175
Agriculture			1.000	0.273	0.927	0.291	0.389	0.911	0.711	0.473	0.675
Conglomerates				0.200	0.873	0.174	0.394	0.947	1.000	0.239	0.407
Construction					0.297	0.943	0.831	0.230	0.127	0.538	0.273
Health care						0.317	0.748	0.894	0.836	0.417	0.822
Information and communication technology							0.571	0.164	0.101	0.429	0.226
Natural resources								0.349	0.264	0.722	0.787
Consumer goods									0.775	0.237	0.472
Industrial goods										0.088*	0.287
Services											0.515

This table shows the independent sample T-test for EDQ between each industry. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 level, respectively.

Source: Developed by the researcher.

Table 9 shows the independent sample T-Test of EDQ between industries. The results show that oil and gas industry released significantly higher EDQ compared to each of construction (at 10% significance level) and information and communication technology (at 5% significance level), which all belong to environmentally sensitive industries. This can be interpreted as oil and gas industry has more environmental damage in Nigeria (Ivungu et al., 2021; Ndal, Ibanichuka and Ofurum, 2021; Mohammed, 2018; Dibia and Onwuchekwa, 2015; Oscar and Juliet, 2015; James and Gbalam, 2013; Victor Chiedu and Fodio, 2012) compared to each of construction and information and communication technology industries. Additionally, the oil and gas industry, which belongs to the environmentally sensitive industry, releases significantly higher EDQ compared to the service industry, which belongs to the non-environmentally sensitive industry (at a 5% significance level). Besides, industrial goods industry, which belongs to the environmentally sensitive industry, releases significantly higher EDQ compared to the service industry, which belongs to the non-environmentally sensitive industry (at a 10% significance level).

6.3 Investigating the association between EDQ and firm characteristics.

This section investigates the association between firm characteristics and EDQ, with the aim of validating the disclosure index to achieve the second objective.

6.3.1 Descriptive statistics

Table 10 below shows the descriptive statistics of firm characteristics variables.

Table 10: Descriptive statistics of firm characteristics variables

Variable	Mean	Median	Maximum	Minimum	Skewness	Kurtosis
FZ (billions of Nigerian Naira)	218.868	12.241	4,833.658	0.100	4.642	23.046
Age	39.330	36.000	100.000	6.000	0.511	-0.143
ROA (%)	0.036	0.027	0.698	-0.987	-0.480	9.508
GER (%)	0.282	0.237	0.976	0.000	0.731	-0.198
LIQ	1.248	1.029	6.811	0.014	2.102	5.907
MN	0.537	1.000	1.000	0.000	-0.152	-2.004
Big4	0.571	1.000	1.000	0.000	-0.292	-1.942
IND	0.531	1.000	1.000	0.000	-0.124	-2.012

This table shows the descriptive statistics for EDQ and firm characteristics.

Variable definition and measurement are provided in Table 6.

Source: Developed by the researcher

Table 10 shows the descriptive statistics of the firm characteristics and EDQ. It shows that the average company size (FZ) is 219 billion Nigerian naira (508 million GBP). The average ROA is very low (4%) but still indicates profit making. Gearing (GER) level on average is 28.2%. Companies, on average, have high liquidity (1.25). The average age of companies is 39 years. Slightly more than half of the sample firms operate in more than one country (MN), audited by one of the Big4 audit firms (Big4), and come from an environmentally sensitive industry (IND).

6.3.2 Correlation

The study measures the Pearson correlation to show the direction and strength of the relationship between the dependent (EDQ) and firm characteristics variables (firm size, firm age, ROA, leverage, liquidity, Big4, multinationalism and industry type).

Table 11: Pearson Correlation test on the association between firm characteristics and EDQ

	EDQ	FZ	Age	ROA	GER	LIQ	MN	Big4	IND
EDQ	1.000								
FZ	0.603***	1.000							
Age	0.100	0.005	1.000						
ROA	0.425***	0.306***	-0.049	1.000					
GER	-0.012	0.109	0.037	0.013	1.000				
LIQ	-0.037	0.049	-0.254***	0.140	-0.120	1.000			
MN	0.308***	0.299***	0.113	-0.014	0.057	-0.092	1.000		
Big4	0.291***	0.431***	0.159*	0.201**	0.029	0.160	0.244***	1.000	
IND	0.104	-0.202**	0.217***	-0.089	0.061	-0.266***	-0.052	-0.126	1.000

This table shows the Pearson correlation test for EDQ and the firm's characteristics. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 level, respectively. Variable definition and measurement are provided in Table 6.

Source: Developed by the researcher.

Table 11 presents the Pearson correlation matrix to measure the direction and strengths of the linear relationship between the variables. It shows that each of firm size (FZ), profitability (ROA), multinationalism (MN), and audit firm (Big4) have a positive and highly significant correlation (1% significance level) with EDQ. in line with the hypothesis's prediction, in table 3.

This means that large, profitable companies audited by Big4 audit firms and operating in the local and foreign markets release higher EDQ. Large firm has more resources to provide on environmental matters, which increases EDQ. Profitable companies use a portion of their profit in taking care of the environment to minimise negative attention on their profitability. Multinational firms use international disclosure guidelines that promote releasing higher quality environmental information. Big4 audit firms do not rely on one customer and are not afraid to ask for more information (Wallace and Naser, 1995)

On the other hand, there is no significant correlation between each of age (AGE), gearing (GER), liquidity (LIQ) and industry type (IND) with EDQ contradicting the expected hypotheses in Table 3. This indicates that EDQ does not increase or decrease based on a firm's age, gearing, liquidity or environmental sensitivity. This is because firms can consider EDQ as a legitimacy tool regardless of liquidity gearing or the number of years spent on operation. Regarding industry type, it happens when sensitive environmental industries face low external pressure and criticism to release environmental disclosure (Tran, 2017).

In conclusion, these results are based on pair-wise correlations, which disregard the effect of other variables. A multi-regression analysis would provide a better picture of the association between EDQ and firm characteristics.

6.3.3 Validity and reliability assessment

This section discusses the results obtained for the reliability and validity assessment.

6.3.3.1 Reliability assessment

According to Krippendorff (2007; p. 77), *"Conclusions from data can be trusted only after demonstrating their reliability"*. As it was discussed in chapter 5.6.4, inter-coder reliability assessment is employed in this research.

Inter-coder reliability minimises ambiguity and overlapping meanings or interpretations (Abu-Raya, 2012). In conducting the inter-coder reliability, the researcher employs an independent person to code for a small sample to ensure consistency and accuracy. The independent coder is trained before the coding assignment to become acquainted with coding instructions and guidelines, as suggested by Tran (2017). After the training, the independent coder analyses one sample to test whether he understands the coding process correctly. The result documented that the coding process/results are correct. The researcher randomly allowed the independent coder to select two companies from each industry. Information was coded for these twenty-two companies considering their annual reports, sustainability reports, and website reporting, making a total of sixty-six reports. The correlation coefficient between the two coders' EDQ was 0.910***, which indicates a prominent level of inter-coder reliability in the current study.

6.3.3.2 Validity assessment

As it was explained in chapter 5.6.4, the study uses construct validity to assess the validity of the disclosure index. Construct validity assesses prediction consistency from theories and evidence from previous literature. Firm size and multi-nationality were used in this study for validity assessment (Abu-Raya, 2012; Abdel-Fatah, 2008).

Table 11 shows that each of firm size (FZ) and multinationalism (MN) have a highly significant positive correlation with EDQ. This result aligns with the predictions of stakeholder, legitimacy, agency, and resource dependency theories. Additionally, previous empirical studies documented a significant positive relationship between each of firm size and multinationalism with EDQ (Alkayed and Omar, 2022; Chand et al., 2022; Raimo et al., 2022; Gerged, 2021; San-Ong, 2019; Alkayed, 2018; Chandok and Singh, 2017; Dyduch and Krasodomska, 2017; Reverte, 2009).

Therefore, the study concludes that the disclosure index used to measure the EDQ is reliable and credible since it passes the reliability test.

6.3.4 Regression result

The current study used OLS regression to investigate the association between firm characteristics and EDQ in line with previous studies (e.g., Danisch, 2021; Chithambo et al., 2021; Ntui et al., 2021). It uses stepwise regression to remove the variables that are not statistically significant in explaining EDQ. Table 12 presents the results of the regression analysis.

Table 12: Regression Result on the association between firm characteristics and EDQ

OLS regression					Stepwise regression		
Explanatory variables	Expected Sign	Coefficient	Tolerance	VIF	Coefficient	Tolerance	VIF
Constant		-0.545***			-0.540***		
FZ	+	0.029***	0.689	1.451	0.029***	0.789	1.267
Age	+/-	0.000	0.858	1.166			
ROA	+/-	0.208***	0.875	1.143	0.206***	0.893	1.119
GER	+/-	-0.053*	0.969	1.032			
LIQ	+/-	-0.003	0.827	1.209			
MN	+	0.042***	0.863	1.159	0.043***	0.899	1.113
Big4	+	-0.001	0.735	1.360			
IND	+	0.059***	0.863	1.158	0.061***	0.958	1.043
R- Squared		0.523			0.511		
Adjusted R-Squared		0.495			0.497		
Standard errors		0.089			0.089		
F Statistics		18.880			37.039		
Sig.		0.001			0.001		
Mean Residual		0.000			0.000		
Durbin Watson		2.173			2.097		
Skewness (Std err)		0.120 (0.200)			0.139 (0.200)		
Kurtosis (Std err)		-0.121(0.397)			0.218 (0.397)		
Kolmogorov-Smirnov		0.200*			0.200*		
Shapiro-Wilk (Sig)		0.906			0.817		
Breusch-Pagan (Sig.)		0.320			0.282		

This table shows the OLS and Stepwise regression for EDQ and firm characteristics in this study. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 level, respectively. Variable definition and measurement are provided in Table 6.

Source: Developed by the researcher.

Table 12 summarises the OLS regression results of the association between firm characteristics and EDQ⁷. The OLS regression output provides evidence of a significant positive association between firm size (FZ) and EDQ ($\beta = 0.029$, $p < 0.01$), which means that increases in the company's assets increase the EDQ. The study accepts the predicted hypothesis (H_1) in Table 3, which expects a significant positive association between firm size and EDQ.

Also, the result finds a significant positive association between profitability and EDQ ($\beta = 0.208$, $p < 0.01$). This finding shows that higher profitable companies release higher quality environmental information than lower profitable companies. Therefore, the study accepts the third hypothesis (H_3) in Table 3, which predicts an association between profitability and EDQ.

Likewise, the coefficient of multinationalism and EDQ ($\beta = 0.042$, $p < 0.01$) show a significant positive association. The result means that companies operating in local and international markets release higher environmental disclosure quality information than those operating in only local markets. Thus, the study accepts hypothesis (H_6) predicted in Table 3, which expects a significant positive association between multinationalism and EDQ.

The study finds a significant positive association between industry type and EDQ ($\beta = 0.059$, $p < 0.01$). Thus, the study accepts the expected hypothesis (H_8) in Table 3, which expects a significant positive association between industry type and EDQ. It means that companies whose activity has a negative impact on the environment release more environmental disclosure quality than those with low environmental impact.

However, the study finds a significant negative association between gearing and EDQ ($\beta = -0.053$, $p < 0.10$). This result indicates that highly geared companies release low-quality environmental information. Thus, the study accepts the stated hypothesis (H_4) in Table 3, which expects an association between gearing and EDQ.

Conversely, the result shows no association between age and EDQ ($\beta = 0.000$, $p > 0.10$). This result means that age is not a factor that increases or decreases

⁷ The study removes the weight and re-run the OLS and stepwise regression. The results of the firm's characteristics variables are similar.

EDQ amongst Nigerian listed companies. Thus, the study fails to accept the second hypothesis (H_2) stated in Table 3, which predicted an association between age and EDQ.

In the same line, the study finds no association between liquidity and EDQ ($\beta = -.003$, $p > 0.10$). This result reveals that companies address EDQ to gain legitimacy without considering their liquidity status. Thus, the result did not accept hypothesis (H_5) in Table 3, which predicted an association between liquidity and EDQ.

Lastly, the result shows no association between Big4 auditing firms and ED ($\beta = -0.001$, $p > 0.10$). This might be due to the low disclosure of financial items of environmental information amongst listed companies or low variability of such disclosure, or both. Thus, the current study did not accept the hypothesis (H_6) that predicted an association between the big4 auditing firms and EDQ stated in Table 3.

6.3.5 Testing OLS assumption

A review of previous literature shows that avoiding a minimum level of multicollinearity is challenging due to the nature of social science research (Tran, 2017; Gujarati and Porter, 2010). However, it is important as collinearity reduces the trustworthiness of the result (Gujarati and Porter, 2010). It may increase the standard error of the coefficients, limit R-square size and make it difficult to consider the importance of each predictor (Tran, 2017; Field, 2013). From Table 12, the variance inflation factor ranges from 1.032 to 1.451 which evidences the absence of a multicollinearity problem for EDQ. This is because the values are lower than ten, which is the most common yardstick, indicating a multicollinearity issue (Tran, 2017; Gujarati and Porter, 2010). The VIF values are below other thresholds of 2.5 (Allison, 1999) and 4.00 (Miles and Shevlin, 2011) set for multicollinearity problems. This is consistent with findings obtained earlier from the correlation matrix presented in Table 11, showing that the highest correlation between the variables is lower than 0.8 and 0.90, which is the yardstick for the multicollinearity problem (Tran, 2017; Field, 2013).

Secondly, the study checked the skewness/kurtosis statistics and conducted Kolmogorov-Smirnov and Shapiro-Wilk tests to check the normality of the residual. Table 12 shows that the P-value of the Shapiro-Wilk and Kolmogorov -

Smirnov test is not significant, indicating a normal distribution of residuals (Wooldridge, 2013). The standard skewness and kurtosis results for EDQ support the normal distribution of the residuals because their values are higher than two times the standard error (Wooldridge, 2013).

Thirdly, the study examines whether the regression analysis is subject to autocorrelation problems using the Durbin-Watson test (Tran, 2017; Ntim and Soobaroyen, 2013). The result of the Durbin-Watson from Table 12 shows that autocorrelation is not an issue for the current analysis of EDQ (Tran, 2017; Brooks, 2008). This is because the study compared the DW statistics with the critical values (Wooldridge, 2013; Brooks, 2008). The DW: $2.17 < 4 - d_{U,1\%}: 2.28$, provides hard evidence of no negative autocorrelation at a 1% significance level (Wooldridge, 2013; Brooks, 2008).

Lastly, the study conducted the Breusch-pagan test to examine whether the regression analysis satisfies the homoskedasticity assumption. The results ($p > 10\%$) from Table 12 show no significant heteroskedasticity issue (Wooldridge, 2013).

6.3.6 Discussion of findings

Table 12 shows a significant highly positive association between firm size (FZ) and EDQ, which is consistent with findings from prior studies (e.g., Gerged, 2021; Marwa, Salhi and Jarboui, 2020; Nguyen et al., 2017; Bhattacharyya, 2016; Fatima, Abdullah and Sulaiman, 2015). It indicates that large Nigerian listed companies can afford human and financial resources to produce higher quality of environmental disclosure. Large companies have different stakeholders who are interested in the quality of various types of information beyond the minimum requirement (stakeholder theory). Large companies attract more public attention and social pressure; hence they release higher quality environmental disclosure to maintain their legitimacy (legitimacy theory). Larger companies experience greater information asymmetry problems; hence, they use corporate environmental disclosure quality to mitigate agency costs (agency theory). Lastly, large Nigerian firms release higher quality environmental information to signal their environmental responsibility (signalling theory).

Table 12 shows a significant highly positive association between profitability (ROA) and EDQ. It indicates that profitable Nigerian listed companies release better EDQ,

supporting predictions based on stakeholder, legitimacy, agency, resource dependency and signalling theories. According to stakeholder theory, highly profitable companies release more EDQ to meet the needs of those stakeholders interested in environmental commitment (Nguyen et al., 2017). In line with legitimacy theory, highly profitable companies release more EDQ because they face higher public pressure and more attention (Haniffa and Cooke, 2005). In addition, to justify their compensation package, show their good performance, and earn a good reputation, managers of profitable companies release higher quality voluntary environmental disclosure according to agency theory (Barako, 2007). According to resource dependency theory, profitable companies release high EDQ to attract investors interested in companies that have good environmental rewards (Fatima, Abdullah and Sulaiman, 2015). One of the interesting findings is that profitability ($\beta = 0.208$) is the main driver of EDQ, which supports signalling theory prediction. According to signalling theory, profitable companies release high EDQ to signal how they use part of their profit for environmental commitment (Fatima, Abdullah and Sulaiman, 2015). The result is consistent with findings from previous studies, which document a significant positive association between profitability and EDQ (Chand et al., 2022; Gerwing Kajüter and Wirth, 2022; Nguyen et al., 2017), indicating that profitable companies use part of their profit to fund the cost of environmental activities.

Table 12 indicates a significantly positive association between multinationalism and EDQ, which aligns with findings from prior studies (e.g., Dyduch and Krasodomska, 2017; Reverte, 2009). Nigerian listed multinational companies differentiate themselves from local ones using foreign disclosure pattern which includes environmental disclosure quality. The findings support stakeholder theory, where companies dealing with various stakeholders from different regions release higher quality environmental information voluntarily to meet the information needs of both local and foreign stakeholders. Consistent with the prediction from agency theory, multinational companies release higher quality environmental disclosure to reduce agency costs between external providers of funds and the management. Multinational companies face pressure from multiple countries; hence, they release higher quality environmental disclosure to repair, maintain or gain legitimacy, according to legitimacy theory.

Table 12 presents a highly significant positive association between industry type and EDQ, which is consistent with results from prior studies (e.g., Alkayed and Omar, 2022; Boshnak, 2021; Marwa, Salhi and Jarboui, 2020; D'Amico et al., 2016). This result indicates that Nigerian-listed environmentally sensitive companies release higher quality environmental information compared to their counterparts. Consistent with predictions based on stakeholder theory, environmentally sensitive industries reveal higher quality environmental disclosure to meet information needs of different stakeholders. Legitimacy theory explains that public pressure varies according to the type of business activity. Companies from environmentally sensitive industries attract more public attention and higher pressure due to the adverse effect of their operations on the environment. Hence, these companies release higher-quality environmental information to legitimise their activities and avoid extra public and political pressure. Signalling theory explains that sensitive environmental companies release higher quality environmental information to signal their environmental performance.

Consistent with previous studies (e.g., Agyemang et al., 2020; Nguyen et al., 2017 D'Amico, et al., 2016; Brammer and Pavelin, 2008), Table 12 shows a significant negative association between gearing (GER) and EDQ. The finding supports the prediction of signalling theory that high-leverage firms focus on paying their debt and interest, which makes them have minimum extra resources to spend on environmental matters. Based on that, they release low environmental information because it does not show a good signal of their environmental activities. This result is not surprising in the Nigerian context since companies depend on borrowing from financial institutions for funding purposes. Lenders can access any information they need directly from the borrowing company; higher gearing does not motivate environmental disclosure. Barnea and Rubin (2010) argue that highly geared firms are more focused on debt repayment and have minimal extra resources to invest in environmental activities, which makes them release low environmental information.

Table 12 shows no association between each of firm age (Age) and liquidity (LIQ) with EDQ consistent with results from prior studies (e.g., Aboagye-Otchere, Simpson and Kusi, 2020; Khalid, Kouhy and Hassan, 2017; Welbeck et al., 2017; Wuttichindanon, 2017; Bhattacharyya, 2016) which indicates that listed

companies on the Nigerian stock exchange release EDQ regardless of their age or liquidity status, consistent with legitimacy theory.

Finally, consistent with results from prior studies, Table 12 shows no association between Big4 and EDQ (e.g., Welbeck et al., 2017; Bhattacharyya, 2016 Alsaeed, 2006) but in contrast to predictions based on stakeholder, legitimacy and agency theories. This might be due to the low disclosure of financial items of environmental information amongst listed companies or low variability of such disclosure or both.

The adjusted R-squared of 0.50 in Table 12 indicates that the model explains 50% of variations in environmental disclosure quality amongst the Nigerian listed companies comparable to that obtained in prior studies: 0.48 in Welbeck et al. (2017); 0.44 in Khalid, Kouhy and Hassan, (2017); 0.51 in Nguyen et al. (2017) 0.51.

For robustness check, the study reruns the analysis using stepwise regression to remove the variables that are not statistically significant in explaining EDQ. For the significant level and impact of impact variables, the results are similar to the original outcome. Table 12 shows a significant positive association between four explanatory variables: firm size, profitability, multinationalism, and industry type with EDQ. However, it removes firm age, gearing, liquidity and Big4 firms, as each of them has no significant association. The stepwise regression result shows that removing the insignificant variables has improved the adjusted R-squared.

The study also checks the interconnection between multinationalism and leverage to see whether multinational firms release higher EDQ despite their leverage status. This is because multinational firms operating in different geographical locations might have different reporting standards to comply with. Additionally, multinational firms attract high political, environmental, and social pressure from societies at home and abroad.

This study checks the interconnection between age and industry type to see whether older environmentally sensitive industries release high EDQ. This is because of high-pressure levels due to long periods of polluting the environment. The result in Table 13 below shows that there is no interconnection between multinationalism and leverage and between industry type and firm age.

Table 13: OLS Regression to check for interconnection.

INDEPENDENT VARIABLES	Expe cted sign	Coeff	Tolerance	VIF
Constant		-0.595***		
Size	+	0.030***	0.681	1.469
Age	+/-	0.001	0.292	3.421
ROA	+/-	0.209***	0.875	1.143
GER	+/-	-0.012	0.443	2.257
Liquidity	+/-	0.000	0.773	1.293
Multi-nationality	+	0.098***	0.145	6.876
Big-4	+	-0.001	0.735	1.361
Industry type	+	0.061	0.852	1.174
Gearing and Multi		-0.072	0.263	3.804
Industry and Age		-0.001	0.123	8.161
R-Squared			0.532	
Adjusted R- Square			0.498	
Standard error of estimates			0.089	
F Statistics			15.462	
Significance level			0.000	
Durbin Watson			2.175	

This table shows the OLS regression between the firm characteristics and EDQ to check for interconnection. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 level, respectively. Variable definition and measurement are provided in Table 6.

6.4 identifying and examining the association between board characteristics and EDQ for listed Nigerian companies.

This section examines the association between board characteristics and EDQ to achieve the third objective.

6.4.1 Descriptive statistics

Table 14 below presents the descriptive statistics of board characteristics variables for listed Nigerian companies.

Table 14: Descriptive statistics of board characteristics variables

Variable	Mean	Median	Maximum	Minimum	Skewness	Kurtosis
BS	9.395	9.00	20.000	4.000	0.830	0.515
CEO	0.027	0.000	1.000	0.000	5.872	32.928
BI	0.580	0.571	0.900	0.250	0.477	1.368
BM	5.422	5.000	8.000	3.000	0.550	3.312
BE	0.216	0.000	1.000	0.000	1.370	0.411
GD	0.126	0.125	0.333	0.000	0.283	-0.393
FM	0.721	1.000	1.000	0.000	-0.996	-1.022

This table shows the descriptive statistics for board characteristics. Variable definition and measurement are provided in Table 6.

Source: Developed by the researcher.

Table 14 shows that, on average, more than half (58%) of the board members of listed companies are non-executive directors (BI). The average board size (BZ) is 9 members; however, four companies, representing 0.03% of the sample, have a minimum of 4 members, which does not adhere to the minimum number of 5 required by the 2011 code of governance, but it is in line with the 2018 revised code of corporate governance which did not specify a minimum number of board size.

Although the average number of board meetings (BM) is 5 times a year, which is higher than the minimum required of 4 by the 2011 code, the board members for one company, representing 0.001% of the sample size, met only three times in 2017. Also, most listed companies (72%) have foreign members (FM) on their boards. 13% of members of the board for the average company in the research sample are women (GD), while 22% of the members are serving in other boards (BE). Only 3% of the firms have CEO duality (CEO).

6.4.2 Correlation analysis

Table 15 shows the correlations between the variables using Pearson correlation test.

Table 15: Pearson Correlation test on the association between board characteristics and EDQ

	EDQ	BZ	CEO	BI	BM	BE	GD	FM	FZ	ROA	MN	IND
EDQ	1.000											
BZ	0.484***	1.000										
CEO	-0.101	-0.033	1.000									
BI	0.085	-0.049	-0.050	1.000								
BM	0.175**	0.075	-0.046	0.100	1.000							
BE	0.346***	0.225***	0.159*	-0.068	0.021	1.000						
GD	-0.019	0.036	-	-0.164**	0.168**	-0.077	1.000					
			0.196**									
FM	0.146*	-0.041	0.104	-0.157*	-0.138*	0.050	-0.110	1.000				
FZ	0.603***	0.652***	-0.046	-0.050	0.170**	0.199**	0.089	0.148*	1.000			
ROA	0.425***	0.218***	-0.037	0.013	0.146*	0.067	0.002	-	0.306***	1.000		
								0.020				
MN	0.308***	0.239***	-0.013	-0.094	0.058	0.099	0.110	-	0.299***	-0.014	1.000	
								0.029				
IND	0.104	-0.226***	0.157	-0.095	-0.367***	0.129	-0.195**	0.084	-0.202**	-0.089	-0.052	1.000

This table shows the Pearson correlation test for EDQ, board characteristics and control variables included in this study. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 levels, respectively. Variable definition and measurement are provided in Table 6.

Source: Developed by the researcher.

In line with the hypotheses prediction, in Table 3, the correlation result shows EDQ increases due to a higher number of experienced and foreign members on the board. This is because directors serving on more than one board are experienced with strategies and procedures on environmental reporting policies of different boards they serve. Foreign members have various perceptions and innovations that support releasing higher environmental information quality (Alshareef and Sandhu, 2015).

The correlation result shows larger boards and frequent board meetings are associated with increasing EDQ, contradicting predicted hypotheses in Table 3. Companies with large board member are mostly large which public expects more environmental accountability because of their operations (Victor-Chiedu and Fodio, 2012). Frequent board meetings increase prompt, significant and critical environmental decisions on environmental problems, which increases the release of environmental information quality (Kumari et al., 2022).

In contrast, the correlation result shows that a board dominated by non-executive directors, CEO duality, or women does not increase or decrease, releasing higher EDQ supporting hypotheses prediction in chapter Table 3. In terms of CEO duality, this can be when the CEO and Chairmen have personal relationships, such as friends or family members, that one decision can influence another and can change the CEO and Chairman position to mere ceremonial (Khan et al., 2013). Regarding non-executive directors, influences can theoretically affect their professional judgement and independence (Raimo et al., 2022). In contrast, women on the board can be due to African culture, which mostly does not consider women's opinions in decision-making (Anazonwu et al., 2018).

The control variables correlation results in large, profitable firms and those operating in both local and international markets EDQ increases. In contrast, there is no difference in releasing EDQ on either environmentally sensitive or not firms. Section 6.3.2 explains the possible reasons.

These results are based on pair-wise correlations, disregarding the effects of other variables. A multi-regression analysis would provide a better picture of the association between board characteristics and EDQ. Chapter 8.3 explained the reason for the correlation between the variables.

6.4.3 Regression result

Table 16 below shows the regression analysis results of Eq.4. It covers both the ordinary and the stepwise least squares regressions.

Table 16: Regression analysis on the association between board characteristics and EDQ

Independent Variables	Expected sign	OLS REGRESSION			STEPWISE REGRESSION		
		Coeff	Tolerance	VIF	Coeff	Tolerance	VIF
Constant		-0.681***			-0.683***		
BZ	+/-	0.008***	0.522	1.916	0.008***	0.524	1.908
CEO Duality	-	-0.114***	0.918	1.090	-0.112***	0.943	1.060
BC	+/-	0.179***	0.907	1.103	0.182***	0.951	1.052
BM	+/-	0.033***	0.803	1.245	0.033***	0.812	1.231
BE	+/-	0.069***	0.880	1.137	0.069***	0.882	1.134
PWB	+/-	-0.021	0.861	1.161			
PFB	+/-	0.041***	0.866	1.154	0.041***	0.878	1.139
FZ	+	0.017***	0.470	2.129	0.017***	0.472	2.118
ROA	+	0.193***	0.879	1.138	0.193***	0.880	1.136
MN	+	0.044***	0.877	1.141	0.044***	0.881	1.136
IND	+	0.077***	0.764	1.309	0.077***	0.776	1.288
R-Squared		0.633			0.633		
Adjusted R-Square		0.603			0.606		
Standard error of estimates		0.079			0.079		
F Statistics		21.159			23.431		
Significance level		0.000			0.000		
Mean residual error		0.000			0.000		
Durbin Watson		2.212			2.214		
Skewness (Std error)		0.010 (.200)			0.006 (0.200)		
Kurtosis (std error)		0.048(0.397)			0.024(0.397)		
Kolmogorov-Smirnov (sig)		0.200*			0.200*		
Shapiro-Wilk (sig)		0.840			0.804		
Breusch-Pagan (sig)		0.222			0.227		

This table shows the Pearson correlation test for EDQ, board characteristics and control variables included in this study. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 levels, respectively. Variable definition and measurement are provided in Table 6.

Source: Developed by the researcher

Focusing on the results from the ordinary least squares (OLS) regression, Table 16 shows a significant positive association between board size (BZ) ($\beta = 0.008$, $p < 0.01$) and EDQ. This result means that large boards release higher-quality environmental information. Therefore, the study accepts the non-directional hypothesis (H_9) stated in Table 3 that predicted an association between board size and EDQ.

The result finds a significant positive association between board independence and EDQ ($\beta = 0.0235$, $p < 0.01$). Therefore, the study accepts non-directional hypothesis (H_{11}), stated in Table 3, which predicted an association between board independence and EDQ. This result means that a higher number of non-executive directors on the board increases release of higher quality environmental information.

The study found a significant positive association between the frequency of board meetings and EDQ ($\beta = 0.033$, $p < 0.01$). This means that more frequent board meetings increase the quality of environmental information. Based on that, the study accepts hypothesis (H_{12}), stated in Table 3 which predicted an association between board meetings and EDQ.

Similarly, the result also finds a significant positive association between cross-directorship and EDQ ($\beta = 0.069$, $p < 0.01$). This means that more experienced directors sitting on the board increase the release of EDQ. Consequently, the study accepts the predicted hypothesis (H_{13}) of a significant positive association between cross-directorship and EDQ stated in Table 3.

The study finds a significant positive association between the presence of foreign members on the board and EDQ ($\beta = 0.041$, $p < 0.01$). This means that a higher number of foreign members on the board increases the release of EDQ. Thus, the study accepts the predicted hypothesis (H_{15}) stated in Table 3 of a significant positive association between cross-directorship and EDQ.

However, the study found a significant negative association between CEO duality (CEO) and EDQ ($\beta = -0.114$, $p < 0.01$). This means that when one person occupies the position of both CEO and Chairman, reduce the release of EDQ. Therefore, the study accepted the tenth hypothesis (H_{10}) stated in Table 3 that predicted a significant negative association between CEO duality and EDQ.

Conversely, the result also finds no association between the presence of women on the board (GD) and EDQ ($\beta = -0.021$, $p > 0.10$). This implies that a higher or lower number of female directors on the board has no association with increasing or decreasing EDQ. Therefore, the study failed to accept the fourteen hypotheses (H_{14}) stated in Table 3 that predicted an association between gender diversity and EDQ.

6.4.4 Testing OLS regression assumptions

The study conducted further analysis to meet the OLS assumption: multicollinearity, normality, linearity and homoscedasticity.

One of the assumptions of the OLS is perfect multicollinearity because multicollinearity might increase the coefficient of standard errors, reduce R-squared size, and make it difficult to evaluate individual predictor importance (Tran, 2017; Field, 2013). However, perfect multicollinearity is inevitable because of the nature of economic data (Tran, 2017; Gujarati and Porter, 2010). Table 16 reports each independent and control variable's variance inflation factor (VIF) ranges between 1.103- 2.129. The result shows the absence of multi-collinearity because a VIF value of 10 is the most common threshold used to indicate a significant multi-collinearity problem (Tran, 2017; Gujarati and Porter, 2010). Similarly, the VIF values are below the threshold of 4 (Miles and Shevlin, 2011) and 2.5 (Allison, 1999), which are all lower than 10 set by other scholars, indicating multicollinearity issues. The Pearson correlation from Table 15 result is less than 0.90 or 0.80, indicating multi-collinearity amongst the variables is not an issue (Tran, 2017; Field, 2013), confirming the absence of multi-collinearity.

To check for outliers, the standard skewness and kurtosis statistics values are less than two times the standard error, which indicates the normality of residuals (Wooldridge, 2013). Additionally, the P-value of Kolmogorov-Smirnov and Shapiro-Wilk test from Table 16 were not significant, which indicates that outliers do not form a severe issue for the current analysis (Wooldridge, 2013).

The study conducted a Durbin-Waston test to see whether the analysis is subject to autocorrelation in line with previous studies (Tran, 2017; Ntim and Soobaroyen, 2013). The Durbin-Waston test value from Table 16, autocorrelation is not an issue. This is because the study compared the DW statistics with the critical values (Wooldridge, 2013; Brooks, 2008). The DW: $2.21 < 4 - d_{U,1\%}: 2.22$, provide hard

evidence that there is no negative autocorrelation at 1% significance level (Wooldridge, 2013; Brooks, 2008).

Lastly, the study conducted the Breusch-pagan test to examine whether the regression analysis satisfies the homoskedasticity assumption. The results ($p > 10\%$) from Table 16 show no significant heteroskedasticity issue (Wooldridge, 2013).

6.4.5 Discussion of findings

Table 16 shows a significant highly positive association between board size (BZ) and EDQ consistent with findings from prior studies (e.g., Alkayed and Omar, 2022; Kumari et al., 2022; Gerged, 2021; Agyemang et al., 2020; Alotaibi, 2016; Tireksani and Djajadikerta, 2016). Companies with large boards are mostly larger companies for which the public expects higher environmental accountability (Victor Chiedu and Fodio, 2012). This result conforms with predictions based on legitimacy theory that a board with many directors could include directors interested in improving companies' reputation, such as environmental reputation, so they ensure that company respond to environmental pressure for a better reputation and image (Ntim and Soobaroyen, 2013). This result is consistent with a prediction based on stakeholder theory that larger boards will likely represent broader groups of stakeholders who are interested in environmental attention, disclosure, and policies (Halme and Huse, 1997). This result is consistent with predictions based on resource dependency theory that larger boards are more likely to have members with different knowledge, skills, and experience (Chouaibil, Miladi and Elouni, 2022), which bring additional human resources that provide various insights on how to reduces environmental risk (Ellili, 2023). This result aligns with the agency theory's prediction that a large board reduces the director's workload, enhancing monitoring management activities (Kaymak and Bektas, 2017).

Table 16 shows a significant highly positive association between board independence (BI) and EDQ consistent with results from prior studies (e.g., Alkayed and Omar, 2022; Chouaibi, Miladi and Elouni, 2022; Gerged, 2021; Agyemang et al., 2020; San-Ong, 2019). Non-executives' directors improve the comprehensiveness of disclosure quality, including EDQ (Leung and Horwitz, 2004). The results support both the 2011 and 2018 codes of Nigerian corporate governance, which show that non-executive directors should form most board

members. The result supports prediction based on legitimacy, stakeholder, agency, and resource dependency theories. In line with legitimacy theory, non-executive directors are more concerned about how company achieve credibility, including environmental credibility. They inspire a company to release environmental disclosure to respond to environmental pressure (Alkayed and Omar, 2022). According to stakeholder theory, non-executive directors are more likely to consider and protect financial and non-financial interests of various stakeholders compared to executive directors (Bowrin, 2013; Gul and Leung, 2004). Based on agency theory, non-executive directors improve more effective monitoring activities, which increase release of different types of information, including environmental information, to address agency conflict (Bowrin, 2013). According to resource dependency theory, non-executive directors use their environmental knowledge and experience to motivate companies to address their environmental impacts and release environmental information (Johnson, Daily and Ellstr, 1996).

A significant highly positive association between board meetings (BM) and EDQ is also reported in Table 16, consistent with results from prior studies (e.g., Alkayed and Omar, 2022; Kumari et al., 2022; Agyemang et al., 2020; Abu-Raya, 2012). The result supports both the 2011 and 2018 codes of Nigerian corporate governance that encourage regular board meetings to monitor and evaluate performance. The reason is that regular board meetings are a significant indicator of board operations and activity that discuss critical issues such as environmental activities (Kumari et al., 2022). Frequent board meetings show strong corporate governance, which encourages higher transparency (Naseem et al., 2017). Frequent board meetings might help consider environmental reputation for long-term sustainability (legitimacy theory) and address stakeholders' environmental interests and expectations (stakeholder theory). Regular board meetings are an effective tool that decreases agency conflict of interest and information asymmetry, improving decision-making and better flow of information, including EDQ (Agency theory). Frequent board meetings facilitate more chances to present board skills, knowledge, and expertise to improve environmental performance (Wincent, Anokhin and Örtqvist, 2010) and attract risk-averse investors (resource dependency theory). Frequent board meetings signal to focus on essential issues,

including effective board supervision that improves the richness of the disclosure, including environmental disclosure quality (signalling theory).

Table 16 shows a significant and highly positive association between board experience (BE) and EDQ consistent with results from prior studies (e.g., Abu-Raya, 2012; Rupley, Brown and Marshall, 2012; Haniffa and Cooke 2005; 2002). This is because of their experience with environmental reporting policies and practices at the various boards they serve. This might also show that directors serving on more than one board perform their duties effectively without obstruction in line with the recommendations of both the 2011 and 2018 codes of corporate governance in Nigeria. This finding also conforms with theoretical expectations from legitimacy, stakeholder, agency, resource dependency and signalling theories. According to legitimacy theory, experienced directors can influence corporation's disclosure policies and practices as a strategy for obtaining legitimacy (Haniffa and Cook 2005). Stakeholder theory explains that directors serving on more than one board have more experience dealing with environmental responsibilities of different stakeholders. This includes releasing higher quality environmental information to supply evidence of their environmental responsibilities. In line with agency theory, directors who serve on more than one board have more experience and skills in lowering monitoring costs, such as releasing higher EDQ (Abu-Raya, 2012). According to resource dependency theory, experienced directors can use their technical skills to guide the management in different areas, such as releasing environmental information to attract risk-averse investors (Weir et al., 2002). Multiple directors support releasing higher quality environmental information to signal their experience and expertise of various boards they serve according to signalling theory (Rupely et al., 2012).

Consistent with earlier studies (e.g., Alkayed and Omar, 2022; Alkayed, 2018), Table 16 shows a significant highly positive association between presence of foreign members on the board (FM) and EDQ. This finding indicates that foreign directors with different backgrounds improve decision-making quality, which has an impact on environmental disclosure (Alkayed and Omar, 2022). The result conforms with predictions based on legitimacy, stakeholder, agency, resource dependency and signalling theories. According to legitimacy theory, foreign members have knowledge of various environmental laws that promote releasing

high-quality environmental information to legitimise business activities (Abdul-Fatteh, 2008). In line with stakeholder theory, foreign members use their foreign experience and knowledge to respond to stakeholders' needs for different types of disclosure, including environmental information (Ramaswamy and Li, 2001). According to agency theory, foreign members are more involved in reducing information asymmetry. Based on resource dependency theory, foreign directors show innovations, expertise, ideas, and experience that support higher quality environmental information to attract investors from international markets characterise with high accountability and transparency (Alkayed, 2018). Foreign members serving on board encourage the release of higher quality environmental information to signal their differences with other companies implementing similar disclosure patterns (Abdel-Fattah, 2008). The result supports the recommendations of both the 2011 and 2018 codes of corporate governance in Nigeria that promote diversity of membership across different countries. However, both codes are silent regarding the minimum and maximum number of foreign members on the board. While previous Nigerian studies found no association between the presence of foreign directors on the board and environmental disclosure quantity (Okere et al., 2021; Anazonwu, Egbunike and Gunardi, 2018), this study reports a significant highly positive association. This indicates that foreign members on the board focus on the quality of environmental disclosure rather than the quantity in line with the foreign disclosure pattern, which focuses on the richness of the disclosure. In addition, it demonstrates how the quality of disclosure differs from its quantity (Hassan and Matson, 2019).

Table 16 shows a significant highly negative association between CEO duality and EDQ consistent with results from prior studies (e.g., Nuskiya et al., 2021; Ismail and Latiff, 2019; Abu-Raya, 2012; Husted and De- Sousa-Filho, 2019) because CEO duality is less likely to be effective in monitoring the management, which affects the quality of environmental disclosure (Gul and Leung, 2004). This finding is in line with both the 2011 and 2018 codes of corporate governance that support separating these two positions to prevent power concentration, which affects checks and balances and promotes the withholding of information. This finding also conforms with predictions based on stakeholder and agency theories. According to stakeholder theory, duality gives power and autonomy to dominate the decision of disclosure of information. Agency theory explains that when one

person occupies the seat of CEO, the chairman of companies increases information asymmetry and weakens monitoring ability (Alotaibi, 2016).

Interestingly, although the proportion of women on the board ranges from zero to 33% (Table 14), which is quite significant (Husted and Sousa-Filho, 2019), the results in Table 16 show no association between gender diversity (GD) and EDQ (e.g., Alkayed and Omar, 2022; Kumari et al., 2022; Agyemang et al., 2020). This can be due to the African cultural viewpoint that do not give women's chance to contribute to decision making process including decision to release environmental disclosure (Anazonwu, et al., 2018). It is consistent with predictions based on resource dependency theory, which expects strategic environmental decisions to be guided by directors' skills, experience, and knowledge rather than their gender (Kilincarslan et al., 2020). This also conforms with both the 2011 and 2018 codes of corporate governance, which did not specify a minimum number of female directors on board, although the codes promote gender diversity of membership.

Table 16 shows significant positive associations between each of the firm size, profitability, multinationalism, and industry type with EDQ consistent with prior studies(Chand, et al., 2022; Gerwing Kajüter and Wirth, 2022; Gerged, 2021; Marwa, Salhi and Jarboui, 2020; Marwa, Salhi and Jarboui, 2020; Nguyen et al., 2017; Bhattacharyya, 2016; D'Amico, et al., 2016; Fatima, Abdullah and Sulaiman, 2015; Brammer and Pavelin 2008). This result indicates that larger, more profitable, multinational, and environmentally sensitive companies release higher quality environmental disclosure.

The adjusted R-squared of 0.633 in Table 16 means that the model explains 63% of changes in environmental disclosure quality amongst the Nigerian listed companies, similar to Alkayed and Omar (2022) 0.67 and Agyemang et al. (2020) 0.60.

Running the stepwise regression to remove the variables that are not statistically significant in explaining EDQ. Table 16 shows similar results to those obtained using OLS after dropping gender diversity (GD).

The study compares the stepwise regression between the control variables and controls with board characteristics variables to see whether incorporating board

characteristics variables has increased the adjusted R-squared. The result shows that board characteristics variables have increased the adjusted R-squared from 50%-61%. This shows that board characteristics variables are associated with the EDQ.

Wald test also shows that board characteristics variables have a significant association with EDQ increase. The P-value for the Wald test in Table 17 below for additional variables (board size, CEO duality, board independence, board meeting board experience) is lower than 5% significance, indicating the additional variables increase the overall fitness of the model. However, the P-value for the gender composition is above the 5% significance level, which indicates that gender diversity does not increase the fitness of the model.

Table 17:Wald test for board characteristics variables

Variables	P-Value
Board size (BZ)	0.0055
CEO Duality (CEO)	0.0073
Board composition (BC)	0.0035
Board meeting (BM)	0.0053
Board experience (BE)	0.0011
Gender Diversity (GD)	0.8050
Presence of foreign member on the board (FM)	0.0103

This table shows the Wald test for independent variables. Variable definition and measurement are provided in Table 6.

Source: Developed by the researcher.

The study examined the interaction terms between board size and each of board experience, gender diversity, and presence of foreign members on the board. The idea is to see if a larger board size may allow for more experienced and skilled directors and may promote diversity. Additionally, the study examines the interconnection between the presence of foreign members on the board and gender diversity. The reason is to check whether foreign female directors improve female participation in African countries' cultures that did not give women a chance to contribute (Anazonwu, Egbunike and Gunardi, 2018). The result in Table 18 shows that there is no interconnection between each of the variables examined.

Table 18: Interconnection between board characteristics variables

Independent Variables	Expected sign	Coeff	Tolerance	VIF
Constant		-0.670***		
BZ	+/-	0.006	0.083	12.051
CEO Duality	-	-0.121***	0.889	1.124
BC	+/-	0.179***	0.904	1.106
BM	+/-	0.032***	0.797	1.255
BE	+/-	0.107	0.086	11.672
PWB	+/-	-0.204	0.059	17.015
PFB	+/-	0.049	0.068	14.684
BZ and BE	+	-0.003	0.076	13.139
BZ and PFB	+	0.024	0.061	16.286
BZ and PWB	+	-0.000	0.053	18.747
PWB and PFB	+	-0.045	0.133	7.524
FZ	+	0.018***	0.466	2.144
ROA	+	0.188***	0.846	1.182
MN	+	0.045***	0.868	1.153
IND	+	0.077***	0.761	1.313
R-Squared			0.636	
Adjusted R- Square			0.594	
Standard error of estimates			0.800	
F Statistics			15.266	
Significance level			0.000	
Mean residual error			0.000	
Durbin Watson			2.233	
Skewness (Std error)			0.005 (.200)	
Kurtosis (std error)			0.120(0.397)	
Kolmogorov-Smirnov (sig)			0.200*	
Shapiro-Wilk (sig)			0.835	

This table shows the OLS regression between the board characteristics and EDQ to check for interconnection. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 level, respectively. Variable definition and measurement are provided in Table 6.

6.5 Assessing the association between ownership structure and EDQ.

This section assesses the association between ownership structure and EDQ to achieve the last objective.

6.5.1 Descriptive statistics

Table 19 below presents the descriptive statistics for ownership structure variables for listed Nigerian companies.

Table 19: Descriptive statistics of ownership structure variables

Independent Variables	Mean	Median	Maximum	Minimum	Skewness	Kurtosis
Institutional (IO)	0.429	0.443	0.970	0.000	-0.175	-1.331
Managerial (MO)	0.199	0.075	0.991	0.000	1.167	0.363
Blockholder (BO)	0.399	0.440	0.953	0.00	-0.082	-1.499

This table shows the descriptive statistics of ownership structure variables. Variable definition and measurement are provided in Table 6.

Source: Developed by the researcher.

The descriptive statistics show that institutional shareholding (IO) owns an average of 43% of the total share equity issued by Nigerian listed companies, ranging from 0-97%. This shows that other investors owned 47% of the remaining total equity shares of the companies. Additionally, the result shows that internal directors (MO) owned an average of 20% of the total equity shares of the companies. This means that outsiders own 80% of the issued share capital of companies listed on the Nigerian stock exchange. Furthermore, the descriptive statistics reveal that 40% of the shares are owned by few investors (BO). In contrast, 60% of the shares are spread across various investors. This means that ownership dispersion dominates Nigerian listed companies' ownership structure for 2017.

6.5.2 Correlation analysis

Table 20 shows the correlations between the variables using the Pearson correlation test.

Table 20: Pearson correlation on the association between ownership structure and EDQ

	EDQ	IO	MO	BO	FZ	ROA	MN	IND
EDQ	1.000							
IO	0.008	1.000						
MO	-0.235***	0.012	1.000					
BO	0.116	0.489***	0.054	1.000				
FZ	0.603***	0.141*	-0.165**	0.033	1.000			
ROA	0.425***	0.023	-0.023	0.110	0.306***	1.000		
MN	0.308***	0.070	-0.181**	0.065	.299***	-0.014	1.000	
IND	0.104	0.103	-0.008	0.059	-0.202**	-0.089	-0.052	1.000

This table shows the descriptive statistics of ownership structure variables. Variable definition and measurement are provided in Table 6.

Source: Developed by the researcher.

Contrary to the hypothesis prediction in Table 3, the correlation result shows no relationship between each of institutional and blockholder ownership with EDQ. This means a higher or lower proportion of institutional/blockholder ownership does not increase or decrease EDQ. This happens when institutional investors access information from those representing them on the board of directors (Abdel-Fattah, 2008). Also, with limited stakeholder engagement, institutional ownership participation and influences on corporate disclosure practices are reduced (Abu-Raya, 2012). In terms of ownership concentration, this happens only when the identity of blockholders (such as outsiders or insiders) affects the relationship between blockholder ownership and environmental disclosure (Abdel-Fattah, 2008).

It can be seen from Table 20 that there is a significant negative correlation between managerial ownership and EDQ, contradicting the predicted hypothesis in Table 3. This occurs when a managerial ownership decision focuses on short-term goals that reduce environmental investment intending to achieve short-term goals (Al Fadli et al., 2022).

Regarding the control variables, the correlation results in Table 20 show a significant positive relationship between each firm size, profitability and multinationality with EDQ, while industry type has no relationship with EDQ. The reason has been explained in section 6.3.2.

These results are based on pair-wise correlations, disregarding the effects of other variables. A multi-regression analysis would provide a better picture of the association between board characteristics and EDQ.

6.5.3 OLS regression result

Table 21 summarises the OLS regression results of the relationship between ownership structure and EDQ.

Table 21: OLS regression results on the association between ownership structure and EDQ

Independent Variables	Expected signs	OLS		
		Coeff	Tolerance	VIF
Constant		-0.534***		
IO	+/-	-0.072**	0.730	1.370
MO	+/-	-0.063**	0.947	1.056
BO	+/-	0.053**	0.741	1.350
FZ	+	0.029***	0.754	1.327
ROA	+	0.194***	0.876	1.142
MN	+	0.038***	0.876	1.142
IND	+	0.063***	0.939	1.065
R-Squared			0.548	
Adjusted R-Square			0.524	
Standard error of estimates			0.866	
F Statistics			24.056	
Significance level			0.000	
Durbin Watson			2.125	
Skewness (Std error)			0.180(0.200)	
Kurtosis (std error)			0.296(0.397)	
Kolmogorov-Smirnov (sig)			0.200	
Shapiro-Wilk (sig)			0.843	
Breusch-Pagan (sig)			0.648	

This table provides the OLS regression output for ownership structure controlling variables and EDQ. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 level, respectively. Variable definition and measurement are provided in Table 6.

The result provides evidence of a significant negative association between institutional ownership (IO) and EDQ with ($\beta = -0.072$, $p < 0.05$). It means that increases in institutional ownership decrease the quality of environmental disclosure amongst listed Nigerian companies. This study accepts the predicted non-directional hypothesis (H_{16}) that states an association between institutional ownership and EDQ in Table.

Also, the result finds a significant negative association between managerial ownership (MO) and EDQ ($\beta = 0.208$, $p < 0.05$). This finding shows that a higher proportion of managerial shareholding releases low-quality environmental information amongst Nigerian listed companies. Therefore, the study accepts the seventeen non-directional hypotheses (H_{17}) in Table 3 that predicted an association between managerial ownership and EDQ.

Lastly, the coefficient of blockholder ownership (BO) with EDQ ($\beta = 0.053$, $p < 0.05$) shows a significant positive association. The result means that companies with blockholder ownership release higher environmental information than those with dispersed ownership. Thus, the study accepts a non-directional hypothesis (H_{18}) in Table 3 that predicted no association between ownership concentration and EDQ.

6.5.4 Testing OLS regression assumption

The study further conducts multicollinearity, normality, autocorrelation and heteroscedasticity tests to determine whether the result meets the OLS assumption.

Table 21 reports the variance inflation factor (VIF) and tolerance value of both each independent and control variable ranges from 1.056 to 1.370. The values are all below ten, which is the most common yardstick, indicating the non-existence of a multicollinearity problem (Tran, 2017; Gujarati and Porter, 2010). The VIF values are below the strict requirement of 2.5 (Allison, 1999) and 4 (Miles and Shevlin, 2011) set by other researchers, indicating the model does not have multicollinearity problem. Table 20 verifies the absence of correlation as the Pearson correlation values are less than 0.8 (Tran, 2017; Field, 2013).

Regarding the normality assumption, statistics show that each variable does not need to be normally distributed. Based on that, skewness/kurtosis statistics and Kolmogorov-Smirnov, as well as Shapiro-Wilk tests, are used to check for outliers.

Table 21 shows a non-significance P-value for Shapiro-Wilk and Kolmogorov - Smirnov tests, indicating a normal distribution of residuals (Wooldridge, 2013). Standard skewness and kurtosis statistics also indicate the normal distribution of the residuals because their values are higher than two times of the standard error (Wooldridge, 2013).

Consistent with previous studies (Tran, 2017; Ntim and Soobaroyen, 2013), the study used the Durbin-Waston test to examine whether the regression analysis is subject to autocorrelation. The result for the Durbin-Waston test of EDQ in Table 21 shows an absence of autocorrelation and satisfies the linearity assumption. This is because the study compared the DW statistics with the critical values (Wooldridge, 2013; Brooks, 2008). The DW: $2.13 < 4 - d_{U,1\%}: 2.28$, shows that there is no negative autocorrelation at a 1% significance level (Wooldridge, 2013; Brooks, 2008). Lastly, the study conducted the Breusch-pagan test to examine whether regression analysis satisfies the heteroskedasticity assumption. Table 21 shows no significant relationship between the dependent variable and the error term, which means the model does not have a significant heteroskedasticity issue (Wooldridge, 2013).

6.5.5 Discussion of findings

It can be seen in Table 21 that there is a significant negative association between institutional ownership (IO) and EDQ consistent with prior studies (Gerged, 2021; Abu-Raya, 2012). This means that institutional investors invested in the Nigerian capital market can obtain the required information from alternative sources other than corporate disclosure. This result is consistent with prediction from agency theory. According to agency theory, institutional ownership assesses information internally, such as board meetings, rather than through public disclosure, resulting in a low demand for public disclosure (Al Fadli et al., 2022).

The study finds a significant negative association between managerial ownership (MO) and EDQ, consistent with the results from prior studies (Gerged, 2021; Tingbani et al., 2020). This indicates that managerial ownership of listed Nigerian companies can establish conditions conducive to their managerial entrenchment, thus neglecting to finance the cost of environmental disclosure. Companies with high managerial ownership may be less worried about managing legitimacy threats and public expectations and decide to release low environmental quality information, which increases the legitimacy gap (legitimacy theory). Additionally,

companies with a high proportion of managerial ownership structure make it difficult for external stakeholders to control management action and decision-making processes, including disclosure of environmental information (stakeholder theory). High managerial ownership gives management decision power to maximise their short-term financial goals, which can reduce environmental commitment and release low environmental quality information (agency theory).

Oppositely, Table 21 shows a significant positive association between blockholder ownership (BO) and EDQ (e.g., Gerwing Kajüter and Wirth, 2022; Lu, 2015; Oh, Chang, and Martynov, 2011). This means that, as developing countries such as Nigeria have weaker regulatory frameworks, blockholder ownership plays a vital role in ensuring better environmental disclosure to protect their investment from environmental damage and reputational risk. Agency theory supports a significant positive association between blockholder ownership and EDQ. According to agency theory blockholder ownership monitors management activities effectively and ensures management activities align with shareholders' interests, including releasing high-quality information based on efficient monitoring hypotheses (Juhmani, 2013). Thus, blockholders supervise management decisions to stick to good corporate governance practices which minimise information asymmetry problems.

The adjusted R-squared of 0.53 in Table 21 means that the model explains 52% of changes in environmental disclosure quality amongst the Nigerian listed companies.

The study compares the OLS and the stepwise regression between the control and control with ownership variables. The reason is to check whether adding ownership structure variables impacts EDQ for listed Nigerian companies. The adjusted R-Square for only control variable is 0.495, while that of control plus ownership structure variables is 0.52. Similarly, the stepwise adjusted R-Square for only control variables is 50%, while that of control plus governance variables is 53%. This shows that there is not much increase in the statistical significance. However, the coefficient of each variable shows that ownership structure variables have economic significance. This means that based on economic significance, adding ownership affects EDQ. This is confirmed by P-values for the Wald test in Table 22 below for additional variables (institutional ownership, managerial ownership and

block holder ownership), which is lower than 5% significance, indicating the additional variables increase the overall fitness of the model.

Table 22: Wald test

Independent variables	Significance level
Institutional ownership (IO)	0.011
Managerial ownership (MO)	0.047
Blockholder ownership (BO)	0.0438

This table shows the Wald test for independent variables. Variable definition and measurement are provided in Table 6.

6.6 Robustness check

After controlling firm characteristics variables, the study runs a Pearson correlation test to see the association between corporate governance (board characteristics and ownership) and EDQ. The aim is to check whether the result will be similar to previous results by considering separate analyses of board characteristics and ownership structure. Table 23 below shows the Pearson correlation result below

Table 23: Pearson Correlation on the association between corporate governance and EDQ

	EDQ	BZ	CEO	BI	BM	BE	GD	FM	IO	MO	BO	FZ	ROA	MN	IND
EDQ	1.000														
BZ	0.484 ***	1.000													
CEO	-0.101	-0.033	1.000												
BI	0.085	-0.049	-0.050	1.000											
BM	0.175 **	0.075	-0.046	0.100	1.000										
BE	0.346 ***	0.225 ***	0.159	-0.068	0.021	1.000									
GD	-0.019	0.036	-0.196**	-0.164**	0.168 **	-0.077	1.000								
FM	0.146 *	-0.041	0.104	-0.157	-0.138	0.050	-0.110	1.000							
IO	0.008	0.110	0.004	-0.016	-0.041	0.071	-0.097	-0.003	1.00 0						
MO	- 0.235 ***	-0.133	-0.052	-0.059	-0.082	0.023	0.200* *	0.018	0.01 2	1.0 00					
BO	0.116	0.126	0.055	-0.069	0.023	0.115	-0.025	0.014	0.48 9**	0.0 54	1.0 00				

FZ	0.603 ***	0.652 ***	-0.046	-0.050	0.170 **	0.199* *	0.089	0.148 *	0.14 1*	- 0.1 65*	0.0 33	1.0 00			
ROA	0.425 ***	0.218 ***	-0.037	0.013	0.146 *	0.067	0.002	-0.020	0.02 3	- 0.0 23	0.1 10	0.3 06*	1.0 00		
MN	0.308 ***	0.239 ***	-0.013	-0.094	0.058	0.099	0.110	-0.029	0.07 0	- 0.1 81*	0.0 65	0.2 99*	- 0.0 14	1.000	
IND	0.104	- 0.226 **	0.157*	-0.095	- 0.367 ***	0.129	- 0.195* *	0.084	0.10 3	- 0.0 08	0.0 59	- 0.2 02*	- 0.0 89	-0.052	1.00 0

This table shows the Pearson correlation test for all variables included in this study. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 level, respectively. Variable definition and measurement are provided in Table 6.

The Pearson correlation result shows that larger board size, higher proportion of experienced and foreign members on the board, and frequent board meetings increase EDQ. Contrary, CEO duality and a high proportion of managerial ownership decreases EDQ. While board independence, gender diversity, institutional ownership and blockholder ownership does not increase or decrease EDQ.

Regarding the control variables correlation result, EDQ increases large, profitable firms and those operating in both local and international markets. In contrast, there is no difference in releasing EDQ on either environmentally sensitive or not firms.

However, the Pearson correlation disregards the effects of other variables. Thus, the study conducted a multi-regression analysis to provide a better picture in Table 24 below:

Table 24: Regression result on the association between corporate governance and EDQ

Independent Variables	Expected	OLS Regression			Stepwise Regression		
		Coeff	Tolerance	VIF	Coeff	Tolerance	VIF
Constant		-0.659***			-0.679***		
BZ	+/-	0.007***	0.510	1.962	0.007***	0.511	1.956
CEO Duality	-	-0.122***	0.914	1.094	-0.122***	0.936	1.608
BI	+/-	0.178***	0.904	1.106	0.179***	0.942	1.062
BM	+/-	0.029***	0.791	1.264	0.029***	0.803	1.245
BE	+	0.072***	0.867	1.154	0.072***	0.871	1.148
GD	+/-	-0.002	0.804	1.243			
FM	+	0.039***	0.860	1.163	0.039***	0.874	1.145
INS	+/-	-0.067***	0.714	1.401	-0.067**	0.722	1.384
MGR	+/-	-0.062**	0.871	1.148	-0.062**	0.922	1.084
BLOCK	+/-	0.040*	0.710	1.408	0.040*	0.711	1.407
FZ	+	0.019***	0.444	2.251	0.019***	0.449	2.225
ROA	+	0.185***	0.861	1.161	0.185***	0.864	1.158
MN	+	0.039***	0.850	1.177	0.039***	0.859	1.164
IND	+	0.078***	0.752	1.331	0.078***	0.758	1.319

R-Squared	0.664	0.664
Adjusted R- Square	0.629	0.631
Standard error of estimates	0.077	0.763
F Statistics	18.651	20.238
Significance level	0.000	0.000
Durbin Watson	2.257	2.257
Skewness (Std error)	-0.060 (0.200)	-0.060 (0.200)
Kurtosis (std error)	0.257 (0.397)	0.256 (0.397)
Kolmogorov-Smirnov (sig)	0.200*	0.200*
Shapiro-Wilk (sig)	0.729	0.730
Breusch-Pagan (sig)	0.250	0.251

This table shows the OLS and Stepwise regression for all variables included in this study. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 level, respectively. Variable definitions and measurements are provided in Table 6.

It can be seen from Table 24 that each of board size, board independence, board meetings, board experience, presence of foreign members on the board, ownership concentration and all control variables have significant positive associations with EDQ. On the contrary, CEO duality, institutional ownership and managerial ownership have significant negative associations with EDQ. Lastly, the OLS regression shows that gender diversity has no association with EDQ. The result is similar to those discussed in sections 6.3.6, 6.4.5 and 6.5.5.

The stepwise regression in Table 24 shows similar results after dropping gender diversity. The stepwise regression considers ownership concentration at a 10% significance level. The study reruns another stepwise regression result based on a 5% significance level to see whether there are significant changes. Table 25 shows stepwise regression result below.

Table 25: Stepwise Regression (at 5% significance level)

Variables	Expected Sign	Stepwise regression		
		Coeff	Tolerance	VIF
Constant		-0.637***		
BZ	+/-	0.008***	1.915	0.522
CEO Duality	-	-0.119***	1.066	0.938
BI	+/-	0.173***	1.058	0.945
BM	+/-	0.030***	1.238	0.808
BE	+	0.074***	1.143	0.875
GD	+/-		-	-
FM	+	0.040***	1.141	0.877
INS	+/-	-0.046**	1.047	0.955
MGR	+/-	-0.059**	1.080	0.926
BLOCK	+/-		-	-
FZ	+	0.017***	2.157	0.464
ROA	+	0.193***	1.137	0.879
MN	+	0.041***	1.160	0.862
IND		0.079***	1.318	0.759
R-Squared			0.657	
Adjusted R- Square			0.626	
Standard error of estimates			0.077	
F Statistics			21.378	
Significance level			0.000	
Durbin Watson			2.246	
Skewness (Std error)			-0.060(0.200)	
Kurtosis (std error)			0.359(0.397)	
Kolmogorov-Smirnov (sig)			0.076	
Shapiro-Wilk (sig)			0.439	
Breusch-Pagan (sig)			0.144	

This table shows the Stepwise regression for all variables included in this study. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 level, respectively. Variable definitions and measurements are provided in Table 6.

The 5% significance stepwise regression result adjusted R-squared is 0.625 after dropping gender diversity and ownership concentration. This shows no difference in terms of adjusted R-squared for stepwise regression using 5% and 10 % significance levels.

6.7 Discussion of overall results and implications for the Nigerian capital market

An overall discussion of the results shows a final table with all independent variables in the three areas (firm characteristics, board characteristics, ownership) and the associations (with both expected signs and actual signs) underpinned by the relevant theories below:

Table 26: Summary of all regression results on the association between corporate governance and EDQ

Variable s	Expect ed signs	Actu al sign	Theories	OLS_ 1	STE_1	OLS-2	STE_2	OLS 3	STE_3	OLS_4	STE_4⁸	STE_5⁹
CONS				- 0.545* **	- 0.540* **	- 0.681* **	- 0.683* **	- 0.534* **	- 0.534* **	- 0.659* **	- 0.637* **	- 0.679* **
FZ	+	+	LT, SHT and AT	0.029* **	0.029* **	0.017* **	0.017* **	0.029* **	0.029* **	0.019* **	0.017* **	0.019* **
AGE	+/-	No	LT	0.000								
ROA	+/-	+	LT, SHT, AT, ST and VDT	0.208* **	0.206* **	0.193* **	0.193* **	0.194* **	0.194* **	0.185* **	0.193* **	0.185* **
GER	+/-	-	ST	- 0.053*								
LIQ	+/-	No	LT	-0.003								
MN	+	+	LT, ST and AT	0.042* **	0.043* **	0.044* **	0.044* **	0.038* **	0.038* **	0.039* **	0.041* **	0.039* **
BIG4	+/-	No		-0.001								
IND	+/-	+	LT, SHT and ST	0.059* **	0.061* **	0.077* **	0.077* **	0.063* **	0.063* **	0.078* **	0.079* **	0.078* **
BZ	+/-	+	LT, SHT And RDT			0.008* **	0.008* **			0.007* **	0.008* **	0.007* **
CEO	-	-	SHT and AT			- 0.114* **	- 0.112* **			- 0.122* **	- 0.119* **	- 0.122* **

⁸ Stepwise regression at 5% significance level⁹ Stepwise regression at 10% significance level

Variable s	Expect ed signs	Actu al sign	Theories	OLS_ 1	STE_1	OLS-2	STE_2	OLS 3	STE_3	OLS_4	STE_4 ₁₀	STE_4 ₁₁
BI	+/-	+	LT, SHT and RDT			0.179* **	0.182* **			0.178* **	0.173* **	0.179* **
BM	+/-	+	LT, SHT, AT, ST RDT			0.033* **	0.033* **			0.029* *	0.030* **	0.029* **
BE	+	+	LT, SHT, ST and RDT			0.069* **	0.069* **			0.072* **	0.074* **	0.072* **
GD	+/-	No	RDT			-0.021				-0.002		
FM	+	+	LT, SHT, AT, ST and RDT			0.041* **	0.041* **			0.039* *	0.040* **	0.039* **
INS	+/-	-	AT					- 0.072* *	- 0.072* *	- 0.067* **	- 0.046* *	- 0.067* **
MGR	+/-	-	LT, SHT and AT					- 0.063* *	- 0.063* *	- 0.062* *	- 0.059* *	- 0.062* *
BLOCK	+/-	+	AT					0.053* *	0.053* *	0.040*		0.040*
R-SQUARE				0.523	0.511	0.633	0.633	0.548	0.548	0.664	0.657	0.664
ADJUSTED R-Square				0.495	0.497	0.603	0.606	0.524	0.525	0.629	0.626	0.631

This table shows the summary of OLS and Stepwise regression for all variables included in this study. ***, **, * Correlation is significant at the 0.01, 0.05, and 0.10 levels, respectively. Variable definition and measurement are provided in Table 6.

¹⁰ Stepwise regression at 5% significance level

¹¹ Stepwise regression at 5% significance level

The findings show a highly significant positive association between firm size (FZ) and EDQ, which is in line with previous studies from developing countries (Nguyen et al., 2017; Fatima, Abdullah, & Sulaiman, 2015). From the legitimacy theory lens, large companies face higher public pressure and expectations on environmental issues compared to smaller ones. Large listed Nigerian companies release EDQ as evidence of their environmental commitment as environmental damages are major issues to manage their legitimacy. From stakeholder's viewpoint, large companies have various stakeholders' environmental activist, media shareholders that demand quality disclosure above the minimum requirement for transparency. Thus, large listed Nigerian companies release high environmental disclosure quality to address stakeholder's concern. From the agency theory, larger companies face higher information asymmetry problems between shareholders and managers. In the Nigerian listed market, larger firms release more detailed information, such as higher EDQ, to reduce agency conflict between shareholders and managers. Based on signalling theory, large firms release EDQ to signal their corporate sustainability commitment. Thus, large companies listed in Nigerian market release higher EDQ to send a positive signal of their environmental commitment as an approach of attracting international and local investors. The economic significance demonstrated that firm size ($\beta = 0.029$) is the least driver of EDQ amongst firm characteristics variables in the Nigerian market. The significant positive association demonstrated that larger companies listed on the Nigerian Stock Exchange could become role models in their territories, motivating smaller ones to improve EDQ and practice. For African and other developing countries, findings indicate that larger companies could lead environmental transparency practices, establishing a benchmark for smaller ones and motivating broader practices within the market. In developing countries where enforcement of environmental regulations is low, large companies can motivate voluntary compliance of higher international environmental standards within the stock market. Lastly, large companies can attract foreign investors by demonstrating their environmental commitment to increase their competitive advantage globally. In summary, the study's implications highlight the importance of supporting large companies' environmental sustainability as an approach to promote sustainable environmental development amongst Nigerian, African, and other developing markets.

In line with the prediction of legitimacy, stakeholder, agency, signalling and resource dependency theories, findings reveal a significant, highly positive association between profitability (ROA) and EDQ. Based on legitimacy theory, profitable companies face higher public pressure and attention. Thus, Profitable companies listed on the Nigerian capital market release higher EDQ to demonstrate environmental transparency and dedication, improving their legitimacy for long-term success. From the stakeholder's theory perspective, profitable companies have better opportunities to meet stakeholders' interests, such as environmental responsibilities. In Nigerian capital market, stakeholders such as environmental activists, investors and media are interested in environmental matters, especially from environmentally sensitive companies with high environmental risk, such as oil and gas, manufacturing and construction. Thus, profitable companies listed in the Nigerian capital market can set a standard for leading environmental transparency releasing detailed EDQ as a response to interested stakeholders. From the resource dependency theory angle, profitable firms use EDQ as a key that attract resources especially from investors that give prioritise to corporate social responsibility and sustainability (Fatima, Abdullah, and Sulaiman, 2015). Thus, profitable listed companies in the Nigerian capital market release higher EDQ to demonstrate environmental commitment to attract international investors and partners. The economic significance demonstrated that profitability ($\beta = 0.208$) is the major driver of EDQ in the Nigerian capital market amongst firm characteristics variables, supporting signalling theory. Profitable companies release higher EDQ to signal how they re-invested part of their profit in environmental sustainability (Fatima, Abdullah and Sulaiman, 2015). Profitable companies operating in the Nigerian capital market release higher EDQ to signal using a portion of their profit for environmental sustainability to improve competitive advantage in both global and local markets. Findings imply that profitability finance resources needed for companies listed in the Nigerian capital market to release detailed EDQ. This means highly profitable companies listed on the Nigerian Stock Exchange have more resources to invest on environmental sustainability and initiatives. In the context of other African and developing countries, findings demonstrate that profitability can be a vital tool of EDQ amongst similar markets. Profitable companies play an important role in improving environmental sustainability practices in developing countries where EDQ is developing. Profitable companies can serve as an example that leads and

motivates EDQ, setting a yardstick for other companies. Overall findings highlight the importance of encouraging profitable companies because of their contribution to higher EDQ amongst Nigerian, African and developing countries at large.

The study found a significant positive association between multinationalism and EDQ. In line with legitimacy theory, multinational companies face higher pressure to build and maintain legitimacy from the international and local countries they operate. Multinational companies listed in the Nigerian capital market release higher EDQ to demonstrate environmental commitment and reduce reputational risk. Multinational companies in the Nigerian Stock Market are strict about environmental standards from international and local markets to enhance their reputation and credibility. According to stakeholder theory, multinational companies release various disclosures to satisfy stakeholders' demands locally and abroad. This implies that multinational companies listed in the Nigerian capital market release higher EDQ to satisfy foreign and local stakeholders' expectations who require transparent and comprehensive environmental disclosure. From the agency theory perspective, multinational companies release higher EDQ to reduce agency costs between managers and shareholders, given the complexity of managing operations amongst various jurisdictions. This means that multinational companies listed in the Nigerian capital market release higher EDQ to reduce the information gap between management and external capital financiers. The economic significance demonstrated that multinationalism ($\beta = 0.042$) is the third major driver of EDQ in the Nigerian market. The finding is unsurprising considering the country's position as one of the global oil and gas industry players. Findings imply that multinational companies listed on the Nigerian Stock Exchange apply their presence globally by implementing higher EDQ practices. Thus, multinational companies' environmental practices can act as a yardstick for companies operating in the local market, increasing the overall standard of environmental disclosure within Nigeria. In the context of African and developing countries, the result implies that multinational companies can be leading examples in implementing higher environmental disclosure standards. Their practice can enhance local firms' ability to promote overall environmental accountability and transparency within the regions. This demonstrates that recognition of multinational sustainable business growth does not depend on regulatory requirements only. However, competitive advantages such as EDQ contribute to a global market of multinational

companies. This Implication can demonstrate how African and developing countries could influence multinational companies' presence to enhance EDQ practices and sustainability goals.

The findings of this study show a highly significant positive association between industry type and EDQ amongst listed Nigerian companies. This demonstrates that environmentally sensitive industries are aware of the need to improve their disclosure and maintain legitimacy by managing public expectations where their operation increases environmental issues. The finding is relevant, particularly in the Nigerian context, where environmental degradation causes major threats to economic sustainability and public health. The economic significance demonstrated that industry type ($\beta = 0.059$) is the second major driver of EDQ in the Nigerian market. This is not surprising as environmentally sensitive industries such as oil and gas, manufacturing, mining and agriculture adopt strong environmental disclosure practices to respond to pressures from stakeholders who demand higher environmental accountability. By doing so, environmentally sensitive industries can maintain legitimacy, promote competitive advantage and build strong relationships with major stakeholders. The findings have wider implications for Africa and other developing countries that have environmental issues similar to those in Nigeria. In many of these countries, environmentally sensitive industries such as oil and gas, mining, and manufacturing contribute significantly to environmental damage. The significant positive association between industry type and EDQ found in this study could indicate that environmentally sensitive industries can improve EDQ as an approach to navigating public scrutiny and stakeholder expectations. By doing so, environmentally sensitive industries can lead by example of setting high environmental transparency and promoting global environmental accountability. This could assist them in meeting their environmental sustainability, attracting investment, improving competitive advantage and overall corporate governance within the market in which they operate. In summary, the study's implications highlight the importance of supporting environmentally sensitive industries to promote sustainable environmental development in Nigerian, African, and other developing markets.

The findings reveal a significant negative association between gearing and EDQ amongst listed Nigerian companies, consistent with prior studies (e.g., Agyemang et al., 2020; Nguyen et al., 2017; D'Amico et al., 2016; Brammer and Pavelin, 2008). This demonstrates that Nigerian leverage-listed companies focus on paying debt above environmental initiatives, resulting in lower EDQ. This finding is unsurprising in the Nigerian context because companies depend mainly on debt financing. Based on that, highly leveraged Nigerian listed companies mainly pay interest and principal, thus assigning few resources for environmental sustainability. Another reason is that lenders can access required information internally, reducing pressure on public environmental disclosure. This can affect the perception of other stakeholders, reducing the trust of potential investors concerned about environmental sustainability practice stakeholders. The findings have significant implications for broader African and developing countries. Companies in these countries have financial challenges that affect their ability to invest in environmental sustainability, which can be the reason behind releasing lower EDQ. This issue affects the importance of combining financial strategies with environmental targets to attain sustainable business practices, especially in African and other developing countries with constrained financial sources. To address this, companies can explore flexible financing options that balance financial management and environmental sustainability.

In line with previous studies findings (e.g., Aboagye-Otchere, Simpson, and Kusi, 2020; Khalid, Kouhy, and Hassan, 2017; Welbeck et al., 2017; Wuttichindanon, 2017; Bhattacharyya, 2016) the result show no association between firm age and liquidity with EDQ. This means that listed companies in the Nigerian capital market release EDQ regardless of their age or liquidity position, supporting legitimacy theory. In the Nigerian context, the lack of association shows that EDQ is becoming important amongst companies of diverse ages and liquidity status. Therefore, age and liquidity are not essential players in determining EDQ amongst listed Nigerian companies. This can be attributed to the Nigerian listed companies identifying the long-term benefit of incorporating environmental practices into main business practices. By doing so, they can maintain legitimacy and earn stakeholders' trust. Finding's implications could extend to broader African and other developing countries. It shows determination to associate with international best practices irrespective of age or liquidity position to achieve standardised EDQ

practices. This will enhance legitimacy, improve corporate reputation and attract international investors.

Consistent with prior study's findings (e.g., Welbeck et al., 2017; Bhattacharyya, 2016; Alsaeed, 2006), findings show no association between Big4 audit firms and EDQ amongst Nigerian listed companies. This absence of association contradicts legitimacy, stakeholder and agency theories. In the Nigerian context, findings can be due to the low disclosure of financial items of environmental information amongst listed companies, the low variability of such disclosure, or both. Another reason is the lack of proper global audit standards implementation amongst the Nigerian listed companies, which constrains Big4 audit firms from rigorous audit environmental audits as environmental disclosure is voluntary in Nigeria is voluntary in Nigeria. In a broader context of African and developing countries, findings show that Big4 audit firms have a minimum role in encouraging high EDQ without robust environmental pressure and market demand. Thus, policymakers in these countries could offer incentives to improve EDQ practices of companies within their regions.

It is explained in the motivation and literature review section that better corporate governance (board characteristics and ownership structure) involves better disclosure, but what constitutes better corporate governance (board characteristics and ownership structure) is context dependent. Findings reveal a significant positive association between board size (BZ) and EDQ. Various theories support the significant positive association between board size and EDQ. According to legitimacy theory, companies associate their actions with societal norms and values to get legitimacy. Larger boards have more members who could be familiar with environmental reputation. This implies that larger boards in the Nigerian capital market motivate their companies to ensure they effectively respond to environmental expectations for environmental reputation. Stakeholder theory explains that larger boards may possibly represent larger stakeholder groups, including those interested in environmental transparency. This implies that large board members representing various stakeholders' interests strongly pay attention to EDQ in the Nigerian capital market, especially as the country suffers from environmental damage across various regions. From the agency theory perspective, larger boards monitor management activities effectively, reducing information asymmetry between shareholders and management. Based on that,

management of companies operating in the Nigerian capital market comprehensively releases more information, including EDQ, to address agency problems. In another insight, according to resource dependency theory, larger boards may provide various skills, ideas, experience and knowledge needed for environmentally responsible business. In the Nigerian capital market context, where practising corporate governance is evolving, board members use their different skills, knowledge and experience to solve environmental challenges and improve environmental practices of their companies. Thus, better corporate governance in the Nigerian capital market, which promotes higher EDQ, should have a large board size. The economic significance demonstrated that board size ($\beta = 0.008$) is the least driver of EDQ amongst board characteristics variables in the Nigerian market. The implication shows that larger boards of Nigerian listed companies attract higher public inspection, which makes them disclose higher EDQ to meet environmental expectations. Findings support Nigerian Corporate Governance Codes 2011 and 2018. The Nigerian Corporate Governance Codes of 2011 provide the importance of board size compared to the Corporate Governance Code of 2018. This is because the Corporate Governance Code 2011 recommends that board size should not be less than five members. However, the 2018 Code of Corporate Governance did not recommend a minimum number of board members. Both the 2011 and 2018 Codes of corporate governance did not identify a maximum number of board members. Findings have broader implications for other African countries as well. In these contexts, the size of corporate boards can be a crucial factor in driving environmental accountability and transparency. As these countries continue to develop their corporate governance frameworks, encouraging the formation of larger boards could be an effective strategy to improve EDQ practices. Findings have wider implications for other developing countries. In this regard, board size can be a driving factor of environmental transparency and accountability. Thus, to improve environmental quality transparency, corporate governance frameworks of developing countries can encourage large board size members.

Findings documented a significant positive association between board independence (BI) and EDQ supporting previous studies (e.g., Alkayed and Omar, 2022; Chouaibi, Miladi, and Elouni, 2022; Gerged, 2021; Agyemang et al., 2020; San-Ong, 2019). According to legitimacy theory, non-executive directors are more

familiar with public perception and benefits of maintaining a social licence. In the Nigerian capital market context, environmental damages such as gas flaring and industrial waste have significant environmental impacts. Non-executive directors urge comprehensive EDQ to improve legitimacy and credibility of their companies to avoid losing public trust. According to stakeholder theory, non-executive directors promote different stakeholder group concerns, including those interested in environmental sustainability. In the Nigerian capital market, stakeholders such as media, environmental activists, and international investors pay more attention to environmental performance. Based on that, non-executive director's presence on the board ensures meeting stakeholders' environmental concerns through comprehensive EDQ. According to agency theory, non-executive directors provide better effective management supervision, minimise information asymmetry problems and ensure comprehensive disclosure of information. In the Nigerian capital market, where investor protection is limited, non-executive directors' responsibilities are important in minimising agency conflict and improving transparency. This can assist Nigerian listed companies in building investors' trust needed for long-term sustainability. Considering resource dependency theory, non-executive directors use their environmental expertise to enhance environmental sustainability management. In the Nigerian capital market, which suffers from high environmental risk, expert environmentalist non-executive directors assist their companies in addressing environmental challenges and enhancing EDQ. This is important in developing countries with limited environmental experts, improving non-executive directors' roles. Therefore, better corporate governance in the Nigerian capital market, which promotes higher EDQ, should have higher number of non-executive directors on the board. The economic significance demonstrated that board independence ($\beta = 0.208$) is the major driver of EDQ amongst board characteristics variables in the Nigerian market. The economic significance of board independence and EDQ support Nigerian Corporate Governance Codes 2011 and 2018. The Nigerian Corporate Governance Codes of 2018 and 2011 recommended that non-executive directors should form a majority of board members. The codes further state that non-executive directors should not be associated with management, so they do not affect their independent judgment. This implies that non-executive directors demonstrate critical responsibilities in improving corporate transparency and accountability concerning EDQ. The significant positive association between board independence and EDQ

amongst Nigerian companies have a wider implication for African and developing countries' corporate governance. Board independence can be a strategic key improving the corporate governance framework for environmental transparency and accountability needed for sustainable development amongst African and other developing countries. By strengthening the role of non-executive directors, these countries can enhance corporate accountability, build stakeholder trust, and contribute to sustainable development goals.

Findings show a significant positive association between the frequency of board meetings (BM) and EDQ amongst listed Nigerian companies, consistent with findings of previous studies (e.g., Alkayed and Omar, 2022; Kumari et al., 2022; Agyemang et al., 2020; Abu-Raya, 2012). According to legitimacy theory, frequent board meetings are important in maintaining social licence. In Nigeria, listed companies, particularly environmentally sensitive ones, face higher scrutiny from society due to the negative environmental impact of their operation. Frequent board meetings can guarantee that companies address environmental challenges caused during operations. This boosts public trust and demonstrates environmental commitment for long-term sustainable practice. Based on stakeholder theory, frequent board meetings are vital for addressing various stakeholders' interests, including those interested in environmental accountability. In the Nigerian capital market context, stakeholders such as environmental activists, media, and international investors focus on companies' environmental accountability is increasing. Based on that, by frequent meetings, the board can certify that environmental concerns are addressed and communicated by releasing comprehensive EDQ to meet stakeholders' expectations. This is important in developing countries such as Nigeria, with increasing stakeholders' activism about environmental issues. In line with agency theory, frequent board meetings enhance oversight and transparency, which assists in minimising agency conflict between shareholders and management. In Nigeria, issues such as weak regulatory supervision coupled with low investor protection affect the implementation of an effective corporate governance framework (Adegbite 2015). Frequent board meetings are important tools to reduce information asymmetry and improve EDQ. This builds investors' trust and attracts foreign and local investors in the Nigerian capital market. Signalling theory supports the significant positive association between frequent board meetings and EDQ. The theory

explains that frequent board meetings strongly signal companies' dedication to solving critical issues such as environmental sustainability. In the Nigerian capital market context, frequent board meetings could be a positive signal of determination to address environmental risk and commitment to high quality environmental disclosure. This could attract risk-averse investors who consider environmental risk important for sustainable investment in the long term. Based on resource dependency theory, frequent board meetings allow directors to demonstrate their expertise, skills and knowledge to enhance environmental performance. In the Nigerian capital market, frequent board meetings allow directors to deliberate strategies that improve environmental methods and disclosure of their companies. Therefore, better corporate governance in the Nigerian capital market, which promotes higher EDQ, should frequently hold board meetings. The economic significance demonstrated that ($\beta = 0.033$) frequency of board meetings is the fifth driver of EDQ amongst board characteristics variables in the Nigerian capital market. The economic significance support recommendations of Nigerian Corporate Governance Codes 2011 and 2018. Both the 2011 and 2018 corporate governance codes recommend that board of directors should have at least one meeting per quarter to evaluate management performance. Both codes highlight the significance of frequent board meetings for efficient evaluation and monitoring of performance, such as environmental performance. In the Nigerian context, the significant positive association between the frequency of board meetings and EDQ implications shows the important responsibilities of effective board meetings in improving corporate accountability, particularly environmental accountability. Regular board meetings demonstrate a key to strong corporate governance practice, providing directors with a platform to deliberate and address significant issues such as environmental policies and disclosure quality. This is important, especially since the country faces high environmental challenges such as deforestation and pollution. A frequent board meeting confirms that environmental challenges are constantly on the agenda, leading to higher EDQ. Findings have broader implications for other African and developing countries. The significant positive association between frequent board meetings and EDQ shows that other African and developing countries can enhance their environmental accountability by increasing board meetings' frequency and efficiency. This is relevant, particularly in countries with critical environmental

issues, and effective governance can play an important role in enhancing sustainable development.

Consistent with previous studies, e.g., Abu-Raya, 2012; Rupley, Brown, and Marshall, 2012; Haniffa and Cooke, 2005; 2002). The result found a significant positive association between board experience (BE) and EDQ. The findings support the theoretical predictions of legitimacy, stakeholder agency, signalling, and resource dependency. Legitimacy theory explains that experienced directors influence environmental disclosure practices and policies to maintain legitimacy. This applies to the Nigerian capital market context, where companies are more often expected to explain their environmental responsibilities for societal acceptance. Stakeholder theory supports the idea that experienced directors on multiple boards are more equipped to meet environmental expectations of different stakeholders. In the Nigerian capital market, stakeholders' environmental demands are more pronounced. In line with that, the responsibilities of experienced directors on the board are critical in achieving environmental demands. According to agency theory, directors who serve on more than one board have higher skills and experience in discharging their responsibilities, which assists in minimising monitoring costs (Abu-Raya, 2012). This is important in the context of the Nigerian capital market, where directors' skills and experience are needed to lower monitoring costs, such as releasing higher EDQ. According to signalling theory, experienced directors support higher EDQ to signal their environmental expertise and experiences across various boards they serve (Rupley et al., 2012). This signalling role becomes more important in the Nigerian capital market, where corporate credibility and reputation are critical to gain investors' confidence. Resource dependency theory explains that experienced directors guide management in different areas, including releasing higher EDQ to attract risk-averse investors. This is particularly important in the Nigerian capital market, where environmental accountability attracts risk-averse investors' attention. Therefore, better corporate governance in the Nigerian capital market, which promotes higher EDQ, should have higher experienced directors on the board. The economic significance demonstrated that ($\beta = 0.069$) board experience is the third driver of EDQ amongst board characteristics variables in the Nigerian capital market. The economic significance supports the 2011 and 2018 corporate governance codes, which recommend having multiple

directorships but do not specify a maximum or minimum number. The result implies that directors on multiple boards perform their responsibilities effectively and understand environmental disclosure practices amongst different boards they serve. The findings broadly apply to corporate governance practices of other African and developing countries. The significant positive association shows that experienced board members play a significant role in improving environmental accountability.

The findings reveal a significant, highly positive association between the presence of foreign members on the board (FM) and EDQ amongst listed Nigerian companies, consistent with previous studies (e.g., Alkayed and Omar, 2022; Alkayed, 2018). Multi-theoretical theories such as legitimacy, stakeholder, agency, signalling and resource dependency theories support a significant positive association between presence of foreign members on the board and EDQ. In line with legitimacy theory, foreign directors are familiar with various international standards and guidelines that support companies to higher EDQ to maintain and sustain legitimacy (Abdul-Fatteh, 2008). In the Nigerian capital market, companies face environmental pressure from society. Foreign members use international guidance and standard familiarities that support higher EDQ to prevent reputational risk and maintain credibility needed to legitimise their business. From the stakeholder theory, foreign members use global international standards and guidelines familiarity to address the needs of various stakeholders, including those interested in comprehensive environmental disclosure (Ramaswamy and Li, 2001). This is important in the Nigerian capital market, where various stakeholders' demand for environmental transparency is growing. Agency theory explains that foreign directors have an important duty to reduce information asymmetry between shareholders and management, which enhances EDQ. In the Nigerian capital market context, where corporate governance is developing, foreign board members can bridge gaps in accountability and transparency, such as environmental transparency, promoting greater confidence amongst shareholders. Signalling theory explains that foreign members support releasing higher EDQ to different their companies with those disclosing low EDQ (Abdel-Fattah, 2008). In a globally competitive market, foreign directors of Nigerian listed companies signal their best practices internationally on environmental commitment, improving global competition. Based on resource

dependency theory, foreign directors bring ideas, innovations and expertise which improve higher EDQ. This EDQ is an important value that attracts international investors characterised by transparency and accountability (Alkayed, 2018). In the Nigerian capital market, foreign investment is important for economic growth. The improvement of environmental governance by foreign board members has become more important. Therefore, better corporate governance in the Nigerian capital market, which promotes higher EDQ, should have higher foreign directors on the board. The economic significance demonstrated that ($\beta = 0.041$) foreign members on board is the fourth driver of EDQ amongst board characteristics variables in the Nigerian capital market. This supports Nigerian Corporate Governance Codes 2011 and 2018 recommendations, which promote board membership diversity but silence on maximum and minimum numbers of foreign members on the board. This result implied that foreign directors from various backgrounds contribute to better decision-making that positively impacts EDQ practices. The implication of this finding extends to other African and developing countries' corporate governance practices. Foreign members' integration plays a significant role in improving environmental accountability practices. This is important, especially in other African and developing countries with high environmental challenges and increasing EDQ demand.

Consistent with previous studies, the result documented a significant negative association between CEO duality and EDQ for listed Nigerian companies. This means that when one person occupies both CEO and chairman positions, it results in lower EDQ. Agency theory explains that separating position between chairman and CEO minimises information asymmetry and agency cost problems. In the Nigerian capital market context, power concentration to one person may create an agency problem between shareholders and management. This could be because CEO defends their interest over accurate and comprehensive public disclosure, which lowers EDQ. According to the stakeholder theory, CEO duality gives CEO power to control decision-making, such as whether to release EDQ or not. In the Nigerian capital market context, the demand for environmental disclosure quality is crucial because of companies' damage to the Nigerian environment, such as deforestation and disposal of toxic waste. CEO duality could reduce stakeholders' capabilities to hold companies responsible for their environmental impact. Therefore, better corporate governance in the Nigerian

capital market, which promotes higher EDQ, should separate positions of CEO and chairman. The economic significance demonstrated that CEO duality ($\beta = -0.114$) is the second driver of EDQ amongst board characteristics variables in the Nigerian market. The findings have a significant implication in the Nigerian context. The implication provides reasons that support the separation of CEO and Chairman positions deliberations for effective corporate governance practices stated in the codes. Nigerian Corporate Governance Code 2011 and 2018 emphasise separating CEO and chairman positions to prevent power concentration, promote efficient checks and balances, and encourage corporate disclosure integrity, including EDQ. Based on that, the Nigerian Code of Corporate Governance 2018 could not have given a three-year window for CEO duality. The finding is relevant in broader settings for other African and developing countries. In most African and other developing countries, CEO duality leadership can result in poor oversight and negatively affect disclosure practices, including EDQ. Thus, findings from Nigerian studies can become a lesson for other African and developing countries to highlight demands for a comprehensive corporate governance framework to improve environmental disclosure quality.

Findings of this study documented no association between gender diversity (GD) and EDQ amongst listed Nigerian companies in line with previous studies (e.g., Alkayed and Omar, 2022; Kumari et al., 2022; Agyemang et al., 2020). The findings support the prediction of resource dependency theory. Resource dependency theory supports non-association between gender diversity and EDQ. The theory explains that directors' knowledge, experience and skills influence environmental disclosure decisions instead of gender (Kilincarslan et al., 2020). Human resources such as experience and expertise are more critical to decision-making more than gender diversity. Thus, gender diversity does not determine better corporate governance for EDQ within the Nigerian capital. The findings imply that women face cultural barriers that decrease their chances of getting leadership positions. Even with the 2011 and 2018 corporate governance codes supporting gender diversity, cultural practices restrict women's influence in decision-making, reducing the benefits of gender diversity. Therefore, promoting gender diversity only without addressing cultural barriers could not promote EDQ. This shows the need to advocate changes in cultural views to promote women's voices in the corporate sectors. The findings affect other African and developing

countries with similar structural and cultural challenges. In most African and developing countries, women have limited opportunities to context for leadership positions in corporate and social roles. Based on that, promoting only gender diversity could be insufficient to improve corporate practices such as EDQ. To address this issue, corporate leaders and policymakers could create a supporting environment that promotes active women's participation that impacts decision-making.

Findings show a significant negative association between institutional ownership and EDQ, aligning with prior studies' (Gerged, 2021; Abu-Raya, 2012). Agency theory supports the findings, explaining that institutional ownership obtains information directly through internal channels from management, reducing reliance on public disclosure (Al Fadli et al., 2022). Based on that, companies with higher institutional ownership could deprioritise EDQ, making it less attractive to investor relations. This applies to the Nigerian capital market, where institutional ownership could rely upon non-public alternative sources of information, such as communicating directly from management to access information directly. Thus, it reduces demand for EDQ amongst companies with higher institutional ownership. Thus, better corporate governance in the Nigerian capital market, which promotes higher EDQ, should have a lower institutional ownership structure proportion. The economic significance demonstrated that institutional ownership structure ($\beta = -0.063$) is the major driver of EDQ amongst ownership structure variables in the Nigerian market. This implied that higher institutional ownership depends on private internal information sources and gives little or no attention to public disclosure. Thus, other shareholders' demand for comprehensive disclosure, such as EDQ, would be neglected. This, in turn, affects the accountability and transparency of listed Nigerian companies. In the context of African and other developing countries, higher institutional ownership could discourage greater public disclosure, which affects comprehensive public disclosure, including EDQ. This is because institutional ownership has access to information internally.

Findings reveal a significant negative association between managerial ownership (MO) and EDQ amongst listed Nigerian companies, aligning with previous studies (Gerged, 2021; Tingbani et al., 2020). Legitimacy, stakeholder, and agency theories provide multiple reasons from different lenses for the significant association between managerial ownership and EDQ. Legitimacy theory explains

that companies aim to associate their activities based on expectations to obtain societal support and legitimacy. In the Nigerian capital market, managers with significant ownership abandon financing EDQ as it is non-essential and costly. This negligence reduces societal and environmental transparency, leading to a legitimacy gap that could increase reputational damage. Stakeholder theory explains that companies have a duty to address not only shareholders' interests but stakeholders' interests at large. High managerial ownership could result in excluding other stakeholders in the decision-making process, making it difficult to influence the actions of management, including EDQ. In the context of the Nigerian capital market, where environmental disclosure is voluntary, absence of external stakeholders' control could lower EDQ as managers may not be pressurised to release information which is not in line with their objectives. According to agency theory, high conflict of interest happens between shareholders and managers when managers patronise personal benefits. In this instance, managers holding significant ownership could prioritise short-term goals at the expense of long-term initiatives such as EDQ. This could lead to concentrating on short-term financial goals, which could result in avoiding environmental commitment, leading to low EDQ. In the Nigerian capital market context, characterised by undeveloped corporate governance structures, this agency problem worsened, resulting in poor EDQ practices compared to developed corporate governance structures (Adegbite, 2012; Jensen and Meckling, 1976). Thus, better corporate governance in the Nigerian capital market, which promotes higher EDQ, should have lower management ownership structure proportion. The economic significance demonstrated that managerial ownership structure ($\beta = -0.063$) is the second driver of EDQ in the Nigerian market amongst ownership structure variables. This negative significant association between managerial ownership and EDQ has significant implications in the Nigerian context. The findings show that high management ownership could result in a lower quality of environmental accountability and transparency. This can impact the reputation of companies and the ability to attract investors who consider environmental risk amongst their investment criteria decisions. The finding's implications are also important to other African and developing countries facing related corporate governance challenges. High managerial ownership focussing on short-term goals will reduce EDQ, which could not attract international investors in the global market characterised by accountability and transparency, such as higher quality environmental disclosure.

Thus, management in Nigerian, other African and developing countries should implement global environmental standards to improve their global competition to attract international investors.

Consistent with prior studies (Gerwing, Kajüter, and Wirth, 2022; Lu, 2015; Oh, Chang, and Martynov, 2011), the result shows a significant positive association between blockholder ownership and EDQ. Based on agency theory, blockholders have the incentives and power to ensure management activities are according to shareholders' interests. This monitoring is particularly significant where high EDQ is needed to assess companies' environmental risk and sustainability. In other words, based on the efficient monitoring hypothesis, blockholder ownership effectively reduces agency problems by ensuring management releases various information, such as EDQ, to reduce information asymmetry between shareholders and management (Juhmani, 2013). In the Nigerian capital market context with weaker regulatory oversight, blockholders supervising management decisions can enhance companies' implementation of higher accountability and transparency in environmental standards. This could protect shareholders' wealth and create value in long-term sustainability. Thus, better corporate governance in the Nigerian capital market, which promotes higher EDQ, should have higher blockholders ownership structure proportion. The economic significance demonstrated that blockholder ownership ($\beta = 0.042$) is the third driver of EDQ amongst ownership structure variables in the Nigerian market. This means that blockholders play an important role in ensuring higher EDQ in Nigeria, which has no regulatory enforcement because of the voluntary nature of environmental disclosure. These findings implied that blockholders have the power to convince management to disclose high quality environmental information which might withheld. High EDQ can protect the investment of blockholders and promote wider sustainable development goals needed for long-term environmental stability and the economy of the Nigerian capital market. The implication could be applicable to other African and developing countries facing similar challenges in corporate governance practices. High blockholder ownership in these countries can improve governance practices and comprehensive accountability, such as higher EDQ. Therefore, regulatory authorities could encourage blockholder ownership to effectively monitor management activities.

6.8 Concluding Remarks

This chapter examines the association between corporate governance and EDQ for listed Nigerian companies. It measures the EDQ released by Nigerian listed companies. After that, the chapter reports the empirical evidence of the association between each of the firm characteristics, board characteristics and ownership structure variables with EDQ. Besides, it provides an overall discussion of the results, showing a final table with all independent variables in the three areas (firm characteristics, board characteristics, ownership) and the associations (with both expected signs and actual signs) underpinned by the relevant theories and empirical evidence to highlight the implications of the findings in the Nigerian context in particular, and the African/developing countries context in general.

CHAPTER 7: CONCLDING REMARKS

7.1 Summary of Findings

This study contributes to the literature by examining the association between corporate governance and EDQ for all listed companies in the Nigerian Stock Exchange. It employs a multi-theoretical framework based on legitimacy, stakeholder, agency, resource dependency, and signalling theories. To achieve the research aim, firstly, it measured EDQ using weighted self-constructed disclosure index and examined its reliability and validity before using it in the subsequent analysis. Secondly, it investigated the association between board characteristics and EDQ. Lastly, it investigated the association between ownership structure and EDQ.

The study is based on positivist research philosophy and followed a deductive research approach. The study used a quantitative research method to achieve the research objectives. The study sampled all the Nigerian listed companies for the year 2017 to generalise the result, in contrast to previous Nigerian studies which focused on subset of industries. The study considered annual, sustainability and internet reports to capture all the environmental information released by Nigerian-listed companies, contrary to prior Nigerian investigations which are limited to annual reports only.

The results show that listed Nigerian companies release low-quality environmental information. This result adds to prior Nigerian studies that focus on environmental disclosure quantity in the sense that it provides evidence that it is not only the quantity of released environmental disclosure that is low in Nigeria but also the quality of such information. The study finds that various firm characteristics, namely firm size, profitability, multinationalism, and industry type, are significantly positively associated with EDQ, which validates the measure of disclosure. This result supports predictions from legitimacy, stakeholder, agency, resource dependency and signalling theories. In addition, the results support predictions from legitimacy theory that there are no statistical differences in the quality of environmental disclosure amongst listed companies on the Nigerian Stock Exchange based on their age, gearing, or liquidity status. However, contrary to predictions based on legitimacy, stakeholder and agency theories there is no association between Big4 audit firms and EDQ amongst Nigerian listed companies

in NSE, which might be due to low disclosure of financial environmental information or low variability in such disclosure or both.

Investigating the association between board characteristics and EDQ to achieve the third objective. This study finds that five board characteristics, namely: board size, independence, experience, frequency of meetings, and the presence of foreign members are significantly positively associated with EDQ in line with the predictions from legitimacy, stakeholder, agency, resource dependency and signalling theories. In addition, in line with stakeholder and agency theories, there is significant negative association between CEO duality and EDQ release by Nigerian listed companies. Finally, the results support predictions from resource dependency theory that there are no statistical differences in the EDQ amongst listed companies on the Nigerian stock exchange based on gender diversity.

Measuring the association between ownership concentration and EDQ is the last objective. The result supports predictions from legitimacy, stakeholder and agency theories that there is a significant negative association between managerial ownership and EDQ amongst listed companies on the Nigerian Stock Exchange. In line with agency theory, there is a significant negative association between institutional ownership and EDQ amongst listed companies in the Nigerian Stock Exchange. Moreover, the study finds that blockholder ownership has a significant positive association with EDQ amongst listed companies in the Nigerian Stock Exchange, supporting agency theory. Lastly, the study found a significant positive association between EDQ and each control variable (firm size, profitability, multinationalism and industry type).

7.2 Research implications and recommendations

The findings of this study could help the Nigerian government to understand the quality of environmental disclosure amongst listed companies and direct resources towards tackling the low level of engagement in high-quality disclosure. For example, the government might use the Ministry of Environment to raise public awareness of environmental issues through the media. Improved public awareness can create social pressure on listed companies to enhance the quality of environmental disclosure. The study recommends that the Ministry of Education introduce environmental subjects such as environmental accounting in both public and private universities and colleges to raise awareness and train future graduates

and executives on environmental responsibilities. This is important because long-term actions should be used to solve environmental problems for sustainable development (Asekomeh, Gershon, and Azubuike, 2021).

Regulatory bodies play a crucial role in shaping disclosure standards. The results of this study provide empirical support for the relationship between EDQ with each board characteristics and ownership structure. Regulators can use this information to inform and refine disclosure requirements, potentially encouraging companies to adopt governance practices associated with higher EDQ. This could contribute to the development of more effective and targeted regulatory frameworks. For example, the results of the current study have some implications on the 2018 revised code of corporate governance for Nigerian listed companies. The results show a positive and highly significant association between board size and the quality of environmental disclosure. Hence, removing the minimum number of board size in the 2018 revised code is not supported. In addition, the results indicate that each of the proportion of independent directors on the board and the proportion of directors serving on more than one board has a positive and highly significant association with the quality of environmental disclosure, so perhaps the 2018 code of governance could consider a minimum number of independent directors in the board as well as a minimum number of directors setting in more than one board to enhance environmental transparency.

The findings support predictions from legitimacy theory, so the study recommend using public and political pressure as well as pressure from environmental activist groups to motivate listed companies to release higher quality environmental disclosure.

Investors could be interested in understanding the factors contributing to EDQ. The positive associations observed between EDQ and board size, independence, meeting frequency, experience, presence of foreign members and ownership concentration suggest that companies with these characteristics are more likely to provide higher quality environmental disclosures. In contrast, companies dominated by institutional, managerial ownership and CEO duality are more likely to provide lower-quality environmental disclosure. Investors can utilise this information to make informed decisions, assessing the environmental transparency and sustainability practices of potential investments. For companies,

findings underscore the importance of board composition and ownership structures in shaping their environmental disclosure practices. Recognising that specific board characteristics and ownership structures positively influence EDQ can guide companies in enhancing their environmental disclosure to meet the expectations of stakeholders and the broader investing community. This insight is particularly relevant in the context of increasing emphasis on corporate social responsibility and sustainability reporting. The findings also support the prediction of resource dependency and signalling theories, which predict that companies use disclosure of information for financial and non-financial benefit. Regarding financial benefits, disclosing only mandatory information is insufficient to attract capital from investors who evaluate environmental risk for investment decisions. Based on that, companies can release voluntary environmental disclosure quality to attract such types of investors. Therefore, this study recommends that Nigerian listed companies release high EDQ, which signals their environmental performance. This can attract risk-averse investors primarily concerned with the safety of their investment, especially in Nigerian environmentally sensitive companies that face the destruction of their properties because of their negative environmental impact.

The academic community could benefit from this study by gaining insights into the multi-theoretical underpinnings of the relationship between board characteristics and ownership structure with EDQ. Scholars can use these findings to deepen their understanding of corporate governance mechanisms and their impact on environmental disclosure. This study contributes to the ongoing academic discourse on sustainability, corporate governance, and disclosure practices.

7.3 Limitations and future research areas

Although the study has tried to ensure objectivity in measuring disclosure, subjectivity cannot be removed entirely. In addition, although this study has arguably developed the largest dataset used in the Nigerian context, due to the labour-intensive and time-consuming research method, it employed cross-sectional analysis, limiting the ability to test for a temporal effect for causality. Panel data analysis, when data is available, could enrich the analysis and provide more insights into the environmental disclosure practices of listed companies over time. This study focused on the association between environmental disclosure

quality and corporate governance. Future studies could also investigate the economic consequences of environmental disclosure quality in emerging markets.

Besides, this study used a quantitative research method to measure EDQ, which relies on secondary data that might be subject to preparers' errors. It could be beneficial to assess environmental disclosure using surveys from views outside the companies. Therefore, the study recommends future research on EDQ through a survey obtaining the host communities' views.

Furthermore, this study focuses on the association between corporate governance and EDQ. However, it did not consider other diversity variables, such as age, culture, and religious diversities, due to data availability issues. This study recommends that further studies consider other diversity variables, such as age diversity, when the data regarding the age of directors is available. This is because releasing environmental information needs both cautious and critical decisions. Thus, young directors mostly consider critical decisions, while older directors always consider cautious decisions.

REFERENCES

- ABDEL-FATTAH, T.M.H., 2008. *Voluntary disclosure practices in emerging capital markets: the case of Egypt*. PhD thesis, Durham University.
- ABIJO, J.K., 2019. *Does corporate governance impact on sustainable development disclosure and anti-corruption? evidence from Nigeria*. PhD thesis, University of the West of Scotland.
- ABOAGYE-OTCHERE, F.K., SIMPSON, S.N.Y. and KUSI, J.A. 2020. The influence of environmental Performance on environmental disclosures: An empirical Study in Ghana. *Business Strategy & Development*, 3(1), pp. 98-111.
- ABU-RAYA, 2012. The Relationship between Corporate Governance and Environmental Disclosure: U.K. Evidence PhD
- ACAR, E., TUNCA ÇALIYURT, K. AND ZENGİN-KARAİBRAHİMOĞLU, Y., 2021. Does ownership type affect environmental disclosure? *International Journal of Climate Change Strategies and Management*, 13(2), pp.120-141.
- ADAMS, K., 2011. Corporate Social Responsibility: Stakeholder Determination and Reporting. PhD thesis. RMIT University.
- ADEGBITE, E. 2015. Good corporate governance in Nigeria: antecedents, propositions and peculiarities. *International Business Review*, 24(2), pp. 319-330.
- ADEGBITE, E., AMAESHI, K., and AMAO, O. 2012. The politics of shareholder activism in Nigeria' *Journal of Business Ethics*, 105 (3), pp. 389-402.
- ADEKANMI, A.D., ADEDOYIN, R.A. and ADEWOLE, J.A., 2015. Determinants of Socio-Environmental Reporting of Quoted Companies in Nigeria. *Journal of Research in Business, Economics & Management*, 4(4), 459-471.
- ADEKOYA, A.A., 2011. Corporate governance reforms in Nigeria. *Journal of law and governance*, 6(1), pp.39-52.
- ADELOPO, I., 2011. Voluntary disclosure practices among listed companies in Nigeria. *Advances in Accounting*, 27(2), pp. 338-345.

AERTS, W., CORMIER, D., and MAGNAN, M., 2004. "Environmental Disclosure by Continental European and North American Firms: Contrasting Stakeholders' Claims and Economic Consequences. [Online] Available from: <http://web.univ-pau.fr/IAE-CREG/IMG/pdf/euamen10.pdf> [Accessed 19 January 2019].

AGYEMANG, et al., 2020. Impact of board characteristics on environmental disclosures for listed mining companies in China. *Environmental Science and Pollution Research*, 27(17), pp. 21188-21201.

AHMAD, Z., HASSAN, S. and MOHAMMAD, J., 2003. Determinants of environmental reporting in Malaysia. *International Journal of Business Studies*, 11(1), pp. 69-90.

AKANNO, S. N., et al., 2015. Patterns of corporate social and environmental disclosure in Nigeria. *International Journal of Business and Finance Management Research*, 3(8), pp. 71-82.

AKBAS, H. E., 2104. Company Characteristics and Environmental Disclosure: An Empirical Investigation on Companies Listed on Borsa Istanbul. *The Journal of Accounting and Finance*, pp. 141-157.

AKBAS, H.E., 2016. The relationship between board characteristics and environmental disclosure: evidence from Turkish listed companies. *South-East European Journal of Economics and Business*, 11(2), pp. 7-19.

AKBAS, H.E. and CANIKLI, S., 2018. Determinants of voluntary greenhouse gas emission disclosure: An empirical investigation on Turkish firms. *Sustainability*, 11(1), pp.1-24.

AL AMOSH, H. and MANSOR, N., 2020. The implications of ownership structure on the environmental disclosure in Jordan. *International Journal of Academic Research in Business and Social Sciences*, 10(3), pp.330-346.

ALBITAR, K., ABDOUSH, T., and HUSSAINEY, K. 2022. Do corporate governance mechanisms and ESG disclosure drive CSR narrative tones? *International Journal of Finance & Economics*, 28(4), pp.3876-3890.

AL FADLI, A., et al., 2022. The influence of ownership structure on the extent of C.S.R. reporting: An emerging market study. *Business and Society Review*, 127(3), pp.725-754.

ALIPOUR, et al., 2019. Does board independence moderate the relationship between environmental disclosure quality and Performance? Evidence from static and dynamic panel data. *Corporate Governance: The International Journal of Business in Society*, 19(3), pp.580-610.

ALLEY, I., et al., 2014. Oil price shocks and Nigerian economic growth. *European Scientific Journal* 10(19), pp. 375-391.

ALLISON, P. D., 1999. Multiple regression: A primer. Thousand Oaks, Calif; London: Pine Forge Press.

ALLEGRIINI, M. and GRECO, G., 2013. Corporate boards, audit committees and voluntary disclosure: Evidence from Italian listed companies. *Journal of Management & Governance*, 17(1), pp. 187-216.

ALKAYED, H. A. M., 2018. *The Determinants and Consequences of Corporate Social Responsibility Disclosure: The Case of Jordan*. PhD thesis, University of Salford.

ALKAYED, H., and OMAR, B. F. 2022. Determinants of the extent and quality of corporate social responsibility disclosure in the industrial and services sectors: the case of Jordan. *Journal of Financial Reporting and Accounting* pp. 1-40.

ALOTAIBI, K., H., 2016. *Determinants and Consequences of C.S.R. Disclosure Quantity and Quality: Evidence from Saudi Arabia*. PhD thesis, Plymouth University.

ALSHAER, W.Y.I. 2022. *The analysis of stock returns in the London Stock Exchange in the context of the cyclical adjusted price to earnings ratio signals*. PhD thesis, Robert Gordon University.

ALUCHNA, M., et al., 2022. Do institutional investors encourage firm to social disclosure? The stakeholder salience perspective. *Journal of Business Research*, 142, pp.674-682.

AKINLUA, et al., 2015. Current prevalence pattern of hypertension in Nigeria: A systematic review. *PloS one*, 10(10), pp. 1-18.

AKROUT, M.M. and OTHMAN, H.B., 2013. A study of the determinants of corporate environmental disclosure in MENA emerging markets. *Journal of Reviews on Global Economics*, 2, pp. 46-59.

ALAWI, N.A.M. AND MASOOD, A., 2018. Environmental quality website disclosure in oil and gas sector: the case of MNCs in Yemen. *Journal of Advanced Research in Business and Management Studies*, 11(1), pp.10-23.

ALDRUGI, A. and ABDO, H., 2016. Social and environmental disclosure rating in the Libyan oil and gas sector. *Change Management*, 16(3), pp. 1-17.

ALNABSHA, A. et al., 2018. Corporate boards, ownership structures and corporate disclosures: Evidence from a developing country. *Journal of Applied Accounting Research*, 19(1), pp. 20-41.

ALOTAIBI, K. and HUSSAINEY, K. 2016. Determinants of C.S.R. disclosure quantity and quality: Evidence from non-financial listed firms in Saudi Arabia. *International Journal of Disclosure and Governance*, 13(4), pp. 364-393.

AL-QAHTANI, M., and ELGHARBAWY, A. 2020. The effect of board diversity on disclosure and management of greenhouse gas information: evidence from the United Kingdom. *Journal of Enterprise Information Management*, 33(6), pp. 1557-1579.

ALSAEED, K., 2006. The Association between Firm-Specific Characteristics and Disclosure: The case of Saudi Arabia. *Managerial Auditing Journal*, 21(5), pp.476-496.

ALSHAREEF, M.N.Z., and SANDHU, K., 2015. Integrating corporate social responsibility (C.S.R.) into corporate governance structure: the effect of board diversity and roles-A case study of Saudi Arabia. *International Journal of Business and Management*, 10(7), pp. 1-15.

AL-TUWAIJRI, S. A., CHRISTENSEN, T. E., and HUGHES, K. E., 2004. The relations amongst environmental disclosure, environmental Performance, and economic

Performance: a simultaneous equations approach. *Accounting, organisations and society*, 29(5), pp. 447-471

AMAESHI, K. M., ADEGBITE, E., and RAJWANI, T. 2016. Corporate social responsibility in Nigeria: Western mimicry or indigenous practices? *Journal of Business Research*, 69(11), pp. 4924-4931.

AMIDJAYA, P. G., and WIDAGDO, A. K. 2020. Sustainability reporting in Indonesian listed banks: Do corporate governance, ownership structure, and digital banking matter? *Journal of Applied Accounting Research*, 21(2), 231-247.

AMRAN, A. AND KEAT O, S., 2014. Sustainability reporting: meeting stakeholder demands. *Strategic Direction*, 30(7), pp.38-41.

ANANZEH, H., et al., 2023. Political connection, ownership concentration, and corporate social responsibility disclosure quality (CSRQ): empirical evidence from Jordan. *International Journal of Disclosure and Governance*, 20(1), pp.83-98.

ANANZEH, H., BUGSHAN, A. and AMAYREH, I., 2023. Does media exposure moderate the relationship between ownership structure and environmental disclosure quality: evidence from Jordan. *Management of Environmental Quality: An International Journal*, 34(1), pp.59-79.

ANAZONWU, H. O., EGBUNIKE, F. C., and GUNARDI, A. 2018. Corporate board diversity and sustainability reporting: A study of selected listed manufacturing firms in Nigeria. *Indonesian Journal of Sustainability Accounting and Management*, 2(1), pp. 65-78.

ANDRIKOPOULOS, A. and KRIKLANI, N. 2013. Environmental disclosure and financial characteristics of the firm: The case of Denmark. *Corporate Social Responsibility & Environmental Management*, 20(1), 55-64.

ANTONAKIS, J., et al., 2010. On making causal claims: A review and recommendations. *The Leadership Quarterly*, 21, pp.1086–1120

ARIBI, Z. A., and GAO, S., 2010. Corporate social responsibility disclosure: A comparison between Islamic and conventional financial institutions. *Journal of Financial Reporting and Accounting*, 8(2), pp. 72-91.

ARAS, G. AND CROWTHER, D., 2008. Governance And Sustainability: An Investigation into The Relationship Between Corporate Governance and Corporate Sustainability. *Management Decision*, 46(3); pp. 433-448.

ARIF, M., et al., (2020). The impact of audit committee attributes on the quality and quantity of environmental, social and governance (ESG) disclosures. *Corporate Governance: The International Journal of Business in Society*, 21(3), pp. 497-514.

ASAOLU, T.O., et al., 2005. Privatisation and commercialisation in Nigeria: Implications and prospects for good governance. *South African Journal of Business Management*, 36(3), pp.65-74.

ASEKOMEH, A., GERSHON, O. and AZUBUIKE, S.I. 2021. Optimally clocking the low carbon energy mile to achieve the sustainable development goals: evidence from Dundee's electric vehicle strategy. *Energies* 14(4), pp 1-28

BAALOUCH, F., AYADI, S. D., AND HUSSAINEY, K. 2019. A study of the determinants of environmental disclosure quality: evidence from French listed companies. *Journal of Management and Governance*, 23, pp. 939-971.

BALLUCHI, F., LAZZINI, A. AND TORELLI, R., 2021. Credibility of Environmental Issues in Non-Financial Mandatory Disclosure: Measurement and Determinants. *Journal of Cleaner Production*, 288, pp.1-13.

BAE, S.M., MASUD, M.A.K. and KIM, J.D., 2018. A cross-country investigation of corporate governance and corporate sustainability disclosure: A signalling theory perspective. *Sustainability*, 10(8), pp 1-16.

BALASUBRAMANIAN, N., 2012. Corporate Governance–By Robert AG Monks and Nell Minow. *Corporate Governance: An International Review*, 1(20), pp.119-120.

BAMAHROS, H. M. et al., 2022. Corporate governance mechanisms and E.S.G. reporting: Evidence from the Saudi Stock Market. *Sustainability*, 14(10), pp. 1-21.

BARAKO, D. G., 2007. Determinants of Voluntary Disclosures in Kenyan Companies Annual Reports." *African Journal of Business Management*, 1(5), 113-128.

BARAKO, D., HANCOCK, P., and IZAN, H. 2006. Factors influencing voluntary corporate disclosure by Kenyan companies. *Corporate Governance: An International Review*, 14 (2), pp. 107-125.

BARNEA, A. and RUBIN, A., (2010). Corporate social responsibility as a conflict between shareholders. *Journal of Business Ethics*, 97(1), pp. 71-86.

BARNETT, A.H. and CALDWELL, J.C., 1974. Accounting for corporate social performance: A survey. *Management Accounting*, 56(5), pp.23-26.

BEATTIE, V. and JONES, M. J. 1992. The use and abuse of graphs in annual reports: theoretical framework and empirical study. *Accounting and business research*, 22(88), pp. 291-303.

BEN-AMAR, W., CHANG, M. and MCILKENNY, P., 2017. Board gender diversity and corporate response to sustainability initiatives: Evidence from the carbon disclosure project. *Journal of Business Ethics*, 142(2), pp. 369-383.

BERTHELOT, S., CORMIER, D. and MAGNAN, M., 2003. Environmental disclosure research: View and synthesis. *Journal of Accounting Literature*, 22(1), pp. 1-44.

BERR, P., and FRIEND, F., 2006. Environmental Accounting: A Management tool for enhancing corporate environmental and management Performance. *Ecological Economics*, 58(3) pp 548-560.

BHATTACHARYYA, A. 2016. Factors associated with the social and environmental reporting of Australian companies. *Australasian Accounting, Business and Finance Journal*, 8(1), pp. 25-50

BIDDLE, C. and SCHAFFT, K.A., 2015. Axiology and anomaly in the practice of mixed methods work: Pragmatism, valuation, and the transformative paradigm. *Journal of Mixed Methods Research*, 9(4), pp.320-334.

BOSHNAK, H.A., 2022. Determinants of corporate social and environmental voluntary disclosure in Saudi listed firms. *Journal of Financial Reporting and Accounting*, 20(3/4), pp.667-692.

BOESSO, G. and KUMAR, K., 2007. Drivers Of Corporate Voluntary Disclosure: A Framework and Empirical Evidence from Italy and The United States. *Accounting, Auditing and Accountability Journal*, 20(2), pp. 269-296.

BOTOSAN, C. 2004. Discussion of a framework for the analysis of firm risk communication. *The International Journal of Accounting*, 39 (3), P.P. 289-295.

BOTOSAN, C.A., 1997. Disclosure level and the cost of equity capital. *Accounting review*, pp.323-349.

BOWRIN, A. R. 2013. Corporate social and environmental reporting in the Caribbean. *Social Responsibility Journal*, 9(2), pp. 259-280.

BOYLE, L., 2023. US hit with highest ever number of billion-dollar climate disasters in 2023. Independent. 10 January. Available from: <https://www.independent.co.uk/climate-change/news/record-disasters-weather-storms-2023-b2475795.html> [Accessed 10 February, 2024].

BRAMMER, S. and PAVELIN, S., 2008. Factors influencing the quality of corporate environmental disclosure. *Business Strategy and the Environment*, 17(2), pp. 120-136.

BRAMMER, S.J. and PAVELIN, S., 2006. Corporate reputation and social Performance: The importance of fit. *Journal of Management Studies*, 43(3), pp. 435-455.

BRANCO, M.C. and RODRIGUES, L.L., 2008. Factors influencing social responsibility disclosure by Portuguese companies. *Journal of Business Ethics*, 83(4), pp. 685-701.

BRICK, I. and CHIDAMBARAN, N. 2010. Board meetings, committee structure, and firm value. *Journal of Corporate Finance*, 16(4), pp. 533-553.

BROOKS, C. 2008. Introductory econometrics for finance. 2nd ed. Cambridge University Press, U.K.

BROWN, P., BEEKES, W. and VERHOEVEN, P., 2011. Corporate governance, accounting and finance: A review. *Accounting & Finance*, 51(1), pp.96-172.

BRYANT, A. and CHARMAZ, K. 2019. *The Sage Handbook of Current Developments in Grounded Theory*. SAGE Publications.

BRYMAN, A. 2021. *Social Research Methods* 6th ed. Oxford University Press.

BRYMAN, A., 2016. *Social research methods*. Oxford University Press.

BRYMAN, A. and BELL, E., 2007. *Business Research Methods* 2nd Ed. Oxford University Press.

BP. 2022. Statistical Review of World Energy, 71st E. [Online] Available from: <https://shorturl.at/afrvX> [Accessed 16 April 2023]

BUCHHOLTZ, A.K., BROWN, J.A. and SHABANA, K.M., 2008. Corporate governance and corporate social responsibility. In C ANDREW, (eds). *The Oxford Handbook of Corporate Social Responsibility*. [online] edn, Oxford Academic, <https://doi.org/10.1093/oxfordhb/9780199211593.003.0014>, Accessed 14 January 2024).

BURGWAL, D, V, D., and VIEIRA, R. J. O. 2014. Environmental Disclosure Determinants in Dutch Listed Companies. *Revista Contabilidade and Finanças*, 25(64), pp. 60-78.

CADBURY, A., 1992. *Report of the committee on the financial aspects of corporate governance*, London: Gee & Co

CAMPBELL, D. 2004. A longitudinal and Cross-Sectional Analysis of Environmental Disclosure in U.K. Companies - A Research Note. *The British Accounting Review*, 36(1), 107-117.

CAMPBELL, D., CRAVEN, B. and SHRIVES, P. 2003. Voluntary social reporting in three FTSE sectors: a comment on perception and legitimacy", *Accounting, Auditing & Accountability Journal*, 16 (4), pp. 558-581.

CAMPBELL, A., TAYLOR B. J., and MCGLADE, A. 2016. *Research Design in Social Work: Qualitative and Quantitative Methods*. London. Learning Matters.

CARMINES, E. G., and ZELLER, R. A. 1991. Reliability and Validity Assessment. Newbury Park: Sage Publications.

CHAND, A., et al., 2022. Determinants of Social and Environmental Accounting Information Disclosure: An Analysis of top 50 Firms in New Zealand. *Engineering Economics*, 33(2), pp. 118-131.

CHANDOK, R.I.S. and SINGH, S. 2017. Empirical Study on determinants of environmental disclosure: Approach of Selected Conglomerates. *Managerial Auditing Journal*, 32(4/5), pp. 332-355.

CHAU, G., and GRAY, S. 2010. Family Ownership, Board Independence and Voluntary Disclosure: Evidence from Hong Kong. *Journal of International Accounting, Auditing and Taxation*, 19(2), pp. 93-109.

CHAU, G.K., GRAY, S.J., 2002. Ownership structure and corporate voluntary disclosure in Hong Kong and Singapore. *The International Journal of Accounting*, 37, pp. 247-65.

CHIANG, K.C., WACHTEL, G.J. and ZHOU, X. 2020. Corporate social responsibility and growth opportunity: The case of real estate investment trusts. *Journal of Business Ethics*, 155(2), pp. 463-478.

CHITHAMBO, L., et al., 2021. Stakeholder pressure and greenhouses gas voluntary disclosures. *Business Strategy and the Environment*, 31(1) pp. 159-172.

CHEBBIA, K., ALIEDANB, M.M. and MOHAMMED, A., 2020. Women on the board and environmental sustainability reporting: Evidence from France. *International Journal of Innovation, Creativity and Change*, 14(11), pp.231-258.

CHOUAIBIL, J., MILADI, E., and ELOUNI, N. 2022. Exploring the relationship between board characteristics and environmental disclosure: Empirical evidence for European firms. *Accounting and Management Information Systems*, 21(1), pp. 51-76.

CLARKSON, P.M., et al., 2008. Revisiting the relation between environmental Performance and environmental disclosure: An empirical analysis. *Accounting, Organizations & Society*, 33(4-5), pp. 303-327.

CLARKSON, P.M., LI, Y., RICHARDSON, G.D. and VASVARI, F.P., 2011. Does it really pay to be green? Determinants and consequences of proactive environmental strategies. *Journal of Accounting & Public Policy*, 30(2), pp. 122-144.

COHEN, J., COHEN, P., WEST, S. G., and AIKEN, L. S. 2020. *Applied multiple regression/correlation analysis for the behavioural sciences* (3rd ed.). Routledge

COLLIS, J. and HUSSEY, R., 2009. *Business research: A practical guide for undergraduate and postgraduate students*. Palgrave Macmillan.

CONG, Y., FREEDMAN, M. AND PARK, J.D., 2020. Mandated Greenhouse Gas Emissions and Required S.E.C. Climate Change Disclosures. *Journal of Cleaner Production*, 247, p.1-9.

CONNELLY, B.L., et al., 2011. Signalling theory: A review and assessment. *Journal of management*, 37(1), pp.39-67.

CORMIER, D., et al., 2010. Web-based disclosure about value creation processes: A monitoring perspective. *Abacus*, 46, 320–347.

CORMIER, D., LEDOUX, M. and MAGNAN, M. 2011. The Informational Contribution of Social and Environmental Disclosures for Investors. *Management Decision*, 49(8), 1276-1304.

CORMIER, D., et al., 2010. Web-based disclosure about value creation processes: A monitoring perspective. *Abacus*, 46, pp. 320–347.

CORMIER, D., MAGNAN, M. and VAN VELTHOVEN, B., 2005. Environmental disclosure quality in large German companies: economic incentives, public pressures or institutional conditions? *European accounting review*, 14(1), pp. 3-39.

CORNETT, M.M., et al., 2007. The impact of institutional ownership on corporate operating Performance. *Journal of Banking & Finance*, 31(6), pp.1771-1794.

CORPORATE AFFAIRS COMMISSION, 2023. *Who we are* Corporate Affairs Commission [Online]. Available From: <https://www.cac.gov.ng/about/> [Accessed 9 January 2024].

COSMA, S., PRINCIPALE, S. and VENTURELLI, A., 2022. Sustainable governance and climate-change disclosure in European banking: The role of the corporate social responsibility committee. *Corporate Governance: The International Journal of Business in Society*, 22(6), pp.1345-1369.

COUNCIL, F.R. and BRITAIN, G., 2010. The U.K. corporate governance code. [Online]. Available From: <https://www.zotefoams.com/wp-content/uploads/2015/11/UK-CorporateGovernance-Code-April-2016.pdf> [Accessed 9 November 2023].

COWEN, S.S., FERRERI, L. B. and PARKER, L. D., 1987. The impact of corporate characteristics on social responsibility disclosure: A typology and frequency-based analysis. *Accounting, Organizations and society*, 12(2), pp.111-122.

CRESWELL, J. W., 2014. *A concise introduction to mixed methods research*. Sage Publications.

CRESWELL, J. W., and CRESWELL, J. D. 2018. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* 5th ed. SAGE Publications.

CRESWELL, J. W. and POTH, C. N. 2018. *Qualitative Inquiry and Research Design: Choosing Amongst Five Approaches*. 4th Ed. London. Sage Publications, Inc

CUCARI, N., ESPOSITO DE FALCO, S. and ORLANDO, B., 2018. Diversity of Board of Directors and environmental social governance: Evidence from Italian listed companies. *Corporate Social Responsibility and Environmental Management*, 25(3), pp.250-266.

DAILY TRUST. 2018. Industrial waste raises health concerns in Kano communities Daily Trust. [Online]. 2 May. Available from: <https://dailytrust.com/industrial-waste-raises-health-concerns-in-kano-communities/> [Accessed 10 October 2019].

DAHYA, J., LONIE, A.A. and POWER, D.M., 1996. The Case for Separating the Roles of Chairman And CEO: An Analysis of Stock Market and Accounting Data, *Corporate Governance: An International Review*, 4(1), pp. 71-77.

DAKHLI, A., 2021. The impact of ownership structure on corporate social responsibility: The moderating role of financial performance. *Society and Business Review*, 16(4), pp. 562-591.

DAMAK-AYADI, S., 2009. Some determinants of social and environmental disclosures in annual reports by French firms. *Journal of Accounting and Management Information Systems*, 8(3), pp.324-351.

D'AMICO, E., et al., 2016. Factors influencing corporate environmental disclosure. *Business Strategy and the Environment*, 25(3), pp.178-192.

DANISCH, C. 2021. The relationship of C.S.R. performance and voluntary C.S.R. disclosure extent in the German Dax indices. *Sustainability*, 13(9), 1-20.

DAUB, C-H., 2007. Assessing the Quality of Sustainability Reporting: An Alternative Methodological Approach. *Journal of Cleaner Production*, 15(1), 75-85.

DEEGAN, C. 2002. The legitimising effect of social and environmental disclosures: A theoretical foundation. *Accounting, Auditing & Accountability Journal*, 15 pp.282-311.

DEEGAN, C., 2003. Environmental Management Accounting: An Introduction and Case Studies for Australia,' Institute of Chartered Accountants in Australia, Melbourne.

DEEGAN, C. and GORDON, B., 1996. A study of the environmental disclosure practices of Australian corporations. *Accounting and business research*, 26(3), pp. 187-199.

DEEGAN, C. AND RANKIN, M. 1996. Do Australian companies report environmental news objectively? An analysis of environmental disclosures by firms prosecuted successfully by the Environmental Protection Authority. *Accounting, auditing & accountability journal*, 9(2), pp. 50-67.

DEMARIA, S. and RIGOT, S. 2021. Corporate environmental reporting: Are French firms compliant with the task force on climate financial disclosures' recommendations? *Business Strategy and the Environment*, 30(1), pp.721-738.

DEMB, A. and NEUBAUER, F.F., 1992. The corporate board: Confronting the paradoxes. *Long range planning*, 25(3), pp.9-20.

DE-MASI, S., et al., 2021. Toward sustainable corporate behaviour: The effect of the critical mass of female directors on environmental, social, and governance disclosure. *Business Strategy and the Environment*, 30(4), pp. 1865-1878.

DIBIA, N. O. and ONWUCHEKWA, J.C. 2015. determinants of environmental disclosures in Nigeria: A case study of oil and gas companies. *International Journal of Finance and Accounting*, 4(3), pp. 145-152.

DILLEY, S.C. and WEYGANDT, J.J., 1973. Measuring Social Responsibility: An Empirical Test. *Journal of Accountancy (pre-1986)*, 136(000003), pp.62-70.

DONG, W., DONG, X. and LV, X., 2022. How does ownership structure affect corporate environmental responsibility? Evidence from the manufacturing sector in China. *Energy Economics*, 112, p.106-112.

DONNELLY, R. and MULCAHY, M., 2008. Board structure, ownership, and voluntary disclosure in Ireland. *Corporate Governance: An International Review*, 16(5), pp. 416-429

D'ORAZIO, P. 2021. Towards a post-pandemic policy framework to manage climate-related financial risks and resilience. *Climate Policy*, 21(10), pp. 1368-1382.

DRAGOMIR, V.D., DUMITRU, M. and FELEAGA, L., 2022. The predictors of non-financial reporting quality in Romanian state-owned enterprises. *Accounting in Europe*, 19(1), pp.110-151.

DYDUCH, J. and KRASODOMSKA, J., 2017. Determinants of corporate social responsibility disclosure: An Empirical study of Polish listed companies. *Sustainability*, 9(11), pp. 19-34.

ECCLES, R.G. AND KRZUS, M.P. 2019. Implementing the task force on climate-related financial disclosures recommendations: An assessment of corporate readiness. *Schmalenbach Business Review*, 71(2), pp. 287-293.

ECHAVE, J. O. and BHATI, S.S., 2010. Determinants of social and environmental disclosures by Spanish companies. *Third Annual International Business Conference Michigan*, U.S.A., pp. 55-68.

EDOGIAWERIE O. and DAVID, J, O., 2016. Financial Reporting and Voluntary Disclosure in Nigeria Quoted Companies. *Igbinedion University Journal of Accounting*, 1 pp. 42-58.

EDWARDS, et al., 2020. Climate-related financial disclosures in the public sector. *Nature Climate Change*, 10(7), pp. 588-591.

EGBUNIKE, A.P. and TARILAYE, N., 2017. Firm's specific attributes and voluntary environmental disclosure in Nigeria: Evidence from listed manufacturing companies. *Academy of Accounting and Financial Studies Journal*, 21(3), pp. 1-9.

EGBUNIKE, P.A. and EFIONAYI, D.O., 2021. Ownership structure and corporate social responsibility disclosure of listed banks in Nigeria. *Journal of Contemporary Issues in Accounting*, 2(1), pp.117-128.

ELFEKY, M.I., 2017. The extent of voluntary disclosure and its determinants in emerging markets: Evidence from Egypt. *The Journal of Finance and Data Science*, 3(1-4), pp. 45-59

ELJAYASH, K.M., 2015. Documentation of Environmental Disclosure Practices in the Oil Companies in the Countries of the Arab Spring–some evidence from Egypt, Libya and Tunisia. *Journal of Economics, Business and Management*, 3(10), pp. 954-960

ELJAYASH, K.M., JAMES, K. and KONG, E., 2012. The quantity and quality of environmental disclosure in annual reports of national oil and gas companies in Middle East and North Africa. *International Journal of Economics and Finance*, 4(10), pp. 201-217.

ELLILI, N. O. D. 2023. Impact of corporate governance on environmental, social, and governance disclosure: Any difference between financial and non-financial companies? *Corporate Social Responsibility and Environmental Management*, 30(2), pp. 858-873.

EMADZADEH, M.K., SHAHRESTANI, B.A., SAFANOOR, M. AND SHAHRAKI, K., 2012. The survey of the relationship between the size of firms and political costs. *Interdisciplinary Journal of Contemporary Research in Business*, 3(10), pp.355-365.

ELTIB, E, E., 2012. *Environmental Disclosure Accounting in Australian Oil and Gas companies*. Master's Dissertation, University of Wollongong, Australia

ELSHABASY, Y.N., 2018. The Impact of Corporate Characteristics on Environmental Information Disclosure: An Empirical Study on the Listed Firms in Egypt. *Journal of Business and Retail Management Research*, 12(2), pp. 232-241.

ELZAHAR, H. and HUSSAINEY, K. 2012. Determinants of narrative risk disclosures in U.K. interim reports. *The Journal of Risk Finance* 13(2), pp. 133-147.

EMEKA, A.H., 2020. Determinants of Dividend Policy: Empirical Evidence from Nigerian Listed Firms. *International Journal of Business Insights & Transformation*, 13(2), pp. 38-68.

EMIR, B., 2016. The Equator Principles: An Empirical Study of Their Effect on the Financial Performance of Banks [Online Access] Available From: <https://www.researchgate.net/publication/26486322> [Accessed July 24, 2020].

ENEH O. 2019. Corporate Governance and Environmental Disclosures in Nigeria: A Quantile Regression Approach. International. *Journal of Academic Management Science Research*, 3(2), pp 39-45.

ENG, L.L., AND MAK, Y.T., 2003. Corporate governance and voluntary disclosure. *Journal of Accounting and Public Policy*, 22(4), pp.325-345.

EQUATOR PRINCIPLES ASSOCIATION MEMBERS REPORTING., 2015. About the Equator Principles. [Online Access] Available from <http://www.equator-principles.com/index.php/> [Accessed July 24, 2020].

EZE, J.C., NWEZE, A.U. and ENEKWE, C.I., 2016. The effects of environmental accounting on a developing nation: Nigerian experience. *European Journal of Accounting, Auditing and Finance Research*, 4(1), pp.17-27

- EZHILARASI, G. and KABRA, K., 2017. The impact of corporate governance attributes on environmental disclosures: Evidence from India. *Indian Journal of Corporate Governance*, 10(2), pp. 24-43.
- FAHAD, P. and NIDHEESH, K.B., 2020. Determinants of C.S.R. disclosure: Evidence from India. *Journal of Indian Business Research*, 13(1), pp.110-13
- FATIMA, A.H., ABDULLAH, N. and SULAIMAN, M., 2015. Environmental disclosure quality: examining the impact of the stock exchange of Malaysia's listing requirements. *Social Responsibility Journal*, 11(4), pp.904-922.
- FASANYA, I.O., ONAKOYA, A.B. and ADABANIJA, M.A., 2013. Oil Discovery and Sectoral Performance in Nigeria: An Appraisal of the Dutch Disease. *IUP Journal of Applied Economics*, 12(2), pp. 1-17.
- FERNANDEZ-FEIJOO, B., ROMERO, S. and RUIZ-BLANCO, S., 2014. Women on boards: do they affect sustainability reporting? *Corporate Social Responsibility and Environmental Management*, 21(6), pp.351-364.
- FENG, X., GROH, A. AND WANG, Y., 2020. Board diversity and C.S.R. *Global Finance Journal*, pp.1-19.
- FERNANDES, S.M., BORNIA, A.C. and NAKAMURA, L.R., 2018. The influence of boards of directors on environmental disclosure. *Management Decision*, 57(9), pp.2358-2382.
- FIELD, A. P. 2013. *Discovering statistics using IBM SPSS statistics*. 4th ed. Los Angeles: Sage.
- FILZEN, J. J., and PETERSON, K. 2015. Financial statement complexity and meeting analysts' expectations. *Contemporary Accounting Research*, 32(4), pp. 1560–1594.
- FINANCIAL REPORTING COUNCIL OF NIGERIA, 2018. Nigerian Code of Corporate Governance [Online Access] Available From: <https://pwc nigeria.typepad.com/files/nigerian-code-of-corporate-governance-2018-1.pdf> [Accessed 13 November 2023].

FINANCIAL REPORTING COUNCIL OF NIGERIA, 2016. National Code of Corporate Governance [Online Access] Available From: <https://www.ecgi.global/code/nigeria-national-code-corporate-governance-2016> [Accessed 13 November 2023].

FOLARIN, S., 2021. Corruption, politics and governance in Nigeria. In: AJAYI, R., AND FASHAGBA, J.Y. eds. *Nigerian Politics. Advances in African Economic, Social and Political Development. Springer, Cham.* pp.377-394. [online] Available from: <https://doi.org/10.1007/978-3-030-50509-7> Accessed [8 January 2023].

FRANCIS, J., NANDA, D., OLSSON, P., 2008. Voluntary disclosure, earnings quality, and cost of capital. *Journal of Accounting Research* 46 (1), pp. 53–88.

FRITZ, M. AND BERGER, P.D., 2015. *Improving the user experience through practical data analytics: Gain meaningful insight and increase your bottom line.* Morgan Kaufmann.

FREEDMAN, M. and JAGGI, B., 2011. Global warming disclosures: impact of Kyoto protocol across countries. *Journal of International Financial Management & Accounting*, 22(1), pp.46-90.

FREEMAN, R. E. 2010. *Strategic management: A stakeholder approach.* Cambridge university press.

FRYNAS, J. G., and STEPHENS, S. 2015. Political, corporate social responsibility: Reviewing theories and setting new agendas. *International Journal of Management Reviews*, 17(4), pp. 483-509.

FRYNAS, J. G., and YAMAHAKI, C. (2016). Corporate social responsibility: review and roadmap of theoretical perspectives. *Business Ethics: A European Review*, 25(3), 258-285.

FUADAH, L.L. et al., 2022. The Ownership Structure, and the Environmental, Social, and Governance (E.S.G.) Disclosure, Firm Value and Firm Performance: The Audit Committee as Moderating Variable. *Economies*, 10(12), p.1-16.

GANAPATHY, E. and KABR, K, C., 2015. Determinants of Environmental Disclosures Practices by Most Polluting Industries in India. *Emerging Trends in Finance and Accounting*. pp. 227-244.

GAO, S.S., HERAVI, S. and XIAO, J. Z., 2005. Determinants of Corporate Social and Environmental Reporting in Hong Kong: A Research Note. *Accounting Forum* 29(2), pp. 233-242.

GARCÍA-AYUSO, M. and LARRINAGA, C., 2003. Environmental Disclosure in Spain: Corporate Characteristics and Media Exposure. *Spanish Journal of Finance and Accounting/Revista Española de Financiación y Contabilidad*, 32(115), pp.184-214.

GARCÍA-MECA, E. AND PUCHETA-MARTÍNEZ, M.C., 2018. What institutional investors on boards impact on stakeholder engagement and corporate social responsibility reporting. *Corporate Social Responsibility and Environmental Management*, 25(3), pp.237-249.

GBEREVBIE, D.E. AND ONI, S., 2021. Postcolonial Nigeria: Power and politics in the first republic, 1960–1966. In: AJAYI, R., AND FASHAGBA, J.Y. eds. *Nigerian Politics. Advances in African Economic, Social and Political Development*. Springer, Cham. pp.55-75. [online] Available from: <https://doi.org/10.1007/978-3-030-50509-7> Accessed [28 November 2023].

GEORGE, B.S. and UKPONG, E.G., 2023. Corporate Governance and Environmental Disclosures of Selected Manufacturing Firms in Nigeria. *International Journal of Advances in Management and Economics International Journal of Advances in Management and Economics*, 12(4); pp 19-41.

GERGED, A.M., 2021. Factors affecting corporate environmental disclosure in emerging markets: The role of corporate governance structures. *Business Strategy and the Environment*, 30(1), pp.609-629.

GERWING, T., KAJÜTER, P., and WIRTH, M. 2022. The role of sustainable corporate governance in mandatory sustainability reporting quality. *Journal of Business Economics*, 92(3), pp. 517-555.

GHAZALI, N. A. M., 2007. Ownership structure and corporate social responsibility disclosure: some Malaysian evidence. *Corporate Governance*, 7(3), pp. 251-266.

GHAZALI, N.A.M. and WEETMAN, P., 2006. Perpetuating traditional influences: Voluntary disclosure in Malaysia following the economic crisis. *Journal of International Accounting, Auditing and Taxation*, 15(2), pp. 226-248.

GHOSH, S., PAREEK, R. and SAHU, T.N., 2023. How far corporate governance and firms' characteristics are relevant toward environmental sustainability? An empirical investigation. *Rajagiri Management Journal*, 17(2), pp.183-197.

GIANNARAKIS, G., ANDRONIKIDIS, A. AND SARIANNIDIS, N., 2020. Determinants of environmental disclosure: investigating new and conventional corporate governance characteristics. *Annals of Operations Research*, 294, pp.87-105.

GIANNARAKIS, G. et al., 2016. Determinants of Dissemination of Environmental Information: An Empirical Survey. *Journal of Business Economics and Management*, 17(5), pp. 749-764.

GIANNARAKIS, G., KONTEOS, G. and SARIANNIDIS, N. 2014. Financial, governance and environmental determinants of corporate socially responsible disclosure. *Management Decision*, 52(10), pp. 1928-1951.

GILL, A., 2008. corporate governance as social responsibility: A research agenda. *Berkeley Journal of International Law*, 26 (2): pp. 452-478.

GRAY, R., 2010. Is Accounting for Sustainability Actually Accounting for Sustainability...And How Would We Know? An Exploration of Narratives of Organizations and The Planet. *Accounting, Organizations and Society*, 35(1), pp. 47-62.

GRAY, R., et al., C. D., 2001. Social and Environmental Disclosure and Corporate Characteristics: A Research note and Extension. *Journal of Business Finance and Accounting*, 28(3-4), pp. 327-356.

GRAY, S, J., MEEK, G.K., and ROBERTS, C.B., 1995. International capital market pressure and voluntary annual report disclosures by U.S. and UK Multinationals. *Journal of international financial management and Accounting*, 6(1), pp. 43-68.

GRAY, R., OWEN, D. AND ADAMS, C., 1996. Accounting & accountability: changes and challenges in corporate social and environmental reporting. Prentice hall.

GUAN, Y., SHEU, D., and CHU, Y. 2007. Ownership Structure, Board of Directors, and Information Disclosure: Empirical Evidence from Taiwan I.C. Design Companies. *Journal of American Academy of Business*, 11(2), pp. 182-190

GUAY, W., SAMUELS, D., and TAYLOR, D., 2016. Guiding through the Fog: Financial statement complexity and voluntary disclosure. *Journal of Accounting and Economics*, 62(2-3), pp. 234-269.

GUJARATI, D. N., and PORTER, D. C. 2010. *Essentials of econometrics* 4th Vol. Boston, MA; London: McGraw-Hill.

GUL A. and LEUNG, S. 2004. Board leadership, outside directors' expertise and voluntary corporate disclosures. *Journal of Accounting and Public policy*, 23, pp. 351-379.

GUTHRIE, J. and ABEYSEKERA, I., 2006. Content Analysis of Social, and Environmental Reporting: What is new? *Journal of Human Resource Costing & Accounting*, 10, pp. 114-124.

HABBASH, M. 2017. Corporate governance and corporate social responsibility disclosure: evidence from Saudi Arabia. *International Journal of Corporate Strategy and Social Responsibility*, 1(2), pp. 161-178.

HABBASH, M. 2015. Corporate governance, ownership, company structure and environmental disclosure: Evidence from Saudi Arabia. *Journal of Governance & Regulation*, 4(4), pp. 460-470.

HABBASH, M., HUSSAINEY, K. and AWAD, A, E. 2016. The Determinants of Voluntary Disclosure in Saudi Arabia: An Empirical Study. *International Journal of Accounting, Auditing and Performance Evaluation*, 12(3), pp. 213-236.

HAKEEM, S., 2006. Anti-Suit Injunctions and Arbitration: A Final Nail in the Coffin? *Journal of International Arbitration*, 23(1), pp. 25–38.

HACKSTON, D. and MILNE, M. J., 1996. Some Determinants of Social and Environmental Disclosures in New Zealand Companies. *Accounting, Auditing and Accountability Journal*, 9(1), pp. 77-108.

HAIR, J. et al., 2018. Multivariate Data Analysis - 9781473756540 - Cengage. 8th ed. Cengage Learning EMEA. Available from: <https://www.cengage.co.uk/books/9781473756540> [Accessed 12 July 2021].

HALME, M., and HUSE, M. 1997. The Influence of Corporate Governance, Industry and Country Factors on Environmental Reporting. *Scandinavian Journal of Management*, 13(2), pp. 137-157.

HANDAYATI, P., et al., 2022. Audit quality, corporate governance, firm characteristics and C.S.R. disclosures—Evidence from Indonesia. *Journal of Corporate Accounting & Finance*, 33(3), pp.65-78.

HANIFFA, R. M. and COOKE, T. E., 2005. The Impact of Culture and Governance on Corporate Social Reporting. *Journal of Accounting and Public Policy*, 24, pp. 391-430.

HANIFFA, R. M., and COOKE, T. E., 2002. Culture, Corporate Governance and Disclosure in Malaysian Corporations. *Abacus*, 38(3), pp. 317-348.

HAQUE, S. and DEEGAN, C., 2010. Corporate climate change-related governance practices and related disclosures: evidence from Australia. *Australian Accounting Review*, 20(4), pp.317-333.

HAQUE, S., DEEGAN, C. and INGLIS, R., 2016. Demand for, and impediments to, the disclosure of information about climate change-related corporate governance practices. *Accounting and Business Research*, 46(6), pp.620-664.

HAQUE, S. and ISLAM, M.A., 2015. Stakeholder pressures on corporate climate change-related accountability and disclosures: Australian evidence. *Business and Politics*, 17(2), pp.355-390.

HARRELL, F. E. 2019. *Regression modelling strategies: With applications to linear models, logistic and ordinal regression, and survival analysis*. Springer.

HARRISON, J. S., et al., 2019. *The Cambridge Handbook of Stakeholder Theory*. Cambridge University Press.

HARWOOD, T., G., and GARRY, T., 2003. An Overview of Content Analysis. *The Marketing Review*, 3(4), pp. 479-498.

HASSAN, N., 2010. *Corporate Social Responsibility Disclosure: An Examination of Framework of Determinants and Consequences*. PhD thesis Durham University.

HASSAN, O., 2006. *The economic consequences of increased disclosure in the Egyptian emerging capital market*, PhD thesis, University of Abertay.

HASSAN, O. A. G., et al., 2009. The value relevance of disclosure: Evidence from the emerging capital market of Egypt. *The International Journal of Accounting*, 44, pp. 79–102

HASSAN, O.A.G., and MARSTON, C. 2019. Corporate Financial Disclosure Measurement in the Accounting Literature- A review article. *The International Journal of Accounting*, 54(2), pp. 1-54.

HASSAN, O.A.G., ROMILLY, P. and KHADAROO, I. 2023. The impact of corporate environmental management practices on environmental performance. *Business ethics, the environment and responsibility*, pp. 1-19.

HASSELDINE, J., SALAMA, A. I., and TOMS, J. S. (2005). Quantity versus quality: the impact of environmental disclosures on the reputations of UK Plcs. *The British Accounting Review*, 37(2), pp. 231-248.

HEALY, P. M., and PALEPU, K. G. 1993. The Effect of Firms' Financial Disclosure Strategies on Stock Prices. *Accounting Horizons*, 7(1), pp 1-11.

HIBBITT, C.J., 2004. *External environmental disclosure and reporting by large European companies: An economic, social, and political analysis of managerial behaviour*. Rozenberg Publishers.

H.O., L-C. J. and TAYLOR, M. E., 2007. An Empirical Analysis of Triple Bottom-Line Reporting and Its Determinants: Evidence from the United States and Japan. *International Financial Management and Accounting*, 18(2), pp. 123-150.

HOOKS, J. and VAN STADEN, C.J., 2011. Evaluating environmental disclosures: The relationship between quality and extent measures. *The British Accounting Review*, 43(3), pp. 200-213.

HO., S. S. M. and WONG, K. S., 2001. A study of The Relationship between Corporate Governance Structure and the Extent of Voluntary Disclosure. *Journal of International Accounting, Auditing & Taxation*, 10(2) pp. 139-156.

HOSSAIN, M., ISLAM, K. and ANDREW, J., 2006. Corporate social and environmental disclosure in developing countries: Evidence from Bangladesh. *Asian Pacific Conference on International Accounting Issues*, pp1-22.

HOWELL, K., 2013. *An introduction to the Philosophy of methodology*. SAGA publication Ltd.

HUSSAIN, H.I., et al., 2020. Environmental reporting and speed of adjustment to target leverage: Evidence from a dynamic regime switching model. *Organizacija*, 53(1), pp.21-35.

HUGHES, S.B., ANDERSON, A., GOLDEN, S., 2001. Corporate environmental disclosures: are they useful in determining environmental performance? *Journal of Accounting and Public Policy* 20 (3), pp. 217–240.

COLLIS, J. and HUSSEY, R., 2009. *Business research: A practical guide for undergraduate and postgraduate students*. Palgrave Macmillan.

HUSTED, B.W. and DE SOUSA-FILHO, J.M., 2019. Board structure and environmental, social, and governance disclosure in Latin America. *Journal of Business Research*, 102, pp.1-8.

HUTCHESON, G. and SOFRONIOU, N. 1999. *The Multivariate Social Scientist*. Sage, London.

IBRAHIM 2015 *Corporate Environmental Disclosure: A Case from the Libyan Construction Industry*. PhD thesis, Liverpool John Moores University.

IBRAHIM, A. H, and HANEFAH, M. M. 2016. Board diversity and corporate social responsibility in Jordan. *Journal of and Accounting*, 14(2), pp. 279-298.

IDIONG, M., 2022. A Critical Appraisal of the Petroleum Industry Act 2021: Challenges and Opportunities. *AJIEEL*, 6(01), pp.178-191.

IFADA, L. M., et al., 2021. Environmental Performance and environmental disclosure: The role of financial Performance. *The Journal of Asian Finance, Economics and Business*, 8(4), pp.349-362.

IFESINACHI, K. AND ANICHE, E., 2015. The Nigerian National Petroleum Corporation (NNPC) and enforcement of zero gas flaring regime in Nigeria. *ANSU Journal of Arts and Social Sciences*, 4(1), pp.48-74.

INNOCENT, O.C., OKAFOR, T. and EGOLUM, P. 2014. An Assessment of environmental information disclosure practices of selected Nigerian manufacturing companies. *International Journal of Finance & Accounting*, 3(6), pp. 349-355.

INTERNATIONAL MONETARY FUND, 2023. World Economic Outlook Database, International Monetary Fund [Online]. Available from: <https://www.imf.org/en/Publications/WEO/weo-database/2023/October/select-country-group> [Accessed 1 January 2024].

INTERNATIONAL MONETARY FUND (I.M.F.). (2020). Global financial stability report: Markets in the time of COVID-19. <https://ISBN9781513529196/1729-701X> [Accessed 1 January 2022].

IOANNOU, I. and SERAFEIM, G., 2012. What drives corporate social performance? The role of nation-level institutions. *Journal of international business studies*, 43, pp.834-864.

ISA., S.S. 2021. *The impact of environmental forces on Nigerian National Petroleum Corporation's growth strategy and profitability*. PhD thesis Robert Gordon University.

ISLAM, M.A., 2009. Social and environmental reporting practices of organisations operating in, or sourcing products from, a developing country: evidence from Bangladesh PhD thesis, University of Dhaka.

ISLAM, M.A., et al., 2022. Moral versus pragmatic legitimacy and corporate anti-bribery disclosure: Evidence from Australia. *In Accounting Forum* 46(1), pp. 30-56.

ISMAIL, A., M. and LATIFF, I.H.M., 2019. Board diversity and corporate sustainability practices: Evidence on environmental, social and governance (E.S.G.) reporting. *International Journal of Financial Research*, 10(3), pp. 31-50.

ISSA, A., et al., 2022. An examination of board diversity and corporate social responsibility disclosure: evidence from banking sector in the Arabian Gulf countries. *International Journal of Accounting & Information Management*, 30(1), pp. 22-46.

IVUNGU, J.A. et al., 2021. Corporate governance mechanisms and environmental reporting of Nigerian oil & gas companies. *Journal of Management and Science* 11(4); pp 80-84.

JEROH, E., 2020. An assessment of the internal determinants of the environmental disclosure practices of firms across Sub-Saharan Africa. *Ekonomski horizonti*, 22(1), pp.47-59.

JAMES, O, K. and GBALAM E, P., 2013. Social and environmental accounting: The challenges of implementation in oil prospecting companies in the Niger Delta States of Nigeria. *Research Journal of Finance and Accounting*, 4(11), 1-6.

JENSEN, M.C. and MECKLING, W. H. 1976. Theory of the Firm: Management behaviour, agency costs and ownership structure. *Journal of Financial Economics*, 3(3), pp. 305-360.

JARIYA, A.I., 2015. Determinants of environmental disclosure in annual reports of Sri Lankan listed manufacturing companies. *Journal of Management*, 12 (1), p 91-112.

JINFENG, Z. and HUIFENG, X., 2009. Empirical research on factors influencing level of environmental protection information disclosure in annual reports by listed companies. *Chinese Journal of Population Resources and Environment*, 7(1), pp. 15-22

Jizi, M. I., et al., 2014. Corporate governance and corporate social responsibility disclosure: evidence from the U.S. banking sector. *Journal of Business Ethics*, 125(4), pp. 601-615.

JOHNSON, J.L., DAILY, C.M. and ELLSTR, A.E., 1996. Boards of directors: A review and research agenda. *Journal of management*, 22(3), pp.409-438.

JUHMANI, O., 2014. Determinants of corporate social and environmental disclosure on websites: The Case of Bahrain. *Universal Journal of Accounting and Finance*, 2(4), pp.77-87.

KANAGARETNAM, K, LOBO, G. J, and WHALEN, D. J., 2007. Does Good Corporate Governance Reduce Information Asymmetry Around Quarterly Earnings Announcements? *Journal of Accounting and Public Policy*, 26(4), pp. 497-522.

KANAGARETNAM, K., LOBO, G.J. and WHALEN, D.J., 2007. Does good corporate governance reduce information asymmetry around quarterly earnings announcements? *Journal of Accounting and Public policy*, 26(4), pp.497-522.

KARAMANOU, I. AND VAFEAS, N., 2005. The Association Between Corporate Boards, Audit Committees, And Management Earnings Forecast: An Empirical Analysis. *Journal of Accounting Research*, 43(3); pp. 453-486.

KATHY RAO, K., TILT, C.A. and LESTER, L. H., 2012. Corporate Governance and Environmental Reporting: An Australian study. *Corporate Governance: The International Journal of Business in Society*, 12(2), pp.143-163.

KAYMAK, T. and BEKTAS, E., 2017. Corporate social responsibility and governance: Information disclosure in multinational corporations. *Corporate Social Responsibility and Environmental Management*, 24(6), pp.555-569.

KELTON, A. S. and YANG, Y., (2008). the impact of corporate governance on internet financial reporting. *Journal of Accounting and Public Policy*, 27, pp. 62-87.

KHAIREDDINE, H., et al. ,2020. Impact of board characteristics on governance, environmental and ethical disclosure. *Society and Business Review*, 15(3), 273-295.

KHALID, F., et al., 2022. Firm characteristics, governance mechanisms, and E.S.G. disclosure: how caring about sustainable concerns? *Environmental Science and Pollution Research*, 29(54), pp.82064-82077.

KHALID, T. B., KOUHY, R., and HASSAN, A. 2017. The impact of corporate characteristics on social and environmental disclosure (CSED): The case of Jordan. *Journal of Accounting and Auditing: Research and Practice*, pp1-28.

KHAN, A., MUTTAKIN, M.B. and SIDDIQUI, J., 2013. Corporate governance and corporate social responsibility disclosures: Evidence from an emerging economy. *Journal of Business Ethics*, 114, pp.207-223.

KHAN, H., 2010. The effect of corporate governance elements on corporate social responsibility (C.S.R.) reporting: Empirical evidence from private commercial banks of Bangladesh. *International Journal of Law and Management*, 52(2), pp. 82-109.

KILINCARSLAN, E., ELMAGRHI, M.H. and LI, Z., 2020. Impact of governance structures on environmental disclosures in the Middle East and Africa. Corporate Governance: The *International Journal of Business in Society* 20(4), pp. 739-763.

KIM O. and GARANINA, T., 2022. The relationship between C.S.R. disclosure and accounting conservatism: the role of state ownership. *Journal of International Accounting, Auditing and Taxation*, pp. 1-57.

KING COMMITTEE ON CORPORATE GOVERNANCE AND INSTITUTE OF DIRECTORS, 2002. *King Report on Corporate Governance for South Africa*. [online]. Institute of Directors in Southern Africa. Available from: https://www.mervynking.co.za/downloads/CD_King2.pdf [Accessed 17 December 2021].

KIPKORIR, R. K., 2016. Drivers of Environmental Reporting Practices by Listed Firms at the Nairobi Securities Exchange PhD thesis, Durham University of Nairobi.

KONRAD, A.M., KRAMER, V. and ERKUT, S., 2008. The impact of three or more women on corporate boards. *Organizational dynamics*, 37(2), pp. 145-164.

KOULOLOUKOUI, D., et al., 2018. Disclosure of climate risk information by the world's largest companies. *Mitigation and adaptation strategies for global change*, 23(8), pp.1251-1279.

KRIPPENDORFF, K. (2013). Content analysis: an introduction to its methodology 3rd Vol. London: SAGE.

KUTNER, M. H., NACHTSHEIM, C. J., and NETER, J. 2020. *Applied linear regression models*. McGraw-Hill/Irwin.

KUMARI, P. R., et al., 2022. Board characteristics and environmental disclosures: evidence from sensitive and non-sensitive industries of India. *International Journal of Managerial Finance*, 18(4), pp.677-700.

LAKSMANA, I. 2008. Corporate Board Governance and Voluntary Disclosure of Executive Compensation Practices. *Contemporary Accounting Research*, 25(4), pp.1147-1182.

LAVIN, J.F. and MONTECINOS-PEARCE, A.A., 2021. ESG disclosure in an emerging market: an empirical analysis of the influence of board characteristics and ownership structure. *Sustainability*, 13(19), pp.1-20.

LEUNG, S. and HORWITZ, B., 2004. Director ownership and voluntary segment disclosure: Hong Kong evidence. *Journal of International Financial Management & Accounting*, 15(3), pp. 235-260.

LI, Z., HAQUE, S. and CHAPPLE, L., 2023. Disclosures of labour practices: Perspectives of legitimacy and impression management. *Journal of Accounting Literature*, 45(2), pp.256-288.

LI, H. and QI, A., 2008. Impact of corporate governance on voluntary disclosure in Chinese listed companies. *Corporate Ownership and control*, 5(2), pp.360-366.

LIAO, L., LUO, L. and TANG, Q., 2015. Gender diversity, board independence, environmental committee and greenhouse gas disclosure. *The British Accounting Review*, 47(4), pp. 409-424.

LIM, S., MATOLCSY, Z. AND CHOW, D. 2007. The association between board composition and different types of voluntary disclosure. *European Accounting Review*, 16(3), pp. 555-583.

LIN, C.C. and NGUYEN, T.P., 2022. The Impact of Ownership Structure on Corporate Social Responsibility Performance in Vietnam. *Sustainability*, 14(19), pp.1-7

LINDBLOM, C. K., 1994. The Implications of Organizational Legitimacy for Corporate Social Performance and Disclosure. In *Critical Perspectives on Accounting Conference*, New York.

LITWIN, M. S. 1995. *How to Measure Survey Reliability and Validity*. London: Sage

LIU, H., 2015. *The Relationship between Corporate Governance, Environmental Disclosure, and Firm Value in Chinese Listed Companies*. PhD thesis, Durham University.

LIU, X. and ANBUMOZHI, V. 2009. Determinant factors of corporate environmental information disclosure: an empirical study of Chinese listed companies. *Journal of Cleaner Production*, 17(6), 593-600.

LODHIA, S. K., 2003. Accountants' Responses to the Environmental Agenda in a Developing Nation: An Initial and Exploratory Study on Fiji. *Critical Perspectives on Accounting*, 14(7), pp.715-737.

LOGSDON, J.M., 1985. Organizational Responses to Environmental Issues: Oil Refining Companies and Air Pollution. *Research in Corporate social Performance and Policy*, 7 pp. 47-72.

LU, Y. and ABEYSEKERA, I., 2014. Stakeholders' power, corporate characteristics, and social and environmental disclosure: Evidence from China. *Journal of Cleaner Production*, 64, pp. 426-436.

MACKENZIE, C., 2007. Boards incentives and corporate social responsibility: The case for a change of emphasis. *Corporate Governance. An International Review*, 15(5), pp. 935-943.

MAGNESS, V. 2006. Strategic Posture, Financial Performance and Environmental Disclosure: An Empirical Test of Legitimacy Theory. *Accounting, Auditing and Accountability Journal*, 19(4), pp, 540-563.

MAKORI, D.M. and JAGONGO, A., 2013. Environmental accounting and firm profitability: An empirical analysis of selected firms listed in Bombay stock exchange, India. *International Journal of Humanities and Social Science*, 3(18), pp. 248-256.

MALHOTRA, NK, et al., 2006, *Marketing research: An applied orientation* 3rd ed. Pearson Educational, Frenchs Forest, New South Wales.

MALLIN, C., MICHELON, G. and RAGGI, D., 2013. Monitoring intensity and stakeholders' orientation: How does governance affect social and environmental disclosure? *Journal of business ethics*, 114, pp.29-43.

MANITA, R., et al., 2018. Board Gender Diversity and ESG Disclosure: Evidence From the USA. *Journal of Applied Accounting Research*, 19(2), pp.206-224

MARSHALL, R.S., BROWN, D. and PLUMLEE, M., 2011. Driving To Distraction or Disclosure? Shareholder Activism, Institutional Investors and Firms' Environmental Transparency, IN JAIN S.C. and KEDIA B.L. Eds, *Enhancing Global Competitiveness Through Sustainable Environmental Stewardship*, Northampton, MA Edward Elgar Publishing, Inc., pp. 153-186

MARTINEZ, R.J. AND DACIN, M.T., 1999. Efficiency motives and normative forces: Combining transactions costs and institutional logic. *Journal of Management*, 25(1), pp.75-96.

MARWA, M., SALHI, B. AND JARBOUI, A., 2020. Environmental Audit and Environmental Disclosure Quality. *Scientific Annals of Economics and Business*, 67(1), pp.93-115.

MASUD, M.A.K., NURUNNABI, M. and BAE, S.M., 2018. The effects of corporate governance on environmental sustainability reporting: Empirical evidence from South Asian countries. *Asian Journal of Sustainability and Social Responsibility*, 3, pp.1-26.

MATHEWS, M.R., 1984. A Suggested Classification for Social Accounting Research. *Journal of Accounting and Public Policy*, 3(3), pp.199-221.

MCMURTRIE, T., 2005. Factors influencing the publication of social performance information: an Australian case study. *Corporate social responsibility and environmental management*, 12(3), pp.129-143.

MICHELON, G. and PARBONETTI, A., 2012. The Effect of Corporate Governance on Sustainability Disclosure. *Journal of Management - Governance*, 16(3), pp.477-509.

MIKLOSIK, A. and EVANS, N., 2021. Environmental sustainability disclosures in annual reports of mining companies listed on the Australian stock exchange (ASX). *Heliyon*, 7(7), pp. 1-11.

MIRFAZLI, E., 2008. Corporate social responsibility (CSR) information disclosure by annual reports of public companies listed at Indonesia Stock Exchange (IDX). *International Journal of Islamic and Middle Eastern Finance and Management*, 1(4), pp.275-284.

MILNE, M.J. and ADLER, R.W., 1999. Exploring the Reliability of Social and Environmental Disclosures Content Analysis. *Accounting, Auditing and Accountability Journal*, 12(2), pp. 237-256.

MILES, J. AND SHEVLIN, M., 2001. *Applying regression and correlation: A guide for students and researchers*. London: Sage Publications.

MINISTRY OF FOREIGN AFFAIRS, NIGERIA, 2022. *Nigerian Natural Resources*. Ministry Of Foreign Affairs, Nigeria. Available from: <https://foreignaffairs.gov.ng/nigeria/natural-resources/> [Accessed 13 January 2024].

MITALI, S., MUKHERJEE, K. AND PATTANAYAK, J.K., 2011. Corporate environmental disclosure practices in India. *Journal of Applied Accounting Research*, 12(2), pp.139-156.

MOBLEY, S.C., 1970. The Challenges of Socio-Economic Accounting. *The Accounting Review*, 45(4), pp.762-768.

MOHAMMED S, D. 2018. Mandatory social and environmental disclosure: A performance evaluation of listed Nigerian oil and gas companies pre-and post-mandatory disclosure requirements. *Journal of Finance and Accounting*, 6(2), pp. 56-68.

MONKS, R. A. G. and MINOW, N., 1995. *Corporate Governance*. Blackwell Business, Cambridge.

MONTEIRO, S, M. and AIBAR-GUZMÁN, B. 2010. Determinants of environmental disclosure in the annual reports of large companies operating in Portugal. *Corporate Social Responsibility and Environmental Management*, 17(4), pp. 185–204.

MURA, M., et al., 2019. An Exploration of Content and Drivers of online sustainability disclosure: a study of Italian organisations. *Sustainability*, 11(12), pp. 488–506.

MUTTAKIN, M. B., and SUBRAMANIAM, N., 2015. Firm ownership and board characteristics: Do they matter for corporate social responsibility disclosure of Indian Companies? *Sustainability Accounting, Management and Policy Journal*, 6(2), pp. 138-165.

NADEEM, M., ZAMAN, R. and SALEEM, I., 2017. Boardroom gender diversity and corporate sustainability practices: evidence from Australian Securities Exchange listed firms, *Journal of Cleaner Production*, 149, pp. 874-885.

NASEEM, M. A., et al., 2017. Impact of board characteristics on corporate social responsibility disclosure. *Journal of Applied Business Research (JABR)*, 33(4), pp. 801-810.

NASER, K., ALKHATIB, K. and KARBHARI, Y., 2002. Empirical evidence on the depth of corporate information disclosure in developing countries: The Case of Jordan. *International Journal of Commerce & Management*, 12 (3/4), pp. 122-134.

NASEER, M. and RASHID, K., 2018. The relationship between environmental reporting and corporate governance: empirical evidence from Pakistan. *In Globalization. Intech Open*, pp. 1-29.

NDALU, T.C., IBANICHUKA, E.A.L. and OFURUM, C.O., 2021. Board characteristics and environmental disclosure of quoted oil and gas firms in Nigeria: The moderating role of firm size. *International Journal of Innovative Finance and Economics Research*, 9(4), pp.51-62.

NICOLÒ, et al., 2021. Sustainable corporate governance and non-financial disclosure in Europe: does the gender diversity matter? *Journal of Applied Accounting Research*, 23(1), pp. 227-249.

NIGERIAN ACCOUNTING STANDARD BOARD 2018. *Code of Corporate Governance for Public Companies in Nigeria*. [Online]. Available from: <https://pwc nigeria.typepad.com/files/nigerian-code-of-corporate-governance-2018-1.pdf> [Accessed 16 March 2023].

NIGERIAN EXCHANGE GROUP., 2023. *Corporate Overview*. [online]. Nigerian Exchange Group. Available from: <https://ngxgroup.com/about/> [Accessed 8 January 2024].

NIGERIAN EXCHANGE LIMITED., 2023. *Dynamic marketplace to raise capital and drive growth*. Nigerian Exchange Group. Available from: <https://ngxgroup.com/exchange/raise-capital/> [Accessed 8 January 2024].

NIGERIAN REAL EXCHANGE., 2023. *What we do*. [online]. Nigerian Exchange Group. Available from: <https://ngxgroup.com/real-estate/what-we-do/> [Accessed 8 January 2024].

NIGERIA REGULATION LIMITED., 2023. *What we do*. [online]. Nigerian Exchange Group. Available from: <https://ngxgroup.com/regulation/what-we-do/> [Accessed 8 January 2024].

NGUYEN, T.L.H., et al., 2020. The determinants of environmental information disclosure in Vietnam listed companies. *Journal of Asian Finance, Economics and Business*, 7(2), pp.21-31.

NGUYEN, L. S., et al., 2017. Factors affecting disclosure levels of environmental accounting information: The case of Vietnam. *Accounting & Finance Research*, 6(4), pp. 255-264.

NEUMAN, W., 2011. *Social Research Science Qualitative and Quantitative Approaches*, Pearson Education Inc, 7th Ed. Boston, USA.

NURLENI, N. AND BANDANG, A., 2018. The effect of managerial and institutional ownership on corporate social responsibility disclosure. *International Journal of Law and Management*, 60(4), pp.979-987.

NTIM, C.G. and SOOBAROYEN, T., 2013. Corporate governance and Performance in socially responsible corporations: New empirical insights from a Neo-Institutional framework. *Corporate Governance: An International Review*, 21(5), pp.468-494.

NTUI, P.P., MZENZI, S. and CHALU, H. 2021. Firm characteristics and environmental disclosure in an extractive industry in Tanzania. *Business Management Review*, 24(2), pp. 33-54.

NUSKIYA, M. N. F., et al., 2021. Determinants of corporate environmental disclosures in Sri Lanka: the role of corporate governance. *Journal of Accounting in Emerging Economies*.pp.1-47.

NWACHUKWU, N (2016). FG suspends Obaze's Code of Corporate Governance. *Business Day*. [online] 7 November. Available From: <https://businessday.ng/exclusives/article/fg-suspends-obazees-code-of-corporate-governance/> [Accessed 15 November 2023].

NWOBU, O.A., 2017. *Determinants of corporate sustainability reporting in selected companies in Nigeria*. PhD thesis, Covenant University Repository

OAKSHOTT, L., 2020. *Essential quantitative methods: For business, management and finance*. 7th ed. London, Bloomsbury Publishing.

ODERA, O., SCOTT, A. and G.O.W., J. 2016. An examination of the quality of social and environmental disclosures by Nigerian oil companies. *Corporate Governance*, 16(2), 400-419.

ODIA, J., 2015. Corporate characteristics and corporate social and environmental disclosures quantity in Nigeria. *Journal of Accounting, Business & Management*, 22(1), pp. 13-28.

ODOEMELAM, N. and OKAFOR, R.G., 2018. The influence of corporate governance on environmental disclosure of listed non-financial firms in Nigeria. *Indonesian Journal of Sustainability Accounting and Management*, 2(1), pp.25-49.

O'DONOVAN, G., 2002. Environmental Disclosures in the Annual Report: Extending the Applicability and predictive Power of Legitimacy Theory. *Accounting, Auditing & Accountability Journal*, 15(3), pp. 344-371.

OGBUIGWE, A., 2018. Refining in Nigeria: History, challenges and prospects. *Applied Petrochemical Research*, 8, pp.181-192.

OFOEGBU, G.N., ODOEMELAM, N. and OKAFOR, R.G., 2018. Corporate board characteristics and environmental disclosure quantity: Evidence from South Africa (integrated reporting) and Nigeria (traditional reporting). *Cogent Business & Management*, 5(1), pp. 1-27.

OHIDOA, T., OMOKHUDU, O.O. and OSEROGHO, I. 2016. Determinants of environmental disclosure. *International Journal of Advanced Academic Research Social & Management Sciences*, 2(8), pp. 49-58.

OKAFOR., 2023. From Balewa to Tinubu: Historical guide on Nigeria's 16 leaders since independence. *Premium Times*. [online]. 8 June. Available from <https://www.premiumtimesng.com/news/603162-603162.html> [Accessed 10 January 2024].

OJO, O. and FAJEMISIN, D., 2010. Nigeria's privatisation programme: Structures, strategies and shortcomings. *Petroleum-Gas University of Ploiesti Bulletin*, 62(1), pp.12-20.

OKE, S.A., 2004. On the environmental pollution problem: A review. *Journal of Environmental Engineering and Landscape Management*, 12(3), pp.108-113.

OKERE, W., et al., 2021. Board characteristics and environmental information disclosure of listed manufacturing firms in Nigeria. *Journal of Business and Entrepreneurship*, 9(2), pp.82-93.

OKOROBIA, A.M. and OLALI, S.T., 2018. The Historical Trajectory of Crude Oil Exploration and Production in Nigeria, 1930-2015. eds. *The political ecology of oil*

and gas activities in the Nigerian aquatic ecosystem. Academic Press. pp. 17-31. [Online] Available from: <https://www.sciencedirect.com/science/article/pii/B9780128093993000057> Accessed [28 November 2023].

OKOTIE, S., 2018. The Nigerian economy before the discovery of crude oil. In: NDIMELE, P.E. eds. *The political ecology of oil and gas activities in the Nigerian aquatic ecosystem* (pp. 71-81). Academic Press. [Online] Available from: <https://www.sciencedirect.com/science/article/pii/B9780128093993000057> Accessed [28 November 2023].

OLUWAGBEMIGA, E.O., 2014. The use of voluntary disclosure in determining the quality of financial statements: evidence from the Nigeria listed companies. *Serbian Journal of management*, 9(2), pp.263-280.

OMRAN, A, M. and M. EL-GALFY, A., 2014. Theoretical perspectives on corporate disclosure: a critical evaluation and literature survey. *Asian Review of Accounting*, 22(3), pp.257-286.

ORAKA, A. & EGBUNIKE, F., 2016. Appraisal of environmental accounting information in the financial statements of consumer goods manufacturing companies in Nigeria. *NG-Journal of Social Development*, 417(3954), pp. 1-23.

ORGANIZATION FOR ECONOMIC CO-OPERATION and DEVELOPMENT (OECD) 2004. *OECD Principals of Corporate Governance*. France, OECD Publishing.

ORTAS, E., GALLEGO-ALVAREZ, I., and ÁLVAREZ ETXEBERRIA, I., 2015. Financial factors influencing the quality of corporate social responsibility and environmental management disclosure: A quantile regression approach. *Corporate Social Responsibility and Environmental Management*, 22(6), pp. 362-380.

OSCAR and JULIET, O. O., 2015. The effect of corporate governance on the extent of environmental reporting in the Nigerian oil industry. *International Journal of Business and Social Science*, 6(10), pp. 203-210.

OSEMENE, O. F., et al., 2021. Corporate governance and environmental accounting reporting in selected quoted African companies. *Global Business Review*, pp. 1-24.

Osemene, O. F., Adinnu, P., Fagbemi, T. O., & Olowookere, J. K. (2021). Corporate governance and environmental accounting reporting in selected quoted African companies. *Global Business Review*, 1-24.

O'SULLIVAN, M., PERCY, M. and STEWART, J. 2008. Australian evidence on corporate governance attributes and their association with forward-looking information in the annual report. *Journal of Management and Governance*, 12(1), pp. 5-35.

OZILI, P.K., 2020. Corporate governance research in Nigeria: A review. *S.N. Business & Economics*, 1(1), p.1-17.

PADDISON, L., and CHOI, A. 2024. *Which countries are contributing the most to climate change?* CNN. [Online] Available from: <https://edition.cnn.com/interactive/2023/12/us/countries-climate-change-emissions-cop28/> (Accessed 2, January 2024).

PATELLI, L. and PRENCIPE, A., 2007. The relationship between voluntary disclosure and independent directors in the presence of a dominant shareholder. *European Accounting Review*, 16(1), pp. 5-33.

PATTEN, D. M., 1991. Exposure, legitimacy, and Social Disclosure. *Journal of Accounting and public policy*, 10(4), pp.297-308.

PEARL, J., 2009. *Causality: Models, Reasoning, and Inference*. Cambridge University Press.

PFEFFER, J., and SALANCIK, G. R., 2003. The external control of organizations: A resource dependence perspective. Stanford University Press.

PHILLIPS, R., 2003. *Stakeholder theory and organizational ethics*. Berrett-Koehler Publishers.

PHILLIPS, O., SOMUYIWA, S. and OLAJIDE, O., 2017. The Nigerian Code of Corporate Governance 2018: An Ethical Approach to the Nigerian Corporate Governance System? *Int'l. In-House Counsel J.*, 11, p.1-17.

POLLACH, I., 2011. Online privacy as a corporate social responsibility: An empirical study. *Business ethics: A European review*, 20(1), pp. 88-102.

POST, C., RAHMAN, N., and RUBOW, E., 2011. Green governance: Boards of directors' composition and environmental corporate social responsibility. *Business & society*, 50(1), pp. 189-223.

PRADO-LORENZO, J.M., GALLEGO-ALVAREZ, I. and GARCIA-SANCHEZ, I.M., 2009. Stakeholder engagement and corporate social responsibility reporting: the ownership structure effect. *Corporate Social Responsibility and Environmental Management*, 16(2), pp.94-107.

PRZEPIORKA, W. and BERGER, J., 2017. Signalling theory evolving: Signals and signs of trustworthiness in social exchange. *Social dilemmas, institutions and the evolution of cooperation*, pp.373-392.

PUCHETA-MARTÍNEZ, M.C. and LÓPEZ-ZAMORA, B., 2018. Engagement of directors representing institutional investors on environmental disclosure. *Corporate Social Responsibility and Environmental Management*, 25(6), pp.1108-1120.

QIU, Y., SHAUKAT, A. and THARYAN, R., 2016. Environmental and social disclosures: Link with corporate financial Performance. *The British Accounting Review*, 48(1), pp. 102-116.

RAAR, J., 2002. Environmental initiatives: towards triple-bottom line reporting. Corporate Communications. *An International Journal*, 7(3), pp.169-183.

RABAYA, A.J. and SALEH, N.M., 2022. The moderating effect of IR framework adoption on the relationship between environmental, social, and governance (ESG) disclosure and a firm's competitive advantage. *Environment, Development and Sustainability*, 24(2), pp.2037-2055.

RABI M, A., 2019. Board characteristics and environmental disclosure: Evidence from Jordan. *International Journal of Business and Management*, 14(2), pp.1-9.

RADHOUANE, I., et al., 2018. The impact of corporate environmental reporting on customer-related Performance and market value. *Management Decision*, 56(7), pp. 1630-1659.

RAHAHLEH, M. Y., 2011. Means for Implementation of Environmental Accounting Jordanian Perspectives. *International Journal of Business and Management*, 6(3), pp.124.

RAHMAN, S. and ANWAR, M., 2016. Shareholder's Demand: A Determinant for the Environmental Disclosures: A Study in the Bangladesh Context. *Research Journal of Finance and Accounting*, 7(18), pp. 68-74.

RAIMO, N., DE NUCCIO, E. and VITOLLA, F., 2022. Corporate governance and environmental disclosure through integrated reporting. *Measuring Business Excellence*, 26(4), pp. 451-470.

RAMASWAMY, K. AND LI, M., 2001. Foreign investors and foreign directors and corporate diversification: An Empirical examination of large manufacturing companies in India. *Asia Pacific Journal of Management*, 18, pp. 207-222.

RAMAMOHANA R A 2017. Environmental pollution causes and consequences: A study North Asian. *International Research Journal of Social Science & Humanities* 13 (8), pp 151-161

RAMBA, M., JOSEPH, C. and SAID, R. 2021. Determinants of environment, social and governance disclosures by top Malaysian companies. *Middle East Journal of Management*, 8(2-3), pp. 233-253.

RAO., K. and TILT, C., 2016. Board composition and corporate social responsibility: The role of diversity, gender, strategy and decision making. *Journal of business ethics*, 138, pp.327-347.

RANKIN, M., WINDSOR, C., and WAHYUNI, D., 2011. An investigation of voluntary corporate greenhouse gas emissions reporting in a market governance system: Australian evidence. *Accounting, Auditing & Accountability Journal*, 24(8), pp. 1037-1070.

REGUERA-ALVARADO, N., DE FUENTES, P., and LAFFARGA, J., 2017. Does board gender diversity influence financial Performance? Evidence from Spain. *Journal of Business Ethics*, 141, pp. 337-350.

RD, J.E. and DISTRICT, W., 2012. Ownership structure and environmental disclosure: Taiwan evidence. *International Research Journal of Finance and Economics*, (88). Pp. 132-144

REBOREDO, J.C. AND SOWAITY, S., 2022. Environmental, Social, and Governance Information Disclosure and Intellectual Capital Efficiency in Jordanian Listed Firms. *Sustainability*, 14(1), pp.1-19.

REVERTE, C. 2009. Determinants of corporate social responsibility disclosure ratings by Spanish listed firms. *Journal of Business Ethics*, 88(2), pp. 351-366.

RIADH, M., et al., 2018. Board gender diversity and ESG disclosure: Evidence from the USS. *Journal of Applied Accounting Research*, 19(2), pp. 1-19.

ROBERTS, R.W., 1992. Determinants of corporate social responsibility disclosure: An application of stakeholder theory. *Accounting, Organizations and Society*, 17(6), pp. 595-612.

ROCKNESS, J.W., 1985. An Assessment of the Relationship Between US Corporate Environmental Performance and Disclosure. *Journal of Business Finance & Accounting*, 12(3), pp.339-354.

ROGERS G and KIRSTOF, J., 2003. Reducing Operational and Product Cost through Environmental Accounting, *Environmental Quality Management* 12(3), pp. 17-42.

ROSA PORTELLA, A. and BORBA, J.A., 2020. Environmental disclosure in corporate websites: a study in Brazil and U.S.A. companies. *RAUSP Management Journal*, 55, pp.309-324.

ROSEN, M.A., 2020. Sustainability: Concepts, Definitions, and Applications. *Building Sustainable Cities: Social, Economic and Environmental Factors*, pp.15-26

ROSENBAUM, P. R. 2020. *Design of Observational Studies*. Springer.

ROVER, S., MURCIA, F. D. R. and DE SOUZA MURCIA, F. C., 2015. The determinants of social and environmental disclosure practices: The Brazilian Case. *Environmental Quality Management*, 25(1), pp.5-24.

ROY., A. and GHOSH, S.K., 2019. Determinants of corporate environmental disclosure from an Asian perspective. *I.I.M. Kozhikode Society & Management view*, 8(2), pp.171-189.

RUENGWIRAYUDH, P. and BROOKS, G.P., 2016. Comparing stepwise regression models to the best-subsets models, or the art of stepwise. *General linear model journal*, 42(1), pp. 1-14.

RUPLEY, K. H., BROWN, D. and MARSHALL, R. S., 2012. Governance, media and the quality of environmental disclosure. *Journal of Accounting and Public Policy* 31 (6), pp. 610-640.

SALEHI, M., TARIGHI, H. and REZANEZHAD, M., 2019. Empirical study on the effective factors of social responsibility disclosure of Iranian companies. *Journal of Asian Business and Economic Studies* pp. 35-85.

SAN-ONG, T.Z.E., et al., (2019). The relationship between corporate governance attributes and environmental disclosure quality of Malaysian public listed companies. *Asian Journal of Accounting & Governance* 12, pp 1–12.

SANTON, P. and SANTON, J., 2002. "Corporate Annual Reports: Research Perspectives Used. *Accounting, Auditing & Accountability Journal*, 15(4), pp. 478-500.

SARHAN, A.A. and AL-NAJJAR, B., 2023. The influence of corporate governance and shareholding structure on corporate social responsibility: The key role of executive compensation. *International Journal of Finance & Economics*, 28(4), pp.4532-4556.

SAUNDERS, M., LEWIS, P. AND THORNHILL, A., 2019. *Research Methods for Business Students*. 8th ed. New York: Pearson.

SAUNDERS, M., LEWIS, P. and THORNHILL, A. 2012. *Research Methods for Business Students*, 6th ed. London: Pearson Education Limited.

SAUNDERS, M., LEWIS, P. and THORNHILL, A., 2009. Understanding Research Philosophies and Approaches. *Research Methods for Business Students*, 4, pp. 106-135.

SECURITIES AND EXCHANGE COMMISSION., 2011. Code of Corporate Governance for Public Companies in Nigeria. [Online] Available from: www.sec.gov.ng [Accessed 16 July 2023].

SECURITIES AND EXCHANGE COMMISSION., 2019. *About us*. [online]. Securities and Exchange Commission, Nigeria. Available from: <https://sec.gov.ng/about/> [Accessed 13 December 2023].

SEKARAN, U. 2003. *Research Methods for Business A Skill Building Approach*, 4th Ed., John Wiley & Sons, Inc.

SHADISH, W. R., COOK, T. D., and CAMPBELL, D. T. 2002. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Houghton Mifflin.

SHARIF, M. and RASHID, K., 2014. Corporate governance and corporate social responsibility (CSR) reporting: Empirical evidence from commercial banks (CB) of Pakistan. *Quality & Quantity*, 48(5), pp.2501-2521.

SHLEIFER, A. and VISHNY, R.W., 1997. A survey of corporate governance. *The journal of finance*, 52(2), pp.737-783.

SIMNETT, R., VANSTRAELEN, A. and CHUA, W.F., 2009. Assurance on sustainability reports: an international comparison. *The Accounting Review*, 84 (3), pp. 937–967.

SOLIKHAH, B. AND MAULINA, U., 2021. Factors influencing environment disclosure quality and the moderating role of corporate governance. *Cogent Business & Management*, 8(1), pp. 1-18.

SOLIMAN, M., EL DIN, M. AND SAKR, A., 2013. Ownership structure and Corporate Social Responsibility (CSR): An empirical study of the listed companies in Egypt. *International journal of social sciences*, 5(1), pp. 63-74.

SONGINI, L., et al., 2021. Integrated reporting quality and board characteristics: an empirical analysis. *Journal of Management and Governance*, 26; pp. 580-620.

SOLOMON, J., 2007. *Corporate Governance and Accountability*. London: John Wiley & Sons.

SUCHMAN, M.C., 1995. Managing legitimacy: Strategic and Institutional Approaches. *Academy of Management Review*, 20(3), pp. 571-610.

SUFIAN, M. A. and ZAHAN, M., 2013. Ownership structure and corporate social responsibility disclosure in Bangladesh. *International Journal of Economics and Financial Issues*, 3(4), pp. 901-909.

SULLIVAN, D., 1994. Measuring the degree of internationalisation of a firm. *Journal of International Business Studies*, 25(2), pp. 325-342.

SUSMAN, G.I. 2007. *Small and medium-sized enterprises and the global economy*. Edward Elgar Publishing. Cheltenham, U.K.

STANKO, B.B., BROGAN, E., ALEXANDER, E. AND CHAY, J., 2006. Environmental accounting. *Business & economic review*, 52(3), pp.21-27.

STANNY, E. AND ELY, K. 2008. Corporate Environmental Disclosure About the Effects of Climate Change. *Corporate Social Responsibility and Environmental Management*, 15(6): pp. 338-348.

STEYN, P., 2009. Oil exploration in colonial Nigeria, 1903–58. *The Journal of Imperial and Commonwealth History*, 37(2), pp.249-274.

STOUT, L.A., 2003. The shareholder as Ulysses: Some empirical evidence on why investors in public corporations tolerate board governance. *U.Pa.L.Rev.* 152, pp. 667-712.

STRAND, R. and FREEMAN, R. E. 2015. Scandinavian cooperative advantage: The theory and practice of stakeholder engagement in Scandinavia. *Journal of Business Ethics*, 127(1), pp. 65-85.

SUTANTOPUTRA, A., 2022. Do stakeholders' demand matter in environmental disclosure practices? Evidence from Australia. *Journal of management and governance*, 26(2), pp.449-478.

TAGESSON, T., et al., 2009. What explains the extent and content of social and environmental disclosures on corporate websites: a study of social and environmental reporting in Swedish listed corporations. *Corporate social responsibility and environmental management*, 16(6), pp.352-364.

TAJ, S.A., 2016. Application of signalling theory in management research: Addressing major gaps in theory. *European Management Journal*, 34(4), pp.338-348.

TAURINGANA, V. AND CHITHAMBO, L. 2015. The effect of DEFRA guidance on greenhouse gas disclosure. *The British Accounting Review*, 47(4), pp. 425-444.

TAVORY, I. AND TIMMERMANS, S. 2014). *Abductive Analysis: Theorizing Qualitative Research*. University of Chicago Press

TINGBANI, et al., 2020. Board gender diversity, environmental committee and greenhouse gas voluntary disclosures. *Business Strategy and the Environment*, 29(6), pp.2194-2210.

THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) Report (2021). [Online] Available from: <https://shorturl.at/pzLVX> [Accessed 12 July 2022].

THE GUARDIAN, 2023 Nearly 14,000 Nigerians take Shell to court over devastating impact of pollution. *The Guardian*. [online]. 2 February. Available from: <https://www.theguardian.com/world/2023/feb/02/nearly-14000-nigerians-take-shell-to-court-over-devastating-impact-of-pollution> [Accessed 20 February 2024].

TRAN, T., M., 2017. *Institutional Environment, Corporate Governance and Corporate Social Responsibility Disclosure: A Comparative Study of Southeast Asian Countries*. PhD Thesis, Huddersfield University.

TRANSPARENCY INTERNATIONAL 2022. Corruption Perceptions Index. [Online] Available from: <https://www.transparency.org/en/countries/nigeria> [Accessed 12 May 2023].

TRIREKSANI, T. and DJAJADIKERTA, H. G., 2016. Corporate governance and environmental disclosure in the Indonesian mining industry. *Australasian Accounting, Business and Finance Journal*, 10(1), pp. 18–28.

TYLER, T. R., 2006. Psychological Perspectives on Legitimacy and Legitimation. *Annual Review of Psychology*, 57, pp. 375–400.

TYROWICZ, J., TERJESEN, S., and MAZUREK, J. 2020. All on board? New evidence on board gender diversity from a large panel of European firms. *European Management Journal*, 38(4), pp. 634-645.

ULLAH, M.S., 2020. *The influence of global, country and firm-level governance on social and environmental reporting: Evidence from developing countries*. PhD thesis, University of Sheffield.

ULLAH, M.H., HOSSAIN, M.M. and YAKUB, KM 2014. Environmental disclosure practices in annual report of the listed textile industries in Bangladesh. *Global Journal of Management and Business Research: Accounting and Auditing*, 14(1), pp. 96-108.

UMOREN, A.O., UDO, E.J. and GEORGE, B.S. 2015. Environmental, social and governance disclosures: A call for integrated reporting in Nigeria. *Journal of Finance and Accounting*, 3(6), pp. 227-233.

UNDERDOWN, B. and TAYLOR, P. J., 1985. *Accounting Theory and Policy Making*, London: Heinemann.

UNERMAN, J., 2000. Methodological issues reflections on quantification in corporate social reporting content analysis. *Accounting, Auditing & Accountability Journal*, 13(5), pp. 667-681.

UNITED NATIONS, 2022. World economic situation and prospects report. *United Nations* [Online]. Available from: <https://shorturl.at/himnz> [Accessed 1 January 2024].

UNITED NATIONS CHILDREN'S FUND, 2022. The Climate Crisis is a Child Rights Crisis: Introducing the Children's Climate Risk Index. *UNICEF Division of Communication* [Online] Available from: <https://www.unicef.org/media/105376/file/UNICEF-climate-crisis-child-rights-crisis.pdf> [Accessed 12 June 2023].

UNITED NATIONS ENVIRONMENTAL PROGRAMME, 2024. About the United Nations Environment Programme. *United Nations Environmental Programme*. [Online]

Available from: <https://www.unep.org/who-we-are/about-us> [Accessed 19 May 2024].

U.S ENERGY INFORMATION ADMINISTRATION (E.I.A.). (2020). Country Ranking on Coal Export. [Online] Available From <https://www.eia.gov/international/analysis/country/NGA> [Accessed 11 April 2022].

UWUIGBE, U.N., EGBIDE, B.C. and AYOKUNLE, A.M., 2011. The effect of board size and board composition on firms' corporate environmental disclosure: a study of selected firms in Nigeria. *Acta Universitatis Danubius. Œconomica*, 7(5), pp. 164-176.

VANGUARD, 2023 Full list of all 371 tribes in Nigeria, states where they originate. *Vanguard* [online]. 10 May. Available from: <https://www.vanguardngr.com/2017/05/full-list-of-all-371-tribes-in-nigeria-states-where-they-originate/> [Accessed 23 November 2023].

VAN STADEN, C.J., and HOOKS, J., 2007. A Comprehensive Comparison of Corporate Environmental Reporting and Responsiveness. *British Accounting Review* 39 (3), pp. 197–210.

VERRECCHIA, R. 2001. "Essays on Disclosure". *Journal of Accounting and Economics*, 32(13), pp. 97-180.

VIANA, D. B. C., and CRISÓSTOMO, V. L. 2020. The effects of voting ownership concentration on social and environmental disclosure: empirical evidence from Brazil. *Review of Business Management*, 21(4), p.906-927.

VICTOR-CHIEDU, O. and FODIO, M. I., 2012. Board Characteristics and the Quality of Environmental Reporting in Nigeria. *The Journal of Accounting and Management*, 2(2), pp.33-48.

WANG, L., FAN, X. and ZHUANG, H., 2023. ESG disclosure facilitator: How do the multiple large shareholders affect firms' ESG disclosure? Evidence from China. *Frontiers in Environmental Science*, 11, pp. 1-9.

WANG, M. and HUSSAINEY, K. 2013. Voluntary Forward-Looking Statements Driven by Corporate Governance and their Value Relevance. *Journal of Accounting and Public Policy*, 32(3), pp. 26-49.

WEBB D. J., MOHR LA, and HARRIS K., E., 2008. A re-examination of socially responsible consumption and its measurement. *Journal of Business Research*, 61(2), pp. 91-98.

WEBER, R. P., 1990. *Basic Content Analysis*, 2nd Ed, Sage, London.

WEIR, C., LAING, D., and MCKNIGHT, P. J. 2002. Internal and external governance mechanisms: their impact on the Performance of large U.K. public companies. *Journal of Business Finance & Accounting*, 29(5-6), pp. 579-611.

WELBECK, E. T., et al., 2017. Determinants of environmental disclosures of listed firms in Ghana. *International Journal of Corporate Social Responsibility*, 2(1), pp 2-11.

WELFORD, R., 2007. Corporate governance and corporate social responsibility: Issues for Asia. *Corporate Social Responsibility and Environmental Management*, 14(1), pp.42-51.

WEN, S. 2009. Institutional Investor Activism on Socially Responsible Investment: Effects and expectations. *Business Ethics*, 18(3), pp. 308–333.

WIDIARTO, S, A., 2009. Social disclosure rating system for assessing firms' C.S.R. reports. *Corporate communications: An International Journal*, 14(1), pp. 34-48.

WILLIAMS, L., 2012, *Bradt travel guides*, The Globe Pequot Press Inc., Connecticut.

WILMSHURST, T.D. and FROST, G. R, 2000. Corporate Environmental Reporting: A Test of Legitimacy Theory. *Accounting, Auditing and Accountability Journal*, 13(1), pp. 10–26.

WINCENT, J., ANOKHIN, S., and ÖRTQVIST, D. (2010). Does network board capital matter? A study of innovative Performance in strategic S.M.E. networks. *Journal of Business Research*, 63(3), pp. 265-275.

WOLF, M. J, et al., 2022. 2022 Environmental Performance Index. New Haven, CT: *Yale Center for Environmental Law & Policy*. [online] Available from: <https://epi.yale.edu/> [Accessed 11 November 2023]

WOOLDRIDGE, J. M. 2013. Introductory Econometrics: A Modern Approach 5th Ed. Australia: South-Western Cengage Learning.

WORLD BANK, 2023. Total greenhouse gas emission. *The World Bank Group*. [Online] Available from: <https://data.worldbank.org/indicator/EN.ATM.GHGT.KT.CE?view=chart> [Accessed 12 October 2023].

WORLD BANK, 2022. Global Gas Flaring Data. [Online]. *The World Bank Group* Available from: <https://www.worldbank.org/en/programs/gasflaringreduction/global-flaring-data> [Accessed 11 April 2023].

WORLD BANK., 2023. Land area (sq. km). *World Bank Group* [Online] Available From: <https://data.worldbank.org/indicator/AG.LND.TOTL.K2?locations=NG> [Accessed 23 November 2023].

WORLD BANK., 2023. Population, total – Nigeria. *World Bank Group* [Online] Available From: <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=NG> [Accessed 23 November 2023].

WORLD BANK., 2023. Worldwide Governance Indicators. World Bank Group [Online] Available From: https://databank.worldbank.org/reports.aspx?Report_Name=WGI-Table&Id=ceea4d8b [Accessed 11 November 2023]

WORLD BANK., 2021. World Bank Climate Change Knowledge for development practitioners and policy makers. *World Bank Group* [Online] Available From: <https://climateknowledgeportal.worldbank.org/country/nigeria> [Accessed 21 November 2023]

WORLD POPULATION REVIEW 2023. Total Population by Country. [Online]. Available from: <https://worldpopulationreview.com/countries> [Accessed 08 May 2023].

World Top Exports. (2022). Iron Ore Export by Countries. [Online]. Available from: <https://www.worldstopexports.com/iron-ore-exports-country/> [Accessed 1 March 2023].

WURYANI, M., KURNIAWATI, S.B. and SATYANOVI, V.A., 2017. Firms' characteristics and environmental disclosure: a comparative study of hospitality industry of Indonesia, Malaysia and Thailand. *Review of Integrative Business and Economics Research*, 6(4), pp.364-377.

WUTTICHINDANON, S. 2017. Corporate social responsibility disclosure—Choices of report and its determinants: Empirical evidence from firms listed on the Stock Exchange of Thailand. *Kasetsart Journal of Social Sciences*, 38(2), pp. 156-162.

ZAID, M., et al., 2020. Boardroom gender diversity: Implications for corporate sustainability disclosures in Malaysia. *Journal of Cleaner Production*, 244, pp.1-14.

ZAID, M.A., ABUHILLEH, S.T. and PUCHETA-MARTÍNEZ, M.C., 2020. Ownership structure, stakeholder engagement, and corporate social responsibility policies: The moderating effect of board independence. *Corporate Social Responsibility and Environmental Management*, 27(3), pp.1344-1360.

ZENG, S. X., et al., 2012. Factors that drive Chinese listed companies in voluntary disclosure of environmental information. *Journal of Business Ethics*, 109(3), pp. 309-321.

ZHANG, D., 2022. Are Firms Motivated to Greenwash by Financial Constraints? Evidence from Global Firms' Data. *Journal of International Financial Management & Accounting*, 33(3), pp.459-479

ZIMMERMAN, M. A. and ZEITZ, G. J., 2002. Beyond survival: Achieving new venture growth by building legitimacy. *Academy of Management Review*, 27, pp. 414-431.

ZOUARI, G. AND DHIFI, K., 2022. The impact of ownership structure on integrated reporting in European firms. *Corporate Communications: An International Journal*, 27(3), pp.527-542.

APPENDICES

Appendix 1: Natural resources and severity of environmental issues ranking amongst developing countries.

S/N	Country Name	Average Gross Domestic Product (2017-20220)	Natural Resources Ranking				Severity of Environmental Issues Ranking			
			Oil	Gas	Coal	Iron ore	Gas Flaring	The Children's Climate Risk Index (CCRI) and CO2 Emissions (by Country)	Environmental Performance Index	Average Greenhouse gas emission (2017-2020)
1	Argentina	538.624	28.000	13.000	64.000	-	21.000	102.000	92.000	373391.040
2	Bahrain	39.157	-	-	-	8.000	50.000	133.000	90.000	52486.527
3	Bangladesh	386.007	-	-	-		66.000	15.000	177.000	209543.617
4	Botswana	17.007	-	-	40.000	65.000		84.000	35.000	12762.784
5	Brazil	1837.789	9.000	15.000	30.000		28.000	70.000	81.000	1068683.273
6	Chile	296.747	-	-	66.000	10.000	72.000	108.000	65.000	108718.619
7	China	15802.873	6.000	-	1.000	6.000	10.000	40.000	160.000	12553411.880
8	Colombia	322.679	21.000	-	12.000	-	39.000	61.000	87.000	182674.570
9	Egypt, Arab Rep.	367.713	27.000	21.000	-	-	12.000	58.000	127.000	319082.514
10	Ghana	70.178	-	-	-	79.000	35.000	35.000	170.000	35441.032
11	India	3045.583	23.000	12.000	2.000	11.000	18.000	26.000	180.000	3329722.308
12	Indonesia	1157.892	24.000	25.000	3.000	28.000	15.000	46.000	164.000	973136.136
13	Iran, Islamic Rep.	1176.222	7.000	17.000	45.000	20.000	3.000	70.000	133.000	867995.698

14	Iraq	226.071	5.000	6.000	-	63.000	2.000	61.000	169.000	267681.317
15	Jordan	45.285	-	-	-	59.000	91.000	96.000	81.000	35194.762
16	Kenya	102.624	-	-	-	50.000	-	49.000	148.000	74843.647
17	Libya	54.793	16.000	24.000	-	-	8.000	97.000	-	99800.056
18	Malaysia	379.384	29.000	18.000	35.000	14.000	17.000	61.000	130.000	295770.295
19	Mauritius	12.495	-	-	-	-	-	-	77.000	6687.029
20	Mexico	1276.965	11.000	11.000	29.000	-	7.000	54.000	73.000	645706.740
21	Nigeria	456.434	14.000	16.000	38.000	54.000	9.000	2.000	162.000	321657.591
22	Oman	91.432	19.000	-	-	16.000	11.000	97.000	149.000	97101.171
23	Philippines	376.471	-	-	-	21.000	56.000	31.000	158.000	428221.373
24	Pakistan	340.266	-	-	26.000	33.000	40.000	14.000	176.000	227363.460
25	Qatar	185.756	15.000	7.000	-	0.000	25.000	133.000	137.000	119937.904
26	Saudi Arabia	836.095	3.000	2.000	-	52.000	13.000	88.000	109.000	719303.863
27	Singapore	386.961	-	-	-	-	-	-	44.000	64834.280
28	Sri Lanka	87.657	-	-	-	-	-	61.000	132.000	34431.905
29	South Africa	394.857	-	-	7.000	4.000	67.000	72.000	116.000	537347.452
30	Tanzania	66.709	-	-	24.000		98.000	40.000	134.000	84116.149
31	Thailand	518.314	33.000	10.000	41.000	38.000	43.000	50.000	108.000	424800.412
32	Tunisia	44.041	49.000	37.000	-	-	41.000	121.000	96.000	41966.957
33	Turkey	818.676	-	-	11.000	23.000	65.000	97.000	172.000	500762.533
34	United Arab Emirates	432.375	8.000	4.000	-	26.000	27.000	100.000	39.000	246046.490
35	Vietnam	357.229	35.000	34.000	13.000	57.000	32.000	-	178.000	416865.156
36	Zambia	24.392	-	-	49.000	-	-	45.000	106.000	35799.549

This appendix shows the ranking of emerging markets in terms of natural resources and severity of environmental performance. Ranking of countries GDP is obtained from International Monetary Fund, 2023 representing average GDP from 2017-2023.

Higer values of ranking GDP is better. Rankings of natural resources in oil and gas are obtained from BP statistical review of world energy (2022). Ranking of coal is obtained from U.S Energy Information Administration, (2020). Ranking of Iron ore is obtained from World Top Exports (2022). Lower values of ranking in natural resources are better. Ranking based on the Children's Climate Risk Index is obtained from the United Nations Children's Fund (2022) with higher values indicating worse environmental performance. Higher values for the ranking based on Environmental Performance Index (2022) Performance Index (2022) indicates worse environmental performance with higher values indicating better environmental performance. Ranking based on gas flaring is obtained from the World Bank Global Gas Flaring (2022) with lower values indicating better environmental performance. Ranking based on average greenhouse gas emission from 2017-2020 is obtained from World Bank, (2023) with lower values indicating better environmental performance.

Appendix 2: Corporate governance indicators scores

S/N	Country Name	Average corporate governance codes scores according to World Bank (2017-2022)					
		Control of Corruption	Government effectiveness	Political Stability	Regulatory quality	Rule of law	Voice and accountability
1	Argentina	-0.258	-0.147	-0.002	-0.445	-0.388	0.563
2	Bahrain	-0.033	0.369	-0.662	0.617	0.434	-1.434
3	Bangladesh	-0.978	-0.744	-1.035	-0.882	-0.628	-0.733
4	Botswana	0.676	0.326	1.032	0.578	0.414	0.457
5	Brazil	-0.490	-0.436	-0.475	-0.166	-0.270	0.315
6	Chile	0.995	0.737	0.188	1.108	0.892	0.989
7	China	-0.152	0.568	-0.370	-0.278	1.353	-1.584
8	Colombia	-0.339	-0.045	-0.811	0.228	-0.422	0.149
9	Egypt, Arab Rep.	-0.643	-0.431	-1.164	-0.697	-0.321	-1.410
10	Ghana	-0.134	-0.205	0.056	-0.173	-0.015	0.519
11	India	-0.292	0.238	-0.778	-0.150	-0.025	0.214
12	Indonesia	-0.403	0.227	-0.499	0.124	-0.303	0.136
13	Iran, Islamic Rep.	-1.041	-0.684	-1.476	-1.462	-0.842	-1.403
14	Iraq	-1.349	-1.287	-2.460	-1.153	-1.770	-0.988
15	Jordan	0.095	0.121	-0.328	0.114	0.198	-0.743
16	Kenya	-0.836	-0.392	-1.066	-0.374	-0.441	-0.300
17	Libya	-1.560	-1.738	-2.387	-2.157	-1.770	-1.443
18	Malaysia	0.192	0.961	0.138	0.637	0.512	-0.145
19	Mauritius	0.308	0.855	0.861	1.103	0.769	0.708
20	Mexico	-0.962	-0.260	-0.749	-0.022	-0.701	-0.052
21	Nigeria	-1.104	-1.097	-1.917	-0.977	-0.895	-0.502
22	Oman	0.195	0.073	0.560	0.339	0.474	-1.123
23	Philippines	-0.545	0.043	-0.948	0.082	-0.579	-0.034

24	Pakistan	-0.826	-0.609	-2.051	-0.730	-0.691	-0.825
25	Qatar	0.758	0.858	0.740	0.705	0.818	-1.200
26	Saudi Arabia	0.298	0.318	-0.590	0.132	0.175	-1.624
27	Singapore	2.116	2.228	1.481	2.172	1.810	-0.141
28	Sri Lanka	-0.369	-0.190	-0.280	-0.314	0.003	-0.079
29	South Africa	-0.118	0.025	-0.422	-0.025	-0.119	0.679
30	Tanzania	-0.422	-0.688	-0.437	-0.635	-0.539	-0.548
31	Thailand	-0.465	0.221	-0.596	0.042	0.062	-0.856
32	Tunisia	-0.174	-0.132	-0.786	-0.393	0.059	0.151
33	Turkey	-0.354	-0.092	-1.300	-0.055	-0.395	-0.839
34	United Arab Emirates	1.112	1.361	0.642	1.001	0.810	-1.143
35	Vietnam	-0.442	0.099	0.016	-0.375	-0.094	-1.378
36	Zambia	-0.657	-0.737	0.022	-0.574	-0.491	-0.311

This appendix shows the ranking of developing countries in terms of average governance scores from 2017-2022 from World Bank governance indicators (2023) with higher positive values better.

Appendix 3: Summary of previous studies on measuring environmental disclosure and its association with firm characteristics in developed countries: Panel A

S/N	References	Country and year	Objectives	Theory	Observations	Source of report	Type of Disclosure	Measurement of Disclosure	Factors considered	Techniques for data analysis
1	Zhang, (2022)	47 countries	To investigate the determinants that lead to companies engaging in ESG greenwashing	Neoclassical and voluntary disclosure	7000	Bloomberg and Thomson	Disclosure index	ESG disclosure quantity	Financial constraint, financial management ability, financial leverage	OLS Regression
2	Danisch (2021)	Germany (2015-2018)	To examine the relationship between the extent of corporate social responsibility disclosure performance and corporate social responsibility disclosure.	Legitimacy	144	Website reports	Disclosure index	Corporate social responsibility disclosure quantity	Environmental Pillar Score, auditing, firm size, industry type, profitability, firm age	OLS Regression
3	Chithambo et al., (2021)	United Kingdom	To examine the determinants of environmental, social and governance greenwashing disclosure.	Stakeholder theory	343	Mixed method	Questionnaire annual reports, sustainability reports and websites	GHG disclosure quantity	stakeholder pressure firm size	OLS regression

4	Miklosik and Evans, (2021)	Australia (2019)	To examine the environmental sustainability disclosure in the annual reports of Australian mining companies.	Stakeholder and legitimacy theories	100	Annual reports	Textual analysis	Corporate environmental disclosure quantity	Firm Size	OLS Regression
5	Balluchi, Lazzeni and Torelli, (2021)	Italy (2017)	To investigate the credibility of environmental reporting	Legitimacy theory	152	Annual and sustainability	Disclosure index	Corporate social and environmental disclosure (SED) quality	Scandals and pressure, profitability, experience, size stand-alone, visibility, leverage and assurance	OLS Regression
6	Sutanoputra (2022)	Australia	To investigate the reason for the environmental disclosure	Stakeholder theory	9	Primary data	Interviews	Corporate environmental disclosure quantity	Environmental performance	Descriptive statistics
	Marwa, Salhi and Jarbooui, (2020)	France (2012 - 2017)	To explore the relationship between environmental quality and environmental audit.	Agency, signalling and legitimacy theories	486	Annual and sustainability reports	Disclosure index	Corporate environmental disclosure quality	environmental audit committee, CSR committee, the environmental auditor's BIG 4, earnings	OLS Regression

									managem nt, firm size, industry type leverage.	
8	Rosa Portel la and Borba , (2020)	United State and Brazil	To investigate the association between environmental disclosure and corporate characteristics amongst website of companies in USA and Brazil.	Legiti macy theory	117	Website	Disclosu re index	Corporate environmen tal disclosure quantity	environmen tal performanc e, size, profitability, debt, industry sector and country	OLS Regression
9	Cong, (2020)	United State (2010-2011)	To examine the relationship between the quantity greenhouse gas emission and climate change disclosure.		134	Annual reports	Disclosu re index	Climate change disclosure quantity	-	Rank Regression
10	Chian g et al., (2020)	United States (2013)	To examine the relationship between corporate disclosure and its determinants.		73	Annual reports	Textual analysis	Corporate social responsibilit y disclosure quantity	Growth opportunity , more incentives, Profitability, Environmental sensitivity, leverage, media coverage and agency cost	Tobit regression

11	Mura et al., (2019)	Italy (2008)	To identify the quantity of environmental and social disclosure and its determinants.	legitimacy and institutional theories	998	Website reports	Disclosure index	Sustainability disclosure quantity		cluster analysis
12	Radhouane et al., (2018)	France (2007-2011)	To examine the benefit of reporting environmental disclosure	stakeholder theory	600	Annual report	Disclosure index	Corporate environmental disclosure quantity	Environmental performance, customer proximity	OLS Regression
13	D'Amico, et al., (2016)	Italy (2006-2009)	To examine the factors that influence environmental disclosures	Legitimacy stakeholder and agency theories.	229	Annual reports	Disclosure index	Corporate environmental disclosure quality	company ownership, auditor type, leverage, public shareholding, cross-listening and legislation, business industry, economic performance, financial situation, firm age, foreign markets	OLS regression

14	Qiu, Shaukat and Tharyan. (2016)	United Kingdom 2005-2009	To examine the link between firm's social and environmental disclosure with profitability.	Voluntary disclosure theory	629	Annual reports	Disclosure index	Social and environmental disclosure quantity	Profitability, Market value and expected cash flow	OLS regression
15	Giannarakis, Andronikidis and Sarianidis, (2016)	Greece (2009-2013)	To identify the factors that influence dissemination of environmental disclosure	Voluntary disclosure, legitimacy, signalling theories.	92	Annual reports	Disclosure index	Environmental, social and governance disclosure quantity	Country risk, analyst, stock recommendation, firm value and environmental performance	Multiple linear regression
16	Bhattacharya, (2016)	Australia (2006-2007).	To examine the extent of social and environmental disclosure.	institutional and legitimacy theories	47	Annual reports	Disclosure index	Social and environmental disclosure quality	Firm size, profitability, age and auditor type	Multiple regression
17	Burgwal and Vieira, (2016)	Netherlands (2007-2008).	To identify variables that significantly impact the level of environmental disclosure practices.	Legitimacy, stakeholder and voluntary	30	Annual reports	Disclosure index	Corporate environmental disclosure quantity	Firm size, industry type and profitability	Pearson, Spearman correlation and student T-test.

	(2014).			ary disclosure theories.						
18	Andrikopoulos and Krikorian' (2013)	Denmark	To examine the breadth and cross-sectional variations of environmental disclosure on corporate characteristics	Legitimacy theory	136	Annual reports	Disclosure index	Corporate environmental disclosure quantity	Size, profitability, the market value of equity and leverage	OLS Regression
19	Mitali, Mukherjee, and Pattanayak, (2011)	India (2007-2008)	To examine the practice of environmental disclosure amongst Indian	Legitimacy, agency and resource dependency theories	22	Annual reports	Textual analysis	Corporate environmental disclosure quantity	-	Descriptive statistics
20	Monteiro and Aibar-Guzmán, (2010)	Portugal (2002-2004)	To identify the main factors that may have a significant influence on the extent of voluntary environmental disclosure	Legitimacy and Stakeholder theories	109	Annual reports	Disclosure index	Corporate environmental disclosure quantity	Firm size, industry type, quotation of the company in the stock exchange, profitability, foreign	Pearson correlation and OLS Regression

									ownership and environmental certification	
21	Echave and Bhati, (2010)	Spain (2007)	To examine the corporate SED practices of Spanish firms	agency, legitimacy and stakeholder	41	Annual reports	Disclosure index	Social and environmental disclosure quality	Firm size, industry type, financial performance, leverage and internationalisation	Descriptive statistics
22	Damak-Ayadi, (2009)	France (2000-2005)	To empirically test a model on determinants SED.	Stakeholder theory	36	Annual reports	Textual analysis	Corporate environmental disclosure quantity	Firm size, industry's reputation, financial performance, stakeholders' salience, and application of new economic regulation (NR)	Correlation
23	Reverte, (2009)	Spain 2005-2006	To investigate the determinants of corporate social responsibility disclosure	Legitimacy theory	46	Annual reports	Disclosure index	Corporate social responsibility quantity	Leverage, industry sensitivity, profitability, corporate	Correlation and OLS Regression

			amongst Spanish listed companies.						size, media pressure international listing, and ownership concentration.	
24	Stanny, and Ely, (2008)	USA 2007	To investigate the impact of climate change on environmental disclosure.		500	Primary data	Questionnaire	Corporate environmental disclosure quantity	Corporate size, foreign sales, capital expenditure, leverage, institutional ownership, asset age, Tobin's Q, profitability, and industry type.	Pearson correlation, and LOGIT Regression
25	Brammer and Pavelin, (2008)	United Kingdom (2005)	To examine patterns in the quality of voluntary ED made.	stakeholder theory	450	Annual and sustainability reports	Textual analysis	Corporate environmental disclosure quality	Nature of business activity, environmental performance, firm size, leverage company ownership,	multivariate regression

									company resources and board composition	
26	Branc o and Rodri gues, (2008)	Portug al (2003)	To investigate the factors influencing social responsibility disclosure Portuguese listed companies	Legiti macy theory	49	Annual report	Disclosu re index	Corporate social responsibility quantity	company size, environmental sensitivity, degree of international activity, consumer proximity, media pressure and industry	OLS Regression
27	Ho and Taylo r,(2007)	USA and Japan (2003)	To examine the extent of triple bottom line reporting in the United States and Japan.	Agenc y and signalli ng theorie s	50	Annual report	Disclosu re index	triple bottom line reporter quantity	Firm size, profitability, liquidity and industry membershi p.	OLS Regression
28	Magn ess (2006)	Canad a (1995)	To examine how stakeholder power improves corporate social responsibility disclosure quality	Legiti macy theory	40	Annual reports and sustainab ility reports	Disclosu re index	Corporate environmen tal disclosure quality	Strategic posture, External funding, financial performanc e and size	Spearman's Rank Correlation and OLS Regression

29	Campbell, (2004)	United Kingdom (1974-2000)	To examine the voluntary disclosure amongst the UK companies.		260	Annual report	Textual analysis	Corporate environmental disclosure quantity	industry type and membership of environmental lobbying organisations	t - tests 2-OLS Regression
30	García-Ayuso and Larrinaga, (2003)	Spain (1991-1995)	To test in the Spanish context, the hypotheses developed and tested in other countries by previous empirical studies	Legitimacy theory	560	Annual reports	Textual analyses.	Corporate environmental disclosure quantity	Size, risk (leverage), profitability, environmental sensitivity, and media exposure	Spearman's rank correlations and OLS regression
31	Gray et al. (2001)	European countries 1988 – 1995	To examine the association between corporate characteristics and social and environmental disclosure		100	Annual report	Disclosure index	Social and environmental disclosure quantity	Number of employees, capital employed, Profit, and turnover, Industry classification	OLS Regression
32	Deegan and Rankin, (1996)	Australia (1990-1993)	It investigates the environmental disclosure practices of a sample of Australian companies	Legitimacy theory	80	Annual report	Textual analysis	Corporate environmental disclosure quantity		T-Test

33	Hackston and Milne, (1996)	New Zealand (1992)	To examine some potential determinants of social and environmental disclosure.	Legitimacy and agency theories.	47	Annual reports	Disclosure index	Social and environmental disclosure quantity	Company size, industry type, and profitability	OLS Regression
34	Roberts, (1992)	1985	To measure stakeholder power in determining corporate social responsibility disclosure	Stakeholder theory	185	Annual reports	Disclosure index	Corporate social responsibility disclosure quantity	Industry type firm size and profitability	OLS Regression
35	Patten, (1991)	United States (1989)	To find out whether the voluntary social disclosures included by corporations in their annual reports are related to either public pressure or firm profitability.		156	Annual reports	Disclosure index	Voluntary disclosure quantity	Firm size, profitability and industry type.	OLS Regression
36	Cowen, Ferreira and Parker, (1987)	United States 1972-1980	To extend the knowledge of the relationship between a number of corporate characteristics and specific types of social responsibility disclosures		134	Annual reports	Counting number of pages	Corporate social responsibility disclosure quantity	Size, profitability and social responsibility committee	OLS Regression

This table provides a summary of studies measuring environmental disclosure and its association with firm characteristics on developed countries.

Source: Developed by the researcher.

Appendix 4: Summary of previous studies on measuring environmental disclosure and its association with firm characteristics in developed countries Panel B

S/N	References	Result
1	Zhang, (2022)	ESG performance scores are motivated by ESG disclosure. Also, Financial constraints are motivated by greenwashing decisions. Also, high-leverage companies have increased financial pressure and thus may enhance their greenwashing behaviour.
2	Danisch (2021)	A positive and significant association exists between environmental performance and industry type with CSR disclosure. On the other hand, there is no association between CSR disclosure and social disclosure. Industry type has a positive and significant association with ED. On the contrary, Big4, firm size, profitability, and age have no association with the extent of CSR disclosure.
3	Chithambo et al., (2021)	Shareholders, community, and investors have the most significant impact on the decision to release GHG disclosure, followed by regulators, employees, customers and suppliers. A positive and significant association exists between perceived organisational and regulatory stakeholder framework and GHG disclosure. However, GHGs have no association with social stakeholders.
4	Miklosik and Evans, (2021)	Mining companies in Australia release information related to the protection of the environment, emissions, carbon footprint, and climate change are addressed in companies. Also, a positive and significant association exists between firm size and environmental disclosure.
5	Balluchi, Lazzini and Torelli, (2021)	Companies release credible SEDs, and the information is simple to understand. However, the SED release is not comprehensive. Also, experience is vital in releasing voluntary non-financial reporting, especially sustainability reports.
6	Sutantoputra, (2022)	Companies release a relatively high level of environmental information to respond to the demands of their stakeholders, particularly investors and customers.
7	Marwa, Salhi and Jarboui, (2020)	A positive and significant association exists between environmental disclosure quality, firm size, environmental audit committee, BIG 4 auditing firms, industry type, and earnings management. In contrast, CSR committees have no association with environmental disclosure quality.

8	Rosa Portella and Borba, (2020)	Companies operating in the US more environmental information compared to those operating in Brazil. Also, firm size, country of origin, industry type has positive and significant association with environmental disclosure. While profitability and leverage have no association with environmental disclosure.
9	Cong, (2020)	The study finds positive and significant relationship between GHG emissions and climate change disclosure.
10	Chiang et al., (2020)	Real estate releases more CSR disclosure especially when they have greater investment opportunities. CED account up to half of the corporate social responsibility disclosure. Also, there is positive and significant association between CSR disclosure with profitability, leverage, media coverage and growth opportunities.
11	Mura et al., (2019)	Results show that companies release low of environmental and social information
12	Radhouane et al., (2018)	Firms release low SED. Firms that have higher revenue and number of employees release more SED. In contrast, consumer goods firms release more information on the supply chain.
13	D'Amico, et al., (2016)	Italian companies release low EDQ. there is a negative and significant association between EDQ and company ownership, auditor-type leverage, and public shareholding. While size environmental sensitive cross listening and legislation have positive and significance association with EDQ. in contrast business industry economic performance financial situation firms age foreign markets have no association with EDQ.
14	Qiu, Shaukat and Tharyan, (2016)	Result reveals that companies that release higher social and environmental information have higher market value.
15	Giannarakis, Andronikidis and Sariannidis,(2016)	The country's risk premium has a positive and significant relationship with environmental disclosure. While firm value has an insignificant relationship with environmental disclosure

16	Bhattacharyya, (2016)	the extent of social and environmental disclosure by Australian companies was low. Moreover, company size has a positive relationship with environmental disclosure, and industrial membership negatively relates to environmental disclosure. In contrast, profitability, age, and entity's audit firm have a non-significant relationship with environmental disclosure.
17	Burgwal and Vieira, (2014).	Firm size and industry membership have a significant and positive association with the level of environmental disclosure. However, profitability is not significantly related to the level of environmental disclosure.
18	Andrikopoulos and Kriklani, (2013)	Market-to-book ratio, profitability, leverage, and size have a positive and significant relationship with environmental disclosure.
19	Mitali, Mukherjee and Pattanayak, (2011)	There is a variation amongst industries and companies in releasing environmental information and environmental disclosure, and the level of information is more qualitative, which is higher than the quantitative information released.
20	Monteiro and Aibar-Guzman, (2010)	Firm size and listening on the stock market are positively associated with Environmental disclosure.
21	Echave and Bhati, (2010)	Social and environmental disclosure has a positive and significant relationship with government regulations, while financial performance has no significant relationship with social and environmental disclosure.
22	Damak-Ayadi, (2009)	Finds a positive relationship between social and environmental disclosure with size, industry's reputation, financial performance, stakeholders' salience, and the NRE application
23	Reverte, (2009)	industry sensitivity, media pressure and corporate size, are significantly associated with corporate social responsibility disclosure, while leverage and profitability are not associated with corporate social responsibility disclosure

24	Stanny, and Ely, (2008)	Foreign sales, size and previous disclosure are significantly associated with ED, while no significant association between ED and leverage, profitability, Tobin's Q, industry type, and asset age and institutional ownership
25	Brammer and Pavelin, (2008)	firm size, media exposure, poor environmental performance and nature of business activity determined the disclosure quality. While leverage has a negative and significant association with EDQ.
26	Branco and Rodrigues, (2008)	Results revealed that only media pressure, company size and are significantly associated with social responsibility disclosure.
27	Ho and Taylor, (2007)	Triple bottom line reporting consisting of economic, social, and environmental disclosure have positive and significant correlation with size and industry type. On the other hand, there is a negative correlation between triple bottom-line reporting with profitability and industry membership.
28	Magness, (2006)	There is a positive relation between ED with external financial markets and press releases.
29	Campbell, (2004)	Disclosure of environmental information increases over the period. Also, there is a significant positive relationship between environmental disclosure with both industry type and membership of environmental lobby group.
30	García-Ayuso and Larrinaga, (2003)	Environmental sensitivity and media coverage have a positive relationship with environmental disclosure, while risk and size do not have a relationship with the extent of environmental disclosure.
31	Gray et al., (2001)	There is a positive relationship between profitability, industry type and corporate size with the social and environmental disclosure
32	Deegan and Rankin, (1996)	There is an increase in the level of environmental disclosure. Also, companies release more positive environmental information than negative ones.

33	Hackston and Milne, (1996)	Size and industry type have a significant relation with the amount of disclosure, while profitability does not. Furthermore, the result indicated that the size-disclosure relationship is much stronger for high-profile companies.
34	Roberts, (1992)	Both size and industry classification have a significant relationship, while profitability has no significant association with CSR disclosure
35	Patten, (1991)	Size and industry type have a significant relationship with social and environmental disclosure, while profitability has no association with social and environmental disclosure.
36	Cowen, Ferreri and Parker, (1987)	Company size has a significant impact on environmental information. Conversely, industry type and presence of social responsibility committee do not have any relationship with environmental disclosure.

This table provides a summary of studies measuring environmental disclosure and its association with firm characteristics on developed countries.

Source: Developed by the researcher.

Appendix 5: Summary of previous studies on measuring environmental disclosure and its association with firm characteristics in developing countries- Panel A

S/N	References	Country and year	Objectives	Theory	Observations	Source of report	Type of Disclosure	Measurement of Disclosure	Factors considered	Techniques for data analysis
1	Reboredo and Sowaity (2022)	Jordan (2009-2018)	To explore the relationship between firm efficiency intellectual capital with environmental, social and governance disclosure.	Stakeholder theory	1040	Annual reports	Environmental social and governance disclosure quantity	Disclosure index	efficiency human capital, relational capital efficiency, structural capital efficiency.	OLS regression
2	Ntui, Mzenzi and Chalu, (2021)	Tanzania (2004-2018)	To examine the association between firm characteristics and corporate environmental disclosure of extractive industries.	Legitimacy theory	216	Annual Reports	Corporate environmental disclosure quantity	Disclosure index	Firm size, firm age, firm type, capital structure, firm profitability, ownership structure	OLS Regression
3	Boshnak, (2021)	Saudi Arabia (2016-2018)	To investigate the determinants of firm characteristics for corporate	Legitimacy and stakeholder theories	211	Annual reports	Social environmental disclosure quantity	Disclosure index	Firm size, industry type, government ownership, ownership structure,	Panel data regression

			social and environmental disclosure.						audit firm size, firm age, profitability, and institutional ownership.	
4	Ifada et al., (2021)	Indonesia (2017-2019)	To examine the determinants of social and environmental disclosure	Legitimacy and stakeholder theories	117	Annual reports	Corporate environmental disclosure quantity	Disclosure index	environmental performance, firm size and independent board of commissioners	OLS Regression
5	Ramba, Joseph and Said, (2021)	Malaysia (2015)	To measure the quantity and determinants of governance social and environmental disclosure.	Resource dependency theory	67	Annual and sustainability reports	Environmental social and governance disclosure quantity	Disclosure index	Research and development expenditure and ISO certification	OLS Regression
6	Hussain et al., (2020)	Malaysia (2014-2018)	The impact of environmental disclosure on target leverage adjustment for non-financial companies.	Trade-off theory	698	Annual reports	Corporate environmental disclosure quantity	Textual analysis	Book Leverage, Market Leverage, firm size, profitability, earning volatility, market-to-book ratio, asset	OLS Regression

									tangibility and industry leverage	
7	Nguyen et al., (2020)	Vietnam	To examine the external and internal determinants that have an impact on environmental disclosure of Vietnam-listed companies.	Stakeholder theory	106	Survey	Corporate environmental disclosure quantity	questionnaires	Business manager's awareness, Company size, business sector, government pressure, stakeholder pressure, community pressure, profitability and leverage.	logistic regression analysis
8	Aboagye-Otchere Simpson and Kusi, (2020)	Ghana (2009-2012)	To examine the extent of corporate environmental disclosure of mining companies.	Legitimacy and signalling theories	100	Annual reports	Corporate environmental disclosure quantity	Disclosure index	Environmental performance, firm size, profitability, company age, leverage, capital intensity, industry type	OLS Regression

9	Fahad and Nidheesh, (2020)	India (2007 to 2016)	To empirically investigate the association of firm characteristics on corporate social responsibility disclosure.	Agency, signalling, legitimacy and political cost theories	386	Annual reports	Corporate environmental disclosure quantity	Disclosure index	foreign ownership, firm age, firm size, promoter ownership, export performance, innovation, firm popularity, financial leverage	OLS Regression
10	Kalash, (2020)	Turkey (2014-2018)	To examine environmental disclosure and its determinants on financial performance.	stakeholder and legitimacy theories	66	Primary data	Corporate environmental disclosure quantity	Questionnaire	Financial performance, business risk, agency cost, investment opportunities, industry type, information asymmetry, profitability, leverage and firm size	OLS Regression
11	Nguyen et al., (2017)	Vietnam (2013-2016)	To examine how corporate characteristics could influence the amount of corporate	Legitimacy theory	296	Annual reports	environmental disclosure quality	Disclosure index	leverage, independent audit size, firm's age, profitability	OLS regression

			environmental disclosure.							
12	Welbeck et al., (2017)	Ghana (2003-2012)	To examine the type of environmental-related information disclosed.	legitimacy theory	170	Annual reports	Corporate environmental disclosure quantity	Textual analysis.)	Firm size, profitability, industry type, auditor type, foreign associate and age.	Random effect panel regression.
13	Elshabasy, (2018)	Egypt	To assess the impact of several Corporate Characteristics on environmental disclosure of the listed firms	stakeholder theory	225	Annual reports	Corporate environmental disclosure quantity	disclosure index	Size leverage, profitability and firms age	Multiple regression
14	Khalid, Kouhy and Hassan, (2017)	Jordan (2010-2012)	To examine how corporate characteristics could influence the amount of corporate social and environmental disclosure	stakeholder theory	198	Annual reports	Social and environmental disclosure quantity	Disclosure index	Firm size, profitability, audit firm, ownership, type of industry and financial market level.	Random effect estimation.

15	Wuryan i, Kurniawati and Satyanovi, (2017)	Multi countries (2012-2014)	To investigate ED in Indonesia, Malaysia and Thailand.	Organisational theory	114	Annual reports	Corporate environmental disclosure quantity	disclosure index	Commissioner's educational background, audit committee size, company size, industry type	ANOVA and multiple linear regression
16	Chandok and Singh, (2017)	India (2014)	To examine the status of corporate environmental disclosure on the websites and annual reports of selected companies.	legitimacy theory	100	Annual and sustainability reports	Corporate environmental disclosure quality	Disclosure index	Company size, foreign influence financial leverage Age profitability and systematic risk	Multiple regression
17	Rahman and Anwar, (2016)	Bangladesh (2016)	To find out whether shareholders' demand plays an important determinant of environmental disclosure.	180	180	Primary data	Corporate environmental disclosure quantity	Questionnaire	Shareholders perception.	ANOVA

18	Aldrugi and Abdo, (2016).	Libya (2011)	To explore the practices of environmental disclosure and the extent of response of companies and identify the motivations of environmental disclosure		10	Primary data	Corporate environmental disclosure quantity	(Interview		Direct answer to question
19	Eljayash, (2015).	Multi countries (2008-2010)	To document ED quality and quantity practices in Egypt, Libya and Tunisia.	Stakeholder, legitimacy and political economy theories	36	Annual reports	Corporate environmental disclosure quality and quantity	Textual analysis and disclosure index		Descriptive statistics
20	Jariya, (2015)	Sri Lanka (2012-2013)	To investigate the level of corporate environmental disclosure practices.	Legitimacy theory	30	Annual reports	Corporate environmental disclosure quantity	Word count	firm size, profitability, and listing age	Multiple regression
21	Ganapathy and Kabr, (2015)	India (2009-2014)	To determine the factors that may have a significant influence on the environmental disclosure	Stakeholder, legitimacy and political economy theories	272	Annual reports	Corporate environmental disclosure quantity	Disclosure index	company size, industry type, profitability, ownership status and foreign	Multiple regression

									association of the company	
22	Rover, Murcia and De Souza Murcia, (2015)	Brazil (2008-2010)	To identify the factors that explain voluntary corporate social and environmental disclosure in the Brazilian market.	Discretionary-based disclosure	272	Annual and sustainability reports	Social and environmental disclosure quantity	Disclosure index	company size, leverage, profitability, financial market performance, ownership concentration, corporate governance, issuance of stock during the study period, auditing firms used, internationalisation, an origin of control, corporate sustainability, industrial sector, and pollution potential.	OLS regression

23	Rover, Murcia and De Souza Murcia, (2015)	Brazil (2008-2010)	To identify the factors that explain voluntary corporate social and environmental disclosure in the Brazilian market.	Discretionary-based disclosure	272	Annual and sustainability reports	Social and environmental disclosure quantity	Disclosure index	company size, leverage, profitability, financial market performance, ownership concentration, corporate governance, issuance of stock during the study period, auditing firms used, internationalisation, an origin of control, corporate sustainability, industrial sector, and pollution potential.	OLS regression
24	Fatima, Abdullah and Sulaiman, (2015)	Malaysia (2009)	To examine the quality of environmental disclosure quality of listed environmentally	Legitimacy and Resource Dependence Theories	164	Annual reports	Corporate environmental disclosure quality	Disclosure index	Profitability, firm size and leverage	OLS Regression

			sensitive industries							
25	Juhmani, (2014)	Bahrain (2012)	To investigate the level of SED practices in the websites of companies listed on Bahrain Bourse	Legitimacy theory	33	website	Social and environmental disclosure quantity	Textual analysis	Firm size, profitability, financial leverage, firm age and audit firm size.	Multiple regression.
26	Akbas, (2014)	Turkey (2011)	To investigate the relationship between company characteristics and the extent of environmental disclosure.	Legitimacy theory	62	Annual reports	Corporate environmental disclosure quantity	Textual analysis.	Size, leverage, profitability, industry membership and age.	OLS regression.
27	Akbas, (2014)	Turkey (2011)	To investigate the relationship between company characteristics and the extent of environmental disclosure.	Legitimacy theory	62	Annual reports	Corporate environmental disclosure quantity	Textual analysis	Size, leverage, profitability, industry membership and age.	OLS regression.

28	Ullah, Hossain and Yakub, (2014)	Bangladesh (2013)	To examine the practice and extent of environmental disclosure for textile industries in Bangladesh	Stakeholder theory	29	Annual reports	Corporate environmental disclosure quantity	Textual analysis counting the number of sentences and words	-	Descriptive statistics
29	Makori and Jagongo, (2013)	India (2007)	To establish whether there is any significant relationship between environmental disclosure and profitability.	socio-political theories	14	Annual reports	Corporate environmental disclosure quantity	Textual analysis	Return on capital employed, Net profit margin, Dividend per share and earnings per share	OLS Regression
30	Jinfeng and Huifeng, (2009)	China (2006)	To examine the factors influencing level of environmental protection information disclosure.		248	Annual reports	Corporate environmental disclosure quantity	Disclosure index	Profitability, corporate size and accounting firm (auditor's type).	Multiple regression analysis
31	Liu and Anbumozhi, (2009)	China (2006)	To examine the determinants factors affecting the disclosure level of	Stakeholder theory	175	Annual report	Corporate environmental disclosure quantity	Disclosure index	Government power, Shareholders power, Creditors	OLS Regression

			environmental information						power, size, age, location	
32	Gao, Heravi and Xiao, (2005)	China (1993 – 1997)	To investigate the patterns and determinants of current social and environmental disclosure.		165	Annual reports S	Corporate social and environmental disclosure quantity	Textual analysis	Firm size and industry effects	Pearson Correlations, ANOVA tests

This table provides a summary of studies measuring environmental disclosure and its association with firm characteristics on developing countries.

Source: Developed by the researcher.

Appendix 6: Summary of previous studies on measuring environmental disclosure and its association with firm characteristics in developing countries- Panel B

S/N	References	Findings
1	Reboredo and Sowaity, (2022)	The companies in Jordan release weak ESG disclosure. There is no relationship between human capital efficiency and relational capital efficiency with environmental, social, and governance (ESG) information.
2	Ntui, Mzenzi and Chalu, (2021)	Firm size, firm age, capital structure and ownership structure have positive and significant associations with environmental disclosure. In contrast, profitability and industry type have an insignificant positive association with environmental disclosure.
3	Boshnak, (2021)	There is an increase in social and environmental disclosure. There is a positive association between CED quantity and Firm size, industry type and government ownership. Ownership structure has a negative association with corporate social and environmental disclosure. Audit firm size, firm age, profitability, and institutional ownership have a negative association with corporate social and environmental disclosure.
4	Ifada et al., (2021)	There is an increase in the quantity of social and environmental disclosure amongst sample companies as a result of implementing the new corporate governance code. Also, leverage, firm size, and industry type positively and significantly affect corporate social and environmental disclosure. Meanwhile, firm age, audit firm size, and profitability have no association with social and environmental disclosure.
5	Ramba, Joseph and Said, (2021)	There is a positive and significant association between environmental disclosure with firm size, environmental performance and financial performance. However independent board of commissioners do not have any association with environmental disclosure.
6	Hussain et al., (2020)	Malaysian companies release low ESG information. Research and development expenditure and ISO certification are positively and significantly associated with ESG disclosure. Book Leverage, Market Leverage, firm size, profitability, earning volatility, market-to-book ratio, asset tangibility and industry leverage
7	Nguyen et al., (2020)	Stakeholder pressure, business managers' views, community pressure sector and size positively and significantly affect environmental disclosure. On the other hand, leverage and profitability have negative associations with environmental disclosure.
8	Aboagye-Otchere,	The results show voluntary environmental disclosure increases external financing. There is a positive and significant association between environmental disclosure and firm size. Meanwhile, capital intensity and

	Simpson and Kusi, (2020)	firm age have negative associations with environmental disclosure. In contrast, profitability, leverage and industry type have no association with environmental disclosure.
9	Fahad and Nidheesh, (2020)	Environmental performance has a negative significance with environmental disclosure. Also, mining companies release more environmental information than manufacturing companies to legitimise their activities. Firm size, Firm age, foreign ownership and leverage have positive and significant associations with environmental disclosure. On the other hand, industry type has no association with environmental disclosure.
10	Kalash, (2020)	Firm size, foreign ownership, firm age and financial leverage have a positive association with CSR disclosure while promoters' ownership has a negative association with CSR disclosure.
11	Nguyen et al., (2017)	The level of environmental disclosure released by construction companies is increasing. Firm size, listening in the stock market, profitability and BIG4 audit firms have positive and significance association with environmental disclosure. In contrast, leverage have negative and significant association with environmental disclosure.
12	Welbeck et al., (2017)	Firm size, profitability, and financial leverage influences environmental disclosure level
13	Elshabasy, (2018)	Industry sensitivity, firm size, and age have a positive and significant effect in determining environmental disclosure, while profitability, ownership type, and auditor type do not affect the disclosure behaviour of listed firms.
14	Khalid, Kouhy and Hassan, (2017)	There is an insignificant relationship between firm size and financial Leverage with environmental disclosure. However, a firm's age has a significant negative relationship with environmental disclosure. In contrast, profitability revealed a significant positive relationship with environmental disclosure.
15	Wuryani, Kurniawati and Satyanovi, (2017)	Firm size, audit firm and financial performance are significantly related to social and environmental disclosure. On the other hand, age, ownership, profitability and industry type have no relationship with social and environmental disclosure.
16	Chandok and Singh, (2017)	Independent audit committee proportion, commissioners educational background has positive and significant association with environmental disclosure. While audit committee size, industry type and firm size have no association with environmental disclosure
17	Rahman and Anwar, (2016)	30% of sample companies do not release environmental disclosure on their annual reports and websites. Besides, company size, systematic risk and leverage have a positive relationship with environmental disclosure. While profitability has a negative relationship with environmental disclosure.

18	Aldrugi and Abdo, (2016).	Investors are concern with environmental information and pressurise managers to release the information which improved the quantity of environmental disclosure.
19	Eljayash, (2015).	Most of the companies release some information regarding the environment or the environmental policy.
20	Jariya, (2015)	The Arabs countries release low environmental information compared to developed countries
21	Ganapathy and Kabr, (2015)	50.63% of manufacturing companies disclose environmental information. Firm size reveals a significant positive relationship with the level of corporate environmental information disclosure, while profitability and listening age have no relationship with environmental disclosure.
22	Rover, Murcia and De Souza Murcia, (2015)	The company size, industry type, profitability, ownership status, and foreign association are essential factors that determine environmental disclosure.
23	Rover, Murcia and De Souza Murcia, (2015)	The company size, industry type, profitability, ownership status, and foreign association are essential factors that determine environmental disclosure.
24	Fatima, Abdullah and Sulaiman, (2015)	There is an increase in the environmental disclosure release, and most companies release quantitative environmental information. Also, firm size and leverage have a positive and significant association with the quality of environmental disclosure. While profitability has no association with environmental disclosure quality.
25	Juhmani, (2014)	companies disclose primarily qualitative information that is favourable to them. Also, firm size, industrial sector, and control origin are significant in explaining social and environmental disclosure in financial and sustainability reports. The result reveals that auditing firms and corporate sustainability are significant in examining only social and environmental disclosure in financial statements. On the other hand, growth opportunity, internationalisation, and pollution potential are significant in explaining social and environmental disclosure in sustainability reports only
26	Akbas, (2014)	57.57% of the sample's companies provided social and environmental information. Also, leverage and audit firm size had a significant relationship with social and environmental information.
27	Akbas, (2014)	57.57% of the sample's companies provided social and environmental information. Also, leverage and audit firm size had a significant relationship with social and environmental information.
28	Ullah, Hossain and Yakub, (2014)	The results show that two-thirds of sample companies did not address environmental disclosure in their annual reports.

29	Makori and Jagongo, (2013)	Company size and industry membership have positive relations to the extent of environmental disclosure.
30	Jinfeng and Huifeng, (2009)	83% of companies provide environmental information in their annual reports. Only company size significantly correlates with environmental disclosure, while industry type, ownership status, country of origin, and profitability have no significant correlation with environmental disclosure.
31	Liu and Anbumozhi, (2009)	The result reveals an increased level of environmental disclosure; still, the disclosure level is a law and does not meet the users' requirements. Also, the study reveals a positive and significant relationship between company sizes and environmental disclosure, while industry type and auditor's type have a positive relationship. In contrast, profitability has no relationship with environmental disclosure.
32	Gao Heravi and Xiao, (2005)	Very few companies provide social and environmental information, which is a law and mostly qualitative. Also, the company's profitability, nature, and debenture have a positive and significant relationship, while audit fees and total assets have a positive relationship with social and environmental disclosure. In contrast, audit firms, a subsidiary of a multinational company, and return on assets negatively correlate with social and environmental disclosure.

This table provides a summary of studies measuring environmental disclosure and its association with firm characteristics on developing countries.

Source: Developed by the researcher.

Appendix 7: Summary of previous studies on measuring environmental disclosure and its association with firm characteristics in Nigeria- Panel A

S/N	References	Objectives	Years	Theories	Industry	Observations	Source of data	Type of Disclosure	Measurement of Disclosure	Factors considered	Techniques for data analysis
1	Mohammed, (2018)	To assess the volume of social and environmental disclosures pre and post the implementation of the 2011 code of corporate governance.	2005-2016	Legitimacy and Stakeholder theories	oil and gas	96	Annual reports	Textual analysis	Social and environmental disclosure quantity	Firm size, profitability, leverage, and liquidity	Panel regression

2	Egbunike and Tarilaye, (2017)	To examine the association between firm characteristics and voluntary environmental disclosure .	2011-2015	Legitimacy	Industrial goods, Agriculture, Consumer goods and Healthcare industries	50	Annual reports	Disclosure index	Environmental disclosure quality	Firm size, economic prosperity, leverage, and the number of independent directors	OLS regression
3	Oraka, and Egbunike , (2016)	To determine if there is a significant difference in the environmental disclosure themes of the firm.	2012-2015	Legitimacy and stakeholder	Consumer goods industry	88	Annual reports	Textual analysis	Environmental disclosure quantity	Firm size, leverage, and environmental sensitivity	OLS Regression

4	Ohidoa, Omokhu du and Oserogh o, (2016)	To investigat e the determina nts of environm ental disclosure in Nigeria.	201 2- 201 3	Stakeh older and agency theories	Financial service and consumer goods	50	Annual reports	Textual analysis	Environm ental disclosure s quantity	Industry type, leverage, and firm size	Quadra tic-hill climbin g regress ion
5	Odera, Scott and Gow, (2016)	To examine the quantity and quality of social and environm ental disclosure s (SEDs) of Nigerian oil companie s.	199 2- 201 1	Political econom y and instituti onal theories	Oil and gas industry	18	Annual report	Textual analysis	Social and environm ental disclosure quality and quantity	-	OLS regress ion
6	Dibia and Onwuche	To analyse the determina nts of	200 8-	Stakeh older theory	Oil and Gas industry	90	Annual reports	Binary variable	Environm ental disclosure quantity	Leverage, profitabilit y, audit	OLS regress ion

	kwa, (2015)	environm ental disclosure	2013							firm and firm size	
7	Adekanm i, Adedoyin , and Adewole, (2015)	To examine the determin ants of social and environm ental disclosure .	2005-2013	Stakeh older theory	Consumer goods and industrial good industries	50	Annual reports	Disclosur e index	Social and environm ental disclosure quantity	Free float, leverage, profitabilit y, firm size, socio-environme ntal performan ce, and governanc e	OLS Regres sion
8	Odia, (2015)	To investigat e the associatio n between the quantity of social and environm ental disclosure and several firms'	2007-2008	Legitim acy theory	All listed industry	91	Annual reports	Textual analysis	Social and environm ental disclosure quantity	Corporate size, profitabilit y, leverage, research and developme nt, capital intensity, corporate reputation, and	OLS Regres sion

		characteristics								company age	
9	Akanno et al., (2015)	To analyse evidence and pattern of corporate social and environmental disclosure .	2009-2013	Stakeholder theory	Oil and gas, financial services, service and consumer goods industries	40	Annual reports	Textual analysis	Social and environmental disclosure quantity	Company size, the location of the disclosure in an annual report, content effect and industry type	Chi-square and ANOVA
10	Umoren, Udo and George, (2015)	To investigate the environmental, social, and governance disclosure practices of Nigerian quoted	2013-2014	Legitimacy theory	Consumer Goods, Conglomerates, Construction, Healthcare, ICT, Industrial Goods, Oil and Gas and Services industries.	80	Annual reports	Disclosure index	Environmental, social, and governance quantity	Company size, profitability, and audit firm size	OLS regression

		companies.									
11	Innocent , Okafor and Egolum, (2014)	To assess the extent, nature, and quality of environmental information disclosure practices of manufacturing firms in Nigeria	2013	-	Industrial goods	3	Annual report and questionnaire	Textual analysis	Corporate environmental disclosure quality and quantity		Descriptive statistics
12	James and Gbalam, (2013)	To examine the factors affecting social and environmental disclosure practices.	2002-2011	Stakeholder theory	Oil and Gas industry	3 oil companies and 30 host communities	Primary	Questionnaire	Social and environmental disclosure quantity	Cost of implementation, management support, profitability, legal environment, and peaceful	Multiple regression

										environme nt	
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This table shows summary of prior empirical studies on Nigeria measuring environmental disclosure and its association with firm characteristics.

Source: Developed by the researcher.

Appendix 8: Summary of previous studies on measuring environmental disclosure and its association with firms' characteristics in Nigeria: Panel B

S/N	References	Result
1	Mohammed, (2018)	The results reveal an increase in environmental disclosure after the implementation of the new governance code. Also, regression results reveal a positive and significant relationship between environmental disclosure and corporate size.
2	Egbunike and Tarilaye, (2017)	There is a positive relationship between environmental disclosure and each of leverage, firm size, earnings per share, and the number of independent directors.
3	Oraka, and Egbunike, (2016)	Total asset turnover and returns on equity have significant associations with environmental disclosure. However, cash flow ratio, current ratio, and returns on assets have no association with environmental disclosure.
4	Ohidoa, Omokhudu and Oserogho, (2016)	Firm size and industry type have positive relationships with environmental disclosure, but leverage has no association with environmental disclosure.
5	Odera, Scott and Gow, (2016)	Oil companies release more quality and quantity of employee information while quality and quantity of environmental information is extremely low
6	Dibia and Onwuchekwa, (2015)	The study reveals a positive and significant relationship between environmental disclosure and corporate size. While profitability, leverage, and audit firm have no relationship with environmental disclosure.
7	Adekanmi, Adedoyin, and Adewole, (2015)	Each of firm size and profitability has a positive and significant relationship with environmental disclosure. In contrast, socio-environmental performance has a negative relationship with environmental disclosure.
8	Odia, (2015)	The results show leverage, reputation, diversification, profitability, and research and development have positive and significance associations with social and environmental disclosure.
9	Akanno et al., (2015)	The study finds positive relationships between social and environmental disclosure and each of industry type and company size.

10	Umoren, Udo and George, (2015)	The study documents that companies release little environmental information. Additionally, only audit firm has a positive and significant relationship with environmental disclosure. While profitability and size have no association with environmental disclosure.
11	Innocent, Okafor and Egolum, (2014)	The findings of the study indicated that the environmental disclosure of firms contains little or no quantifiable data
12	James and Gbalam, (2013)	The findings reveal that companies which release environmental information enjoy an elevated level of competitiveness. cost of implementation, the effect on profitability, the existence of a legal framework, the peaceful environment and top management support have positive and significant association with social and environmental disclosure

This table shows summary of prior empirical studies on Nigeria measuring environmental disclosure and its association with firm characteristics.

Source: Developed by the researcher.

Appendix 9: Summary of prior studies on the association between board characteristics and environmental disclosure in developed countries: Panel A

S/N	References	Country and year	Objectives	Theory	Observations	Source of report	Type of Disclosure	Measurement of Disclosure	Factors considered	Control variable	Techniques for data analysis
1	Chand, et al., (2022)	New Zealand	To investigate determinants of social and environmental disclosure.	Legitimacy and stakeholder	350	Annual report	SED quality and quantity	Disclosure index	board size and gender composition	Profitability, size SED Big-4	logit regressions
2	Gerwing Kajüter and Wirth, (2022)	Germany (2014 - 2017)	This study investigates the association between corporate governance and mandatory sustainability disclosure quality in Germany	Agency	540	Annual reports, sustainability report	Sustainability disclosure quality	Disclosure index	board supervisory level, executive board, sustainable remuneration, supervisory board level based on gender diversity, existence of a CSR	Size, profitability. Leverage, ownership structure analysis coverage	OLS Regression

									committee and gender diversity.		
3	Raimo et al., (2022)	Many countries 2018	examine the impact of the corporate governance mechanisms on the level of environmental information disseminated by the firms	Stakeholder-agency theories	129 Firms	Website	Environmental disclosure quantity	Disclosure index	board size, board independence, board gender diversity and CSR committee existence	board activity level, firm profitability, firm size, firm age,	OLS
4	Khalid et al., (2022)	Developed countries. (2010 to 2019)	examines the association firm characteristics governance mechanism with environmental social and	no	564	Bloomberg	Environmental social and governance disclosure quantity	Disclosure index	Board size, board independence,	corruption, cross listing, financial performance, current ratio, liquid ratio, cross	OLS regression

			governance disclosure amongst developed economics.							domestic product per capita, firm size	
5	Chouai bi, Miladi and Elouni, (2022)	European countries (2015)	To investigate the impact of board characteristics level of environmental disclosure by European firms.	Legitimacy, stakeholder and agency theories	220	Annual report	Environmental disclosure quality	Disclosure index	board size, board independence, CEO duality, audit committee independence	Company size, profitability and executive compensation	OLS regression
6	Cosmas, Principe and Venturelli, (2022)	European countries (2018)	To measure climate change disclosure of European banks. To examine whether European banks understand Task Force on Climate-related	Legitimacy and stakeholder theories	101 European banks	Website reports	Climate change disclosure quantity	Textual analysis	Presence of corporate social disclosure committee	Board size, presence of women on board, board composition	OLS Regression

			Financial Disclosures (TCFD) recommendations. To examine the influence of corporate social responsibility disclosure to compliance of TCFD disclosure.								
7	Issa et al., (2021)	Gulf Countries 2011–2019	To investigate the impact of board diversity on voluntary social responsibility disclosure of Arabian Gulf banks.	Resources dependency and stakeholder	527banks	Annual reports	Corporate social responsibility disclosure quantity	Disclosure index	gender diversity, presence of royal family members on the board, nationality diversity, Education diversity	board size, board independence, board meetings, CEO duality, firm size, leverage, equity to assets ratio, Equity to	OLS regression

										assets ratio, Deposits to assets ratio, Loans to assets ratio	
8	Nicolò et al., (2021)	European countries (2014 - 2019)	To investigate the impact of gender diversity on environmental social and governance disclosure amongst firms listed in Europe.	stakeholder and resource dependence theories	1,392	Thomson Reuters's database	ESG quantity	Disclosure index	Presence of women on the board	Board size, number of board meeting, independent directors, firm size, profitability, leverage, directive.	Multiple regression
9	De Masi et al., (2021)	Italy (2005 - 2017)	To examine the impact on gender diversity on ESG disclosure	Critical mass theory	337	Annual reports and website reports	ESG quantity	Disclosure index	critical mass of women, percentage of women on board, presence of female director	Firm size Board independence, board size CEO duality	OLS Regression

10	Arif et al., (2020)	Australia 2009-2018	to ascertain the impact of audit committee (AC) activism and independence on the quality and quantity of environmental, social and governance (ESG)	Legitimacy and agency theories	219 companies in energy sector	Bloomberg data base	ESG quality and quantity	Disclosure index	Audit committee activism and independence	leverage, firm size and firm performance	pooled ordinary least square
11	Khairidine et al., (2020)	France (2012 - 2017)	To investigate's board size, board meetings, gender diversity and board meetings have a positive and significant influence on governance		564 companies	Annual report	Environmental ethical disclosure quantity	Disclosure index	board gender diversity Board independence, and board meetings and board size	-	OLS Regression

			environmen tal and social disclosure.								
1 2	Chebbi a, Aliedan b and Moham med, (2020)	France (2010 - 2019)	The study examine association between gender diversity and environmen tal sustainabili ty disclosure	Resourc e depende ncy and critical mass theories	833	Bloomb erg	Environ mental disclosur e quantity	Disclosur e index	Presence of women on board and percentage of women on board	Firm size, profitabil ity, firm risk	OLS regres sion
1 3	Feng Groh and Wang, (2020)	United States (1992 - 2017)	To examine the impact of board diversity on CSR disclosure	Stakeho lder theory	3996	Annual reports	Corporat e social responsi bility disclosur e quantity	Disclosur e index	Age diversity, bonus diversity, salary diversity, stock diversity, tenure diversity, gender diversity	Firm size, cash, Leverage , research and develop ment, profitabil ity, property plant and equipme nt	Panel regres sion

14	Tingbani et al., (2020)	United Kingdom (2011 - 2014)	To examine the impact of environmental committees and gender diversity on greenhouse gas voluntary disclosure	stakeholder, legitimacy and resource dependency theory	860	Annual reports	GHG voluntary disclosure quality and quantity	Disclosure index	Gender diversity, environmental committees, CEO duality, board composition, board size, board meetings, director ownership, ownership concentration	Firm size, profitability, gearing, financial slack, liquidity, firm age, capital expenditure, industry type carbon, disclosure index.	OLS Regression
15	Al-Qahtani and Elgharabawy, (2020)	United Kingdom 2017	Investigates whether industry type and board diversity explain GHG information.	Stakeholder theory	350 companies	Primary data	ESG disclosure	questionnaire	gender diversity, board tenure and board skills	firm size, leverage, industry type, board meetings, board size, board independence and CEO duality	Ordinal logistic regression

16	Giannarakis, Andronikidis and Sariannidis, (2020)	United States (one year)	Examines whether corporate governance factors influence sustainability disclosure	Agency theory	278 companies	Bloomberg	ESG disclosure quantity	Disclosure index	presence of Sustainable Committee, presence of Lead Independent Director, Independent Directors, Age of the Youngest Director, frequency of Audit Committee Meetings	Firm size, industry type	logistic regression
17	Baalouch, Damak Ayadi and Hussainey, (2018)	France (2009 - 2014)	To investigate the factors that impact environmental disclosure quality	Institutional and resource dependency theories	570 polluting companies	Annual reports	Environmental disclosure quality	Disclosure index	Environmental committee, environmental audit, gender diversity, board independence	size, profitability, leverage, stand report	panel data fixed effects regression

18	Riadh et al., (2018)	United State (2010 - 2015)	To investigate the effect of board gender	stakeholder theory	2002	Bloomberg	ESG quantity	Global reporting initiatives.	Women on corporate board, presence of at least 3 female directors	Economic performance, leverage, firm size and research and development	OLS Regression
19	García-Meca and Pucheta - Martínez, (2018)	Spain 2004–2014	To investigate the association between environmental disclosure and institutional directors (institutional investors) investors		1332 non-f	Annual reports	CSR disclosure quantity	Disclosure index	Institutional directors, pressure-sensitive institutional investors, pressure-resistant investors	Board independence board size, ownership concentration firm size leverage	OLS regression
20	Nadeem, Zaman and	Australia (2010)	Examine the impact of gender diversity on	Stakeholder and resource dependence	1224	Annual report	Sustainability disclosure	Disclosure index	Gender diversity	CEO Duality, Firm size,	OLS

	Saleem, (2017)	- 2014)	sustainability disclosure	nce theories			e quantity			profitability, Equal Employment Opportunities	
2 1	Rao and Tilt, (2016)	Australia	the association between CSR and board diversity	Agency	150	Annual reports	CSR quantity	Disclosure index	Multiple directorships , board independence, gender diversity, tenure diversity	Firm size industry type, profitability, industry type CEO duality and board size	OLS
2 2	Kathy- Rao, Tilt and Lester, (2012)	Australia (2008)	To investigate s the relationship between ED and corporate governance attributes of companies.		96 listed companies.	Annual reports	Environmental disclosure quantity	Disclosure index	Board independence, institutional ownership, board size, proportion of female director	Firm size profitability industry type	OLS regression

23	Abu-Raya, (2012)	United Kingdom (2004 - 2007)	To investigate the association between corporate governance with quality and quantity of ED	stakeholders-agency theory	229	Annual reports	Environmental disclosure quality and quantity	Disclosure index	Board independence, CEO duality, board size, board meetings, director qualification and experience, corporate re environment al responsibility committee presence, audit committee independence, remuneration committee independence, nomination committee independence, ownership concentration, institutional ownership	Firm size, profitability, industry type, liquidity, systematic risk, leverage cross listening	OLS Regression
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24	Cormier, Ledoux and Magnan, (2011)	Canada (2005)	To investigate the contribution of SED for investors	legitimacy theory	137 companies	Annual report and sustainability reports	Social and environmental disclosure quality	Disclosure index	Audit committee size, board size, board independence, environmental media exposure, ownership dispersion.	firm size, leverage, profitability, Environmental performance, analyst following	OLS Regression
25	Rupley, Brown and Marshall, (2012)	USA (2000 - 2005)	The relationship between corporate governance and quality of environmental disclosure	Legitimacy theory	361 listed companies	Annual reports	Environmental disclosure quality	Disclosure index	CSR Committee, multiple directorships, board independence, CEO duality, gender diversity short-horizon institutional ownership, long-horizon institutional investors Environmental media coverage	Presence of a separate environmental report, profitability, regulation sensitivity, firm size and industry sensitivity	Pearson Correlation and OLS Regression

26	Post, Rahman and Rubow, (2011)	USA (2006)	The relationship between directors' composition and ESG disclosure	Agency theory	78 US firms Annual Reports and website	Annual/sustainability and website reports	ESG quantity	Disclosure index	Directors' status insider/outsider, gender diversity board age and board education	CEO duality and Industry, slack resources	Pearson Correlation and OLS Regression
27	Marshall, Brown and Plumlee, (2011)	USA (2000 - 2002)	The association between corporate governance and quality of environmental disclosure.		183 US firms	annual and sustainability reports	Environmental disclosure quality	Disclosure index	Board composition external board representation, shareholder proposal outcomes, (institutional investors, short horizon and long horizon institutional investors	Profitability and firm size	OLS Regression
28	Hassan, (2010)	United Kingdom (2005)	To examine the effect of corporate governance, media	Legitimacy theory	317 companies annual and sustainability	Annual reports	CSR disclosure quality and quantity	Counting number of sentences	Presence of social responsibility committee, board composition,	- multinationality, media pressure,	OLS Regression

		- 2006)	pressure and firm characteristics on quality and quantity of social disclosure		bility reports				block ownership, board size,	profitability, type of activity, corporate size	
29	Michelon and Parbonetti, (2010)	European and American (2003)	effects of corporate governance on sustainability disclosure	Stakeholder theory	114 European and American	Annual reports	Sustainability quantity	Disclosure index annual, sustainability, social and environmental reports	proportion of independent directors, community influential directors, CSR responsibility, CSR committee and CEO duality	profitability corporate citizenship, country of origin, listening status, company age, market risk leverage, industry type, firm size and board size.	OLS Regression

30	O'Sullivan Percy and Stewart , (2008)	Australia (2000 - 2002)	To investigate corporate governance role in determining quality of voluntary disclosure		183 companies	Annual reports	Voluntary disclosure quality	Disclosure index	audit function, board committees, ownership structure and, board autonomy	Information environment, leverage, firm size and performance	Logistic regression
31	Brammer and Pavelin, (2008)	United Kingdom (2000)	To investigate patterns of environmental disclosure quality made by UK companies	Stakeholder theory	447	annual reports	Environmental disclosure Quality	Disclosure index	Board composition, ownership composition, media visibility, environmental performance,	nature of business activities , firm size financial resources	Logit Regression
32	Boesso and Kumar, (2007)	United States (2002)	To examine factors, drive voluntary disclosure in the united State	Stakeholder theory	181 companies	Annual reports	Voluntary disclosure quality	Disclosure index	Business complexity, industry volatility, industry instability intangible assets management , corporate governance	Firm size and industry membership	OLS Regression

									and stakeholder engagement		
33	Lim, Matolcsy and Chow, (2007)	Australia 2001	To examine the association between board composition and voluntary disclosure	Agency theory	181 annual reports	Annual reports	Voluntary disclosure quantity	Disclosure index	Board composition	Management growth set, compensation and investment, profitability, Firm size, industry classification, leverage, auditor type and shareholders' consideration	OLS and stepwise regression

3 4	Halme and Huse, (1997).	Three countries (1992)	To find the relation between corporate ED and corporate governance variables, industry variables and country variables	Agency and stakeholder theories	140 listed companies.	Annual report	Environmental disclosure quantity	Disclosure index	Ownership structure, board size, industry variation and country differences.		Logistic regression.
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This table a summary of association between board characteristics and environmental disclosure studies on developed countries.

Source: Developed by the researcher.

Appendix 10: Summary of prior studies on the association between board characteristics and environmental disclosure in developed countries: Panel B

S/N	References	Result
1	Chand, et al., (2022)	The result show quantitative and qualitative environmental disclosure have positive and significant association with firm size and presence of female directors on the board. While profitability and board size have positive association with quantitative environmental disclosure. In contrast qualitative environmental disclosure have negative association with board size. Lastly BIG4 have no association with both quantitative and qualitative environmental disclosure.
2	Gerwing Kajüter and Wirth, (2022)	There is a positive and significant association between sustainability reporting quality with board supervisory level, executive board sustainable remuneration, supervisory board level based on gender diversity and existence of a CSR committee, Profitability, Leverage Analyst Coverage, Ownership Structure (Percentage of closely held shares). However, gender diversity executive board level and firm size have no association with sustainability reporting quality.
3	Raimo et al., (2022)	The result show positive and significant impact between environmental disclosure quantity with gender diversity, board size and corporate social responsibility. While board independence has no association with environmental disclosure quantity.
4	Khalid et al., (2022)	The result found the positive and significance association between board size, board independence, cross listening, current ratio, low corruption with the quantity of environmental social and governance disclosure.
5	Chouaibi, Miladi and Elouni, (2022)	The result show that board size and board independence have positive and significant association with environmental disclosure quality. While CEO duality has no association with environmental disclosure quality
6	Cosmas, Principale and	The presence of CSR committee, Presence of Women on the board and firm size, have positive and significant impact with climate change related disclosure. While board size, independent directors, profitability has no association with climate change disclosure

	Venturelli, (2022)	
7	Issa et al, (2021)	There is appositive and significant association between presence of royal family members on board, education diversity and nationality diversity with voluntary corporate social responsibility disclosure. While gender diversity has negative association with voluntary corporate social responsibility disclosure
8	Nicolò et al., (2021)	There is a positive and significance association between presence of women on the board, board, board independence, board meeting, EU Directive enactment, size with environmental social and governance disclosure. However, board size has a negative association with environmental social and governance disclosure.
9	De Masi et al., (2021)	The result shows that positive critical mass women, percentage of women on board, presence of women on board have positive and significant association with ESG disclosure
10	Arif et al. (2020)	There is a positive and significance association between audit committee activism, independence and firm size on the quality and quantity of corporate environmental disclosure. While leverage and profitability have no association with the quality and quantity of environmental disclosure
11	Khairreddine et al., (2020)	board gender diversity, board independence, board meetings and board size have a positive and significant influence on governance, environmental and ethics disclosure.
12	Chebbia, Aliedanb and Mohammed, (2020)	The result reveals that presence of women in the board have positive association with environmental disclosure quantity.
13	Feng Groh and Wang, (2020)	Bonus diversity, gender diversity, and tenure diversity have positive and significant relationship with environmental disclosure quantity. However, age diversity has negative relationship with environmental disclosure quantity.

14	Tingbani et al., (2020)	There is a positive association between gender diversity and greenhouse gas voluntary disclosure. While environmental committees have no significance impact on greenhouse gas voluntary disclosure
15	Al-Qahtani and Elgharbawy, (2020)	Female directors, industry type and firm size has positive and significance association with GHG information. While board skills have negative association with GHG information. On the other hand, board tenure has no association with GHG information.
16	Giannarakis, Andronikidis and Sariannidis, (2020)	The result shows that independent directors and presence of Lead independent director have positive and significant association with ESG disclosure. However, age of the youngest director has negative association with ESG disclosure
17	Baalouch, Damak Ayadi and Hussainey, (2018)	Firms release low environmental disclosure quality. Additionally environmental disclosure quality has positive and significance association with environmental audit, gender diversity, Big4 and environmental performance. Contrary board independence has a negative and significance association with environmental disclosure quality.
18	Riadh et al., (2018)	There is no association between gender diversity and ESG disclosure
19	García-Meca and Pucheta-Martínez, (2018)	There is a positive and significance association between CSR disclosure and institutional directors
20	Nadeem, Zaman and Saleem, (2017)	There is a significant positive association between gender diversity and sustainability disclosure

21	Rao and Tilt, (2016)	multiple directorships, tenure diversity and gender diversity, industry type, firm size, have positive and significant relationship with CSR reporting. While profitability, industry type CEO duality and board size have been found to have no association with CSR disclosure some influence on CSR disclosure
22	Kathy-Rao, Tilt and Lester, (2012)	Board independence, gender diversity board size and institutional investors have positive and significance association with environmental disclosure quantity.
23	Abu-Raya, (2012)	There is a positive and significant association between the quantity of environmental disclosure with institutional ownership, the presence of directors with accounting and/or finance, business presence of non-executive directors on the audit committee, There is a negative association between the quantity of environmental disclosure with CEO duality, board meeting, non-executive directors on the board, cross-directorships of board members, environmental responsibility committee presence ownership concentration. While board size and directors' education have no association with the quantity of environmental disclosure. There is a positive and significant association between board meetings and cross-directorship with environmental disclosure quality. Contrary independence, board size, institutional ownership, and ownership concentration have no association with environmental disclosure quality. while CEO duality has a significant negative association with environmental disclosure quality
24	Cormier Ledoux and Magnan, (2011)	Result shows environmental performance, environmental news exposure and firm size, board size, leverage have positive and significant association with quality of environmental disclosure. While board independence, profitability, and audit committee size have no significant association with environmental disclosure quality.
25	Rupley, Brown and Marshall, (2012)	Multiple directorships, board independence and gender diversity have positive and significant association with quality of environmental disclosure.
26	Post, Rahman	There is a positive association between proportion of board with higher outside directors and ESG disclosure. Also, companies with minimum number of 3 female directors and directors that are closer to 56 years and directors with western education have positive and significant association with ESG disclosure.

	and Rubow, (2011)	
27	Marshall, Brown and Plumlee, (2011)	Result shows that board composition, long-horizon institutional ownership and percentage of equity pension board have no association with quality of environmental disclosure. However, short-horizon institutional ownership and equity fund investment have negative association with quality of environmental disclosure. While withdrawn resolutions profitability and firm size have positive association with quality of environmental disclosure
28	Hassan, (2010)	Empirical analysis indicated that there is a positive association between corporate size, industry, board size, corporate social responsibility committee, media pressure and ownership diffusion with quality and quantity of corporate social responsibility disclosure.
29	Michelon and Parbonetti, (2010)	Community influential directors have positive and significant association with sustainability disclosure while CEO duality, board composition and presence of CSR committee have no relationship with sustainability disclosure.
30	O'Sullivan Percy and Stewart, (2008)	Presence of independent director, meeting frequency nomination committee, audit committee, big 6 auditor, auditor's independence, presence of compensation committee has positive association with voluntary disclosure
31	Brammer and Pavelin, (2208)	Nature of business activities, firm size has positive and significance association with quality of environmental disclosure. While media pressure has no association with the quality of environmental disclosure. Board composition have a significance negative association with quality of environmental disclosure.
32	Boesso and Kumar, (2007)	Industry volatility, industry instability business complexity, firm size and industry type have positive and significance association with voluntary disclosure quality

33	Lim, Matolcsy and Chow, (2007)	Positive relationship between board composition, investment growth, shareholder concentration industry classification, management compensation, and firm size. And voluntary disclosure. Moreover, board with higher number of independent directors release more forward looking strategic and quantitative disclosure
34	Halme and Huse, (1997).	Environmental disclosure has positive and significance association with board size and ownership structure

This table shows a summary of association between board characteristics and environmental disclosure studies on developed countries.

Source: Developed by the researcher.

Appendix 11: Summary of prior studies on the association between board characteristics and environmental disclosure in developing countries-Panel A

S/N	References	Country and year	Objectives	Theory	Observations	Source of report	Type of Disclosure	Measurement of Disclosure	Factors considered	Control variable	Techniques for data analysis
1	Ellili, (2023)	UAE 2010-2019	This study examines the association of corporate governance on environmental, social, and governance disclosure by financial and non-financial companies	Stakeholder, agency signaling	30 Listed companies	Bloomberg	Sustainability disclosure quantity	Disclosure index	Institutional, managerial block holder and foreign investors	Size leverage performance	Panel data regression

2	Wang, Fan and Zhuang, (2023)	China (2011–2020)	The function of large multiple shareholders in assisting a firm's ESG disclosure	stakeholder and agency theories	listed companies 5177	Bloomberg	Environmental, social, and governance quantity	Disclosure index	Multi-shareholders, CEO duality, board independence, board size, state ownership	Book-to market value, age, profitability, firm size	Multiple regression
3	Bamahr et al., (2022)	Saudi-Arabia (2010-2019)	To investigate the association between and environmental social and governance disclosure amongst listed Saudi Arabian companies	Agency and signalling theories	206	Annual reports	Environmental social and governance disclosure quantity	Disclosure index	presence of members of the royal family on the board and of external members on the audit committee	board meeting, board size, board independence, government-owned institutional investors, company profitability, leverage, Tobin Q, company loss, and	OLS regression

										company size	
4	Kumari et al., (2022)	India (2015–2020)	To examine the impact of board characteristics on environmental disclosure for environmental sensitive and non-sensitive firms in India.	Agency and stakeholder theories	1158 Sensitive and non-sensitive environmental industries	Sustainability reports	Environmental disclosure quality	Disclosure index	Board size, board independence, CEO duality, gender diversity, board meetings and sustainable committee presence	Profitability, leverage firm size	OLS Regression
5	Alkayed and Omar, (2022).	Jordan (2010–2015)	To examine the determinants of the quality and extent of corporate social	Legitimacy, stakeholder and agency theories	675 companies	Annual reports	Corporate social responsibility disclosure quantity and quality	Disclosure index	Board size board composition, presence of female director, presence of foreign director	Big4 audit, firm size, gearing, industry type.	Pooled OLS

			responsibility disclosure in Jordan.						on the board, presence of family director on the board, number of board meeting, firm, CEO duality, ownership concentration, government ownership, institutional ownership,		
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6	Handayati, et al., (2022)	Indonesia (2016 - 2020)	The aim is to examine the impact of corporate governance and firm characteristics on corporate social responsibility of listed firms in Indonesia .	Stakeholder theory	80 Listed companies	Annual and sustainability reports	Corporate social responsibility disclosure quantity	textual analysis	Diligence board member, reputation of external auditor, firm reputation	independent directors, gender diversity, multiple directorships, firm size profitability, education of directors, existence of CSR committee CEO duality	OLS regression
7	Ghosh et al., (2022)	India (2010-2020)	The study examines the impact of corporate governance and firm characteristics on environmental	Stakeholder theory	78 non-financial companies	Annual and sustainability reports	Sustainability disclosure quantity	Disclosure index	Board size board independence and board meetings	age, Tobin's Q, debt-equity	Pooled OLS

			disclosure .								
8	Solikha h, and Maulina, (2021)	Indonesia (2012–2016)	To examine the scope and quality of ED for environmentally sensitive manufacturing companies	Stakeholder theory	135 manufacturing companies	Annual Report or Sustainability Report	Environmental disclosure quality	Disclosure index	Implementation of corporate governance principles	Media coverage, environmental award, financial performance	partial least squares (PLS) test
9	Nuskiya et al., (2021)	Sri Lanka (2005–2009)	To examine the trend and the determinants of environmental disclosure determinants of corporate environmental	Legitimacy and stakeholder theories	205	Annual Reports	Corporate environmental disclosure quantity	Disclosure index	Board size, board meetings, board independence and CEO duality.	firm size, industry type, and profitability	Panel quantile regression

			disclosure .								
10	Lu et al., 2021	Pakistan (2010-2019)	To investigate the association between CSR disclosure and corporate governance		475 listed companies	Annual report	CSR disclosure quantity	Disclosure index	Board independence, board size, ownership concentration, managerial ownership, audit quality, corporate social responsibility, chief executive officer power	Property plant and equipment, firm size, asset turnover, environmental awareness	OLS regression
11	Gerged, (2021)	Jordan (2010-2014)	To investigate how corporate governance variables, impact	Stakeholder and agency theories	500 non-financial sectors	Annual reports	environmental disclosure quality and quantity	Disclosure index	CEO duality, board independence, board size ownership concentra	Return on assets, auditor type, firm size, market to book	linear panel quantile regression

			environm ental disclosure						tion, institution al ownership , manageri al ownership foreign ownership	ratio, leverage	
1 2	Zahid et al., (2020).	Malasia 2011- 2013	To investigat es the impact of gender diversity on Malaysian companie s	Stakeho lder theory	878	Annual reports	Sustaina bility disclosur e quantity	Disclosu re index	Gender diversity	Profitabili ty firm size and firm age	OLS Regres sion

13	Kilincarslan et al., (2020)	Africa and Middle East (2010-2017) Botswana, Israel, Kenya, Mauritius, Nigeria, Oman, Qatar, Saudi Arabia, South Africa, UAE and Zambia	To examine the effect of corporate governance on environmental disclosure in Africa and middle east	Institutional and legitimacy theories	587	Bloomberg's database	environmental disclosure quantity	Disclosure index	audit committee, CEO duality, gender diversity, and board size	firm age, insider ownership, profitability, firm size, institutional ownership, debt ratio, growth. Time effect, country effect, time effect	OLS Regression
14	Agyemang et al., (2020)	China (2000–2018)	To examine the effect of board characteristics on environmental	agency and stewardship theories	646 mining companies	Annual reports	Environmental disclosure quality	Disclosure index	board size, board independence, board meetings, CEO	shareholding proportion, leverage, annual remuneration,	OLS regression

			disclosure for listed mining companies						duality, gender diversity and foreign nationality	company size, Return on equity	
15	Akbaş and Canikli, (2019)	Turkey (2014-2016)	To examine the impact of financial characteristics and board structure on greenhouse gas emissions.	Legitimacy, stakeholder, signalling and institutional theories	84	Primary data	Greenhouse gas disclosure quantity	Questionnaire	institutional ownership, board size and board independence	firm size, profitability, leverage, industry membership and market value	logistic regression
16	Fernandes, Bornia and Nakamura, (2018)	Brazil (2016)	To investigate the effect of board characteristics on environmental	Agency	152 companies' sustainability and websites	Sustainability and website report	Environmental disclosure quantity.	Counting number of sentences	Gender diversity, board independence, board size, board qualification	Profitability, Firm size, pollution level, Indebtedness	Generalised linear Model (GLM)

			disclosure levels						on CEO duality		
17	San-Ong, (2019)	Malaysia (2012-2016)	To investigate the impact of corporate governance on the quality of environmental disclosure	Legitimacy theory	510 listed companies	Annual and sustainability report	Environmental disclosure quality	Disclosure index	board independence, board size and CEO duality	Firm size, leverage, sales growth rate	OLS Regression
18	Alipour et al., (2019)	Iran 2011 and 2016	to link environmental disclosure quality to firm performance and examine the moderating role of board independence in this	Agency theory	120 companies	Annual report	Environmental disclosure quality	Disclosure index	Board independence	Firm size, Age, liquidity and leverage	OLS Regression

			relationships								
19	Rabi', (2019)	Jordan (2014-2017)	Investigates the association between board characteristics and environmental disclosure in industrial companies.	Agency theory	63 industrial companies	Annual reports	environmental disclosure quantity	Disclosure index	Board ownership, board independence, board size	Firm size	OLS Regression
20	Ismail and Latiff, (2019)	Malaysia (2010-2016)	To investigate association between board diversity and sustainability practice	Stakeholder and resource dependency theories	58	Annual report	ESG disclosure quantity	Disclosure index	Board reputation, board capabilities, board composition, age diversity, gender diversity,		OLS regression

21	Husted and De-Sousa-Filho, (2018)	Brazil, Mexico, Colombia and Chile (2011-2014)	To examine the effect of board structure on ESG disclosure in Latin American countries	Agency theory	176 listed companies	Bloombergrg	ESG	Disclosure index	Board size, independent directors, presence of women on the board, CEO duality	Research and development	Generalised least square
22	Naseer and Rashid, (2018)	Pakistan (2014-2016)	To investigate the association between corporate governance and environmental disclosure	Stakeholder and agency theories	50 non-financial companies	Annual report	environmental disclosure quantity	Disclosure index	Board size, CEO duality, audit committee independence, board independence, gender diversity, proportion of institutional investors	Firm size, profitability and leverage	OLS Regression

2 3	Alkayed , (2018)	Jordan (2010- 2015)	The study examines determina nts and conseque nces of corporate social responsibi lity disclosure	Agency, legitima cy, stakeho lder and political econom y theories	675 compani es	Annual reports	CSR quality and quantity	Disclosu re index	CEO duality, family directors in the board, female directors in the board, foreign members, non- executive directors, audit committe e, number of meetings, type of external auditors, and board size	industry type, firm's age, size and gearing,	OLS Regres sion
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24	Masud, Nurunnabi and Bae, (2018)	Bangladesh, India and Pakistan (2	To investigate the impact of corporate governance on environmental sustainability disclosure	Agency, resource dependency, political cost and stakeholder theories	326	Annual Reports	Environmental sustainability reporting quantity	Disclosure index	Foreign ownership, institutional ownership, director share ownership, family ownership,	GRI level, leverage, size, market capitalization, return on asset	OLS Regression
25	Elfeky, (2017)	Egypt (2012-2015)	To examine how governance variables determine the quantity of voluntary disclosure for companies listed stock exchange of Egypt.	Legitimacy, capital need, stakeholder and agency and signaling theories	173 largest company	Annual and internet report	Voluntary disclosure quantity	Disclosure index	Board independence, board size, CEO duality block holder ownership	firm size, auditor type, leverage, profitability	OLS regression

26	Roy and Ghosh, (2017)	India (2008-2013)	The study investigates the determinants of environmental disclosure for Indian companies	Stakeholder, agency and legitimacy theories	84 polluting companies	Annual and sustainability reports	environmental disclosure quality	Disclosure index	Board independence, CEO duality ownership concentration public shareholding, environmental committee	Leverage, capital intensity, age of fixed assets, firm size, return on assets	GLS Regression
27	Ezhilarsi and Kabra, (2017)	India (2009-2015)	To examine the impact of corporate governance on environmental disclosure	Agency and legitimacy theories	177 polluting companies	Annual reports	Environmental disclosure quality	Disclosure index	CEO duality, foreign institutional ownership, domestic institutional ownership and board size	Profitability, firm size and environmental certification	OLS regression

28	Alnabsha et al., (2017)	Libya (2006-2010)	To examine the effect of ownership structure, board attributes, and firm level characteristics on both voluntary and disclosure	stakeholder, resource dependency, agency and legitimacy theories	193 listed companies	Annual reports	voluntary disclosure quantity	Disclosure index	Board size, CEO duality, board composition, frequency of board meetings, audit committee presence, institutional ownership, government ownership, foreign ownership and director ownership	firm size, industry type, auditor type, liquidity, listing status, firm age, gearing profitability	OLS regression
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29	Tran, (2017)	Asian Countries Thailand, Singapore, Malaysia, Indonesia, Philippines and Vietnam.	The study aims to examine the influence of corporate governance institutional environment on social responsibility disclosure	Legitimacy, stakeholder, signaling and institutional theories	171 companies	Annual reports	CSR disclosure quantity	Disclosure index	Board size, board independence, CEO duality board gender diversity, block ownership, CSR committee, institutional environment	Auditor type, industry affiliation, firms age, leverage, profitability, firm size	OLS Regression
30	Trireksani and Djajadikerta, (2016)	Indonesia (2012)	To examine association between corporate governance and environmental disclosure extent.	stakeholder and agency theories	38 mining companies	Annual reports	Environmental disclosure quantity	Disclosure index	Board size, gender diversity, board independence	-	OLS Regression

3 1	Akbas, (2016)	Turkey (2011)	To analyse the relationship between selected board characteristics and the extent of environmental disclosure in annual reports	Agency theory	62 non-financial firms listed on the BIST-100	Annual reports	Environmental disclosure quantity.	Textual analysis (Word count)	Board size, board independence, board gender diversity and audit committee independence	Firm size profitability, industry membership	OLS Regression
3 2	Alotaibi, (2016)	Saudi Arabia (2013-2014)	To investigate the determinants and consequences of quantity and quality of CSR disclosure	stakeholder, signalling and agency theories	171 non-financial companies	Annual reports	CSR quality and quantity	Disclosure index	Board size, presence of independent directors, CEO duality, board frequency meetings, size of remuneration	Profitability, dividend, liquidity, size	OLS Regression

									tion, size of audit committee, auditor type committee, managerial ownership.		
33	Habbas h, Hussain ey and Awad, (2016)	Saudi Arabia (2007-2011)	To measure the quantity of voluntary disclosure and investigate the drivers of voluntary disclosure	Agency, resource dependency, legitimacy, theories	361	Annual reports	Environmental disclosure quantity	Disclosure index	board independence and family ownership	Industry type, Auditor type, firm size, age, profitability and leverage	OLS Regression

34	Habbas h, (2015)	Saudi Arabia (2007-2011)	To investigate the extent of environmental disclosure in Saudi Arabia and the potential influence of CG and ownership type and company structure on environmental disclosure	agency	267 annual reports	Annual reports	Environmental disclosure quantity	Disclosure index	Audit committee, Board independence, role duality, family ownership, state ownership, institutional ownership.	profitability, leverage, sensitivity and firm size	OLS Regression
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This table show provides a summary of association between board characteristics and environmental disclosure studies on developing countries.

Source: Developed by the researcher.

Appendix 12: Summary of prior studies on the association between board characteristics and environmental disclosure in developing countries-Panel B

S/N	References	Result
1	Ellili, (2023)	The study finds a positive and significance association between environmental disclosure quantity and board independence. While environmental disclosure quantity has no association with institutional ownership, managerial ownership, block holder ownership, foreign ownership, board size, board diversity, firm size, leverage and profitability.
2	Wang, Fan and Zhuang, (2023)	ESG disclosure has no association with board meetings, board independence, board size and profitability. Contrary CEO duality has no association with ESG disclosure. Lastly, ESG disclosure has a positive and significant association between maximum large shareholders, firm age and firm size.
3	Bamahros et al., (2022)	The result show there is a positive and significant association between find the presence of members of the royal family on the board, presence of external members on the audit committee, board size, Government-owned institutional investors, with ESG disclosure. In contrast, there is a negative association between board meetings, with ESG disclosure. However, there is no relationship between board independence, audit committee independence, audit committee meetings, leverage, Tobin Q, loss and firm size with ESG disclosure.
4	Kumari et al., (2022)	There is a positive and significant association between the frequency of board meetings, board size, presence of sustainability committees, and firm size with sustainability disclosure quality of both environmentally sensitive and non-sensitive companies in India. In contrast, CEO duality, gender diversity, board independence, and profitability have no association with the quality of sustainability disclosure for both sensitive and non-sensitive environmental industries in India. Leverage is not associated with sustainability disclosure quality for sensitive and non-sensitive environmental industries.
5	Alkayed and Omar, (2022).	companies release higher CSR quantity compared to quality. Also, there is a positive and significant association between CSR disclosure quality and quantity with non-executive directors, board size, foreign members on the board, age of firm, number of boards meetings, the presence of audit committees, big 4, government ownership, size of firm and industry type. In contrast there is no

		association between CSR quality and quantity with the presence of women on the board institutional investors and ownership concentration.
6	Handayati, et al., (2022)	The results find a positive and significant association between corporate social responsibility disclosure with that CSR committee, CEO duality, number of board meeting, firm reputation, diligent boards and firms audited by Big 4 auditors.
7	Ghosh et al, (2022)	There is a positive association between age, market based financial performance, size, board independence with sustainability disclosure. While board size has negative association with sustainability disclosure. In contrast board meetings have no association with sustainability disclosure.
8	Solikhah, and Maulina, (2021)	Implementation of good corporate governance principles have positive impact with environmental disclosure quality. The result shows environmental award and media coverage have positive association with EDQ. will increase media and environmental award have positive impact on EDQ.
9	Nuskiya, et al., (2021)	Companies release of environmental disclosure is increasing over the period. Board size, board meetings, board independence, firm size, industry type, and profitability have positive and significance association with corporate environmental disclosure. In contrast, CEO duality has negative and significant association with corporate environmental disclosure.
10	Lu et al., (2021)	There is a positive and significance association between CSR disclosure with board size, board independence, ownership concentration, managerial ownership, audit quality, profitability.
11	Gerged, (2021)	Result release an increase in environmental disclosure. Also board foreign ownership, board independence, CEO duality, board size, firm size leverage, big4 has positive association with environmental disclosure quality and quantity. However, ownership concentration, managerial ownership institutional ownership and profitability have negative association with environmental disclosure quality and quantity.
12	Zahid et al., (2020).	The result shows that women directors have a positive and significant association with environmental social and governance disclosure

13	Kilincarslan et al., (2020)	Companies with high governance release more environmental information. Also, size of audit committee, CEO duality, gender diversity and board size have positive and significance association with environmental disclosure.
14	Agyemang et al., (2020)	board size, board independence board meetings CEO duality, reveals positive and significance association with environmental disclosure quality. While gender diversity and foreign nationality reveal no association with environmental disclosure quality.
15	Akbaş and Canikli, (2019)	The results represented that there is a positive significant relationship between CSRD and each of Profitability, firm size and institutional ownership. While other variables have no association with greenhouse gas disclosure.
16	Fernandes, Bornia and Nakamura, (2018)	The result show board independence has a positive and significant association with environmental disclosure. While gender diversity, board size, CEO duality and board qualification have no association with environmental disclosure.
17	San-Ong, (2019)	Malaysian companies release low descriptive and general environmental information. Board independence and separation of CEO duality have positive and significant association with environmental disclosure. While board size and managerial ownership have no association with environmental disclosure.
18	Alipour et al., (2019)	Findings showed that board independence have a positive and significance association with EDQ.
19	Rabi', (2019)	Board size, board ownership and firm size have positive and significance association with environmental disclosure. While board independence has no association with environmental disclosure.
20	Ismail and Latiff, (2019)	There is positive association between board reputation, age diversity, board capabilities with ESG disclosure. On the other and independent director and women director have negative association with ESG disclosure.
21	Husted and De- Sousa-Filho, (2018)	The study found positive and significant association between ESG disclosure with board independence and board size while CEO duality and gender composition have negative association with ESG disclosure

22	Naseer and Rashid, (2018)	The study found a positive and significance association between Board independence, board size, institutional ownership with environmental disclosure. While CEO duality have negative association with environmental disclosure. On the other hand, there is no association between gender diversity and audit committee independence with environmental disclosure.
23	Alkayed, (2018)	Result shows CSR quality and quantity have a positive association with firm's size, industry type, firm's age, number of boards meetings, board size, non-executive directors, the presence of audit committees, foreign members on the board, government ownership, big 4. While non-executive directors have positive association with quantity of CSR disclosure
24	Masud, Nurunnabi and Bae, (2018)	The empirical results indicate ESRP has a positive association with foreign and institutional ownership, board independence, board size, director share ownership. In contrast, the results also reveal no association between ESRP and family ownership, female directorship, and CSR and environmental committees.
25	Elfeky, (2017)	There is a positive and significant association between firm size, auditor type, leverage, profitability, independent directors with voluntary disclosure. In contrast there is a negative and significant association between block holder ownership and voluntary disclosure. Lastly no association between board size, CEO duality with voluntary disclosure
26	Roy and Ghosh, (2017)	CEO duality, board independence, environmental committee and capital intensity and public Shareholding have no association with environmental disclosure quality. Contrary ownership concentration has negative and significance association with environmental disclosure quality.
27	Ezhilarasi and Kabra, (2017)	The study finds positive association between foreign institutional ownership and board size with environmental disclosure. while on the other hand the study finds no association between CEO duality, and domestic institutional ownership with environmental disclosure.
28	Alnabsha et al., (2017)	The frequency of board meetings, and audit committee have a positive and significant associations with voluntary disclosure. Contrarily, board size and board composition have negative and significant associations with voluntary disclosure. However, foreign, institutional, government and managerial ownership have no association with voluntary disclosure.
29	Tran, (2017)	Result shows a positive association between social responsibility disclosure with presence of CSR committee, board size and institutional environment. On the other hand, the result reveals a negative impact of Block ownership and gender diversity on social responsibility disclosure. However, board independence has no association with corporate social responsibility disclosure.

30	Tireksani and Djajadikerta, (2016)	Result release moderate environmental information. Also, the study found positive association between environmental disclosure. and board size. While gender diversity and board independence have no association with environmental disclosure.
31	Akbas, (2016)	The study found positive and significant association between board size and environmental disclosure. While other variables have no association with environmental disclosure.
32	Alotaibi, (2016)	CSR quantity has positive and significant association with audit committee size, board size. CSR quality has negative association with government ownership, and remuneration committee size. While quality of CSR disclosure has positive association with managerial ownership and board size, while proportion of independent directors have negative association with CSR disclosure quality.
33	Habbash, Hussainey and Awad, (2016)	Saudi firms release low voluntary information. Also, firm size, age, profitability, family ownership, and industry type have a positive and significant association with voluntary disclosure. Contrarily, leverage has a negative and significant association with voluntary disclosure. Lastly, Big 4 and board independence have no association with voluntary disclosure.
34	Habbash, (2015)	A positive and significance association between state ownership, institutional ownership, industry type CEO duality with voluntary disclosure. On the other hand, leverage have found negative association with environmental disclosure. While firm size, board independence and family ownership have no association with environmental disclosure.

This table provides a summary of association between board characteristics and environmental disclosure studies on developing countries.

Source: Developed by the researcher.

Appendix 13: Summary of prior studies on the association between board characteristics and environmental disclosure in Nigeria: Panel A

S/ N	References	year	Objectives of the study	Theories	Industries	Observations	Source of data	Type of Disclosure	Measurement of Disclosure	Factors considered	Control Variables	Techniques for data analysis
1	George and Ukpong, (2023)	2013-2020	to investigate the association between corporate governance and environmental disclosures of selected consumer goods companies	Stakeholder and agency theories	consumer goods industry	96	Annual report	Environmental disclosure quantity	Disclosure index	Board size, board meeting and audit committee	-	OLS regression

2	Okere et al., (2021)	2013-2017	To examine the association between board characteristics and environmental disclosure quantity for Nigerian listed manufacturing companies	Stakeholder theory	Manufacturing	100	Annual report	Environmental disclosure quantity	Disclosure index	Board size, board independence, gender composition, foreign member on the board		OLS
3	Ivungu et al., (2021)	2011 - 2020.	To investigate the association between corporate governance and	Agency theory	Oil and gas	80	Annual report	Environmental disclosure quality	Disclosure index	Board size, board independence and board ownership	Firm age	OLS

			environm ental disclosur e for Nigerian listed companie s									
4	Ndalu, Ibanic huka and Ofuru m, (2021)	201 0- 201 9	To examine the associati on between board character istics and environm ental disclosur e quantity for oil and gas companie s listed in the Nigerian market	Stakeh older and agenc y theorie s	Oil and gas	120	Annual report s	Environ mental disclosu re quantity	-	Board independence	Firm size	Correl ation

5	Oseme ne et al., (2021)	Nig eria Egy pt, Ken ya and Sou th Afri ca (20 11 to 201 7)	A comparat ive study of the impact of corporate governan ce on environm ental disclosur e on companie s quoted in African countries (Nigeria Egypt, Kenya and South Africa)	Stakeh older and social contra ct theorie s	Industrial, Consumer goods Health care Industrial Oil and gas and Technolog y/telecom municatio n/	70 (Eg ypt 10 Sou th Afri ca 18 Ken ya 10, Nig eria 28)	Annual and websit e report	Corpora te environ mental disclosu re quantity	Discl osure index	board size, board committee, board independence, institutional investors and, board diversity	Firm size, firm age and profita bility	Poole d OLS
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6	Jeroh, (2020)	2012-2017	To analyse determinants of ED amongst companies in South Africa, Kenya and Nigeria	Legitimacy theory		360 (120 from each country)	Annual report	environmental disclosure quantity	Disclosure index	Board size, gender diversity, board independence, audit committee size, audit committee diligence, audit committee independence	Firm size	OLS Regression
7	Eneh, (2019)	2011-2017	The study aims to investigate the association between corporate governance and environmental disclosure for Nigerian listed	Resource dependency theory	Consumer goods	40 Food and beverages industries	Annual report	Environmental disclosure quantity	Disclosure index GRI	Board independence, board size, and foreign ownership		OLS

			companies									
8	Odoemelam and Okafor, (2018).	2015	To examine the Impact of corporate governance on corporate environmental disclosure for non-financial companies in Nigeria	Stakeholder theory and agency theories	Information and communication Technology, Oil and Gas, Industrials, Industry Membership-Environmentally Sensitive Healthcare Services Consumer Goods Industry Membership-	77	Annual reports	environmental disclosure quantity	35 Disclosure index	board independence, board meeting, board size, audit committee independence	Firm size, Big-4 and industry type	OLS Regression

					Environmentally Non Sensitive							
9	Ofoegbu, Odoemelam and Okafor, (2018)	2015	To compare the influence of corporate board characteristics on the extent of environmental disclosure quantity of listed firms between South Africa and Nigeria.	Legitimacy and stakeholder theories	All listed industries	Listed companies. 303 companies (90 in Nigeria and 213 in South Africa)	Annual reports	Environmental disclosure quantity	Disclosure index	Board size, board independence, audit committee independence, board meetings, environmental committees	Industry membership, firm size, audit firm size,	OLS Regression

10	Oscar and Juliet, (2015)	(2010-2013)	To examine the effect of corporate governance on the extent of environmental disclosure.	Agency theory	Oil and Gas industry	42	Annual reports	Environmental disclosure Quantity		Board size, board independence, audit committee independence and ownership concentration.		Pears on correlation and pooled OLS
11	Victor-Chiedu and Fodio, (2012)	2005-2009	To examine how board characteristics interact with quality of environmental disclosure.	Agency and Legitimacy theories	Industrial goods, construction and Conglomerates	105	Annual report	EDQ	Disclosure index	Board size, presence of independent non-executive director, presence of women on the board and presence of foreign director on the board	Firm size and financial slack	Logistic regression

12	Uwuigbe Egbide and Ayokunle, (2011)	2006-2010	To examine whether board size and board composition have any association with the level of firms' corporate environmental disclosure in annual reports	Legitimacy and Stakeholder	Listed industries	40	Annual report	Environmental disclosure quantity	Textual Analysis	Board size and board composition		Analysis of Variance
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This table provide summary of prior Nigerian studies on the association between board characteristics and environmental disclosure.

Source: Developed by the researcher.

Appendix 14: Summary of prior studies on the association between board characteristics and environmental disclosure in Nigeria: Panel B

S/N	References	Result
1	George an Ukpong, (2023)	There is a positive and significance association between environmental disclosure with each of the board meeting, board size and audit committee.
2	Okere et al., (2021)	There is a positive and significant association between environmental disclosure and Board size, board independence. However, no association between environmental disclosure with gender diversity and foreign directors on the board
3	Ivungu et al., (2021)	There is a positive and significance association between environmental disclosure with board independence and board ownership. While board size has negative and significance association with environmental disclosure.
4	Ndalu, Ibanichuka and Ofurum, (2021)	There is a negative and significant association between board independence and environmental disclosure quantity. While Firm size have moderating significant impact between board characteristics and environmental disclosure quantity association
5	Osemene et al., (2021)	The board committee has a significant influence on environmental disclosure amongst the African countries. Board diversity have significant positive association in Kenya and significant negative association in Nigeria. Board size have significant positive association in South Africa and significant negative association Nigeria. Board independence has significant positive association Egypt and negative significant association in Kenya. institutional ownership has significant negative association with environmental accounting disclosure amongst Nigeria, Egypt and South African companies
6	Jeroh, (2020)	Board size and audit committee have positive and significance association with ED of companies in Nigeria and Kenya. However, no association between the variables with companies in South Africa

7	Eneh, (2019)	The result for that board independence have positive and significance association with environmental disclosure. While board size has, and foreign ownership have no association with environmental disclosure.
8	Odoemelam and Okafor, (2018)	The results show that board independence, board meeting, and the environmental committee and firm size have positive and significance association with corporate environmental disclosure. However, board size, audit committee independence, Big-4 and industry type have insignificant association with corporate environmental disclosure.
9	Ofoegbu, Odoemelam and Okafor, (2018)	Result shows a significant positive relationship between board independence and ED in both South Africa and Nigeria. While industry type has positive association with ED of companies in South Africa and have no relationship with companies in Nigeria. While board meetings audit committee independence and firm size have no association with companies in both south Africa and Nigeria
10	Oscar and Juliet, (2015)	Board independence, audit committee independence, managerial ownership and board size have positive and significant relationship with environmental reporting.
11	Victor- Chiedu and Fodio, (2012).	presence of foreign member on board, board independence firm size, and financial slack has positive significance association with quality of ED. While board size has negative association with quality of ED. In contrast gender diversity have no association with quality of environmental disclosure
12	Uwuigbe Egbide and Ayokunle, (2011)	Board composition has positive association with environmental disclosure while board size has a negative association with environmental disclosure

This table provides summary of prior Nigerian studies on the association between board characteristics and environmental disclosure.

Source: Developed by the researcher.

Appendix 15: Summary of prior studies on the association between ownership structure and environmental disclosure in developed countries: Panel A

S/N	References	Country and year	Objectives	Theory	Observations	Source of report	Type of Disclosure	Measurement of Disclosure	Factors considered	Control variable	Techniques for data analysis
1	Zouari and Dhifi, (2022)	European countries 2012 - 2019	To examine the association between ownership structure and integrating disclosure.	Agency theory	3449 European firms	Data stream	Integrated reporting quantity	Disclosure index Unweighted approach	Institutional, managerial and block holder ownership	Firm size, return on asset	OLS
2	Aluchna et al, (2022)	Poland (2015 - 2019)	How institutional investors impact ESG disclosure	Stakeholder theory	529 companies	EIKON data base	ESG disclosure quantity	Unweighted approach	Mutual funds venture capital ownership by hedge, government	Firm size, ROA Tobin's Q.	Panel Regression

									pension ownership, corporate pension fund ownership		
3	Dragomir, Dumitru and Feleaga, (2022)	Romania 2018	To examine non-financial reporting quality predictors by state owned firms.	Agency and stakeholder theories	63 state-controlled companies	Annual report	Non-financial disclosure quality	Disclosure index	Ownership concentration	industry, sector characteristics, and company size	OLS regression
4	Acar, Tunca Çaliyurt and Zengin-Karaibrahimoglu, (2021)	72 countries	To investigate the association between environmental disclosure and ownership	legitimacy and stakeholder theories	27,847 observations	DataStream	Environmental disclosure quantity	Disclosure index	state and institutional ownership	Firm size leverage cash flow from operations	OLS regression

			p structure								
5	Dakhli, (2021)	France 2007– 2018	To examine the associatio n between corporate social responsib ility disclosur e and ownershi p structure		2400 French	DataStr eam	CSR disclosur e quantity	Disclosur e index	Institutio nal ownershi p and manager ial ownershi p	Firm size and leverage	multipl e regress ion
6	García- Meca and Pucheta- Martínez, (2018)	Spain 2004– 2014	To investigat e the associatio n between environm ental disclosur e and	Steward ship, institutio nal and agency theories	1332 non- financial compani es	Annual reports	CSR disclosur e quality	Disclosur e index	Institutio nal directors , pressure - sensitive institutio nal investors	Board independ ence board size, ownership concentra tion firm size leverage	OLS regress ion

			institutional directors (institutional investors) investors						, pressure - resistant investors		
7	Giannarakis et al., (2016)	European countries (2014)	To examine the determinant of climate change disclosure of European companies.	Legitimacy voluntary agency theories	European firms 720	Bloomberg	Climate change disclosure quantity	Disclosure index	Government ownership	firm size, profitability, and board size, Environmental performance External assurance	OLS regression
8	Rd and District, (2012)	Taiwan (2006 - 2009)	To investigate the association between environmental disclosure and	Agency	942	Annual report	Environmental disclosure quantity	Disclosure index	Director shareholding and institutional shareholding	Firms size, leverage and industry type	Panel regression

			ownershi p structure								
9	Tagesson et al., (2009)	Swee den	To explain the extent and content of SED informati on on corporati ons.	Steward ship and agency theories	267 listed compani es	Website reports	CSR disclosur e quantity	Disclosur e index	ownershi p structure and governm ent ownershi p.	Industry type, profitabilit y, size,	Multipl e regress ion

This table provides a summary of prior developed countries studies on the association between ownership structure and environmental disclosure.

Source: Developed by the researcher.

Appendix 16: Summary of prior studies on association between ownership structure and environmental disclosure in developed countries-Panel B

S/N	References	Result
1	Zouari and Dhifi, (2022)	There is a positive and significant association between integrated reporting and institutional ownership. However, there is negative and significant association between integrated reporting with ownership concentration and managerial ownership
2	Aluchna et al., (2022)	There is a positive and significance association between ESG disclosure and firm size. There is a negative and significance association between environmental social and governance disclosure with mutual and corporate institutional ownership. While ESG disclosure has no association with return on assets and Tobin Q.
3	Dragomir, Dumitru and Feleaga, (2022)	There is a positive and significant association between non-financial disclosure with firm size and environmental impact. While non-financial disclosure has negative and significant association with ownership concentration.
4	Acar, Tunca Çaliyurt and Zengin-Karaibrahimoglu, (2021)	There is a positive and significance association between environmental disclosure and state ownership. While environmental disclosure has negative and significant association with institutional ownership.
5	Dakhli, (2021)	There is a positive and significant association between CSR disclosure and institutional ownership. In contrast CSR disclosure have negative and significant association with managerial ownership
6	García-Meca and Pucheta-Martínez, (2018)	There is a negative and significance association between CSR disclosure and institutional investors
7	Giannarakis et al., (2016)	There is a negative and significance association between CSR disclosure and institutional investors
8	Rd and District, (2012)	The Director shareholding have positive and significance association with environmental disclosure for environmental sensitive industry only. In other words, managerial shareholding has negative and significant association with environmental disclosure.
9	Tagesson et al., (2009)	Government ownership has positive and significant association with social and environmental disclosure while ownership concentration has no association with social and environmental disclosure.

This table provides a summary of prior developed countries studies on the association between ownership structure and environmental disclosure.

Source: Developed by the researcher.

Appendix 17: Summary of prior studies on the association between ownership structure and environmental disclosure in developing countries: Panel A

S/N	References	Country and year	Objectives	Theory	Observations	Source of report	Type of Disclosure	Measurement of Disclosure	Factors considered	Control variable	Techniques for data analysis
1	Ananze h, Bugshan and Amayreh, (2023)	Jordan (2010-2016)	Examine the association between ownership structure and quality of environmental disclosure	Agency and stakeholder theories	604	Annual reports	Sustainability disclosure quality	Disclosure index	ownership concentration, foreign ownership, government ownership, managerial ownership	Media exposure	T-test and OLS regression

2	Ananzen et al., (2023)	Jordan 2022	To examine whether and how political connection and ownership concentration have association with quality of environmental disclosure	Stakeholder theory	916 non-financial	Annual report	CSR disclosure quality	disclosure index	political connection and ownership concentration		OLS regression
3	Kim and Garanina, (2022).	Russia (2012–2017)	To examine the relationship between corporate social responsibility disclosure and ownership	Legitimacy theory	1125 listed companies	Annual reports	CSR disclosure quality	Disclosure index	federal, regional, and municipal state ownership	Firm size, market-to-book ratio of equity, leverage	Panel regression

			p structure.								
4	Al Amosh and Mansor, (2020)	Jordan (2012 – 2107)	To investigat e the associatio n between ownershi p structure and environm ental disclosur e	Legitim acy theory	408 companie s	Annual reports	Environm ental social and governan ce disclosur e quantity	Disclosur e index	foreign, manageri al, governm ent and block- holder ownershi p	Firm size, age, industry type	OLS regress ion
5	Fuadah et al., (2022)	Indone sia (2018- 2020)	To examine the impact of ESSG disclosur e and ownershi p structure.	Stakeh older and agency theories	140	Annual reports	ESG quantity	Unweigh ted method Disclosur e index	foreign ownershi p, public ownershi p, state ownershi p, family ownershi p	size leverage	partial least square s regress ion

6	Dong, Dong and Lv, (2022)	China 2009-2018)	To examine the impact of ownership structure of environmental disclosure of manufacturing companies in China	Voluntary disclosure, resource dependency and agency theories	2237 Chinese manufacturing companies listed	Bloomberg	Environmental responsibility disclosure quantity	Disclosure index	Foreign ownership government ownership private ownership, state ownership		probit regression
7	Al Fadli et al., (2022)	Jordan (2006-2015)	To examine the association between ownership structure and CSR disclosure	Legitimacy theory	800 nonfinancial sectors	Annual report	CSR disclosure quantity	Disclosure index	foreign ownership structure managerial and institutional ownership		OLS regression

8	Boshnak, (2022)	Saudi Arabia 2016–2018	To investigate the association between ownership structure and environmental disclosure.	legitimacy and stakeholder theories	210 non-financial listed companies	Annual report	Voluntary environmental disclosure quantity	Disclosure index	institutional ownership, government ownership and family ownership	firm age, firm size, leverage, profitability, audit firm size and industry type	OLS
9	Lavin, and Montecinos-Pearce, (2021)	Chile 2002 - 2017	To investigate the difference in environmental disclosure of companies according to their ownership structure	Legitimacy theory	178	Bloomberg	ESG disclosure quantity	Disclosure index weighted	State ownership, board independence, board diversity, independence of the internal audits	size, profitability, efficiency, leverage, return, and liquidity, internationalization	Tobit panel regression

10	Zaid, Abuhijleh and Pucheta-Martínez, (2020)	Palestine (2013–2018)	To investigate the shareholders engagement impact on CSR disclosure.	Agency theory	198 companies	Annual reports	CSR disclosure quantity	Disclosure index	institutional, foreign and government ownership.	Firm size, firm age, leverage industry type and board size	pooled ordinary least square
11	Viana and Crisóstomo, (2020)	Brazil 2010–2014	To investigate the association between social and environmental disclosure of ownership concentration	Agency theory	1252 companies	Annual report	Environmental disclosure quantity	Textual analysis	Ownership concentration	profitability; and firm size	OLS regression

12	Amidjaya, and Widagdo, (2020).	Indonesia 2012 to 2016	to find investigate how corporate governance and ownership structure has impact on sustainability reporting	Stakeholder and institutional theories	155 listed banks	Annual report	Sustainability disclosure quality	Disclosure index	Corporate governance, foreign ownership, family ownership, OJK sustainable finance regulation, digital banking index	Government ownership, Bank size, Profitability, Liquidity risk	panel regression
13	Nurleni and Bandanug, (2018)	Indonesia (2011-2015).	To investigate the association between institutional and managerial ownership with CSR disclosure.	Agency theory	-	Annual report	CSR disclosure quantity	Disclosure index	Institutional and managerial		partial least square

14	Akrout and Othman, (2016)	MENA (2010-2012)	To investigate the association between environmental disclosure and ownership structure in Middle East and North African companies.	Signalling and agency theories	143 polluting companies	website reports	Environmental disclosure quantity	Disclosure index	Family and government ownership	Size, profitability and leverage	Panel data regression
15	Sufian and Zahan, (2013)	Bangladesh (2010)	To examine association between ownership structure and corporate social responsibility	Agency theory	70 non-financial companies	Annual reports	CSR disclosure quantity	Disclosure index	Managerial ownership, foreign ownership, number of shareholders		OLS

			ility disclosur e.								
16	Soliman , El Din and Sakr, (2013)	Egypt (2007- 2009)	To examine the associatio n between ownershi p structure on CSR disclosur e	Agency theory	50	Annual report	CSR disclosur e quantity	Disclosur e index unweight ed approac h	Foreign, manageri al and institutio nal ownershi ps	Firms size firm age firm performance and firm survival	logistic regress ion

This table provides a summary of prior developed countries studies on the association between ownership structure and environmental disclosure.

Source: Developed by the researcher.

Appendix 18: Summary of prior studies on the association between ownership structure and environmental disclosure in developing countries: Panel B

S/N	References	Result
1	Ananzeh, Bugshan and Amayreh, (2023)	There is a positive and significant association between environmental disclosure quality and foreign ownership. Environmental disclosure quality has negative and significant association with ownership concentration and managerial ownership
2	Ananzeh et al., (2023)	There is a positive and significance association between quality of CSR disclosure and political connection. While ownership concentration has significant negative association with quality of CSR disclosure.
3	Kim and Garanina (2022)	Companies that release higher CSR are more cautious on financial reporting. Also, there is negative association between federal, state and municipal ownership with CSR disclosure.
4	Al Amosh and Mansor, (2020)	There is a positive and significant association between environmental disclosure and foreign ownership. In contrast environmental disclosure have no association with block-holder, managerial and government ownership
5	Fuadah et al., (2022)	There is a positive and significance association between ESG disclosure with foreign and public ownership. While ESG disclosure has no association with state and family ownership.
6	Dong, Dong and Lv, (2022)	There is a positive and significance association between government ownership, foreign ownership with environmental disclosure. While private ownership has no association with environmental disclosure.
7	Al Fadli et al., (2022)	The result shows that government and foreign ownership have a positive and significance association with quantity of corporate social responsibility disclosure. While family and managerial ownership have negative and significance association with CSR disclosure. Lastly institutional ownership has no association with CSR disclosure.
8	Boshnak, (2022)	Voluntary environmental disclosure has positive and significance association with government ownership, industry type, firm size and leverage. While environmental disclosure has no association with family ownership. However, institutional ownership, firm size and firm age have negative and significant association with environmental disclosure.

9	Lavin and Montecinos-Pearce, (2021)	There is a negative and significant association between ESG disclosure with state ownership while, ESG disclosure have negative and significant association with institutional ownership.
10	Zaid, Abuhijleh and Pucheta-Martínez, (2020)	There is a positive and significance association between CSR disclosure with institutional, foreign and government ownership.
11	Viana and Crisóstomo, (2020)	There is positive and significant association between environmental disclosure and ownership concentration
12	Amidjaya, and Widagdo, (2020)	Indonesian firms release low sustainability information. Also, there is a positive and significance association between sustainability disclosure with corporate governance, family ownership institutional ownership. Lastly sustainability disclosure has no association with OJK finance sustainable roadmap and digital banking.
13	Nurleni and Bandang, (2018)	There is a positive and significance association between CSR disclosure and institutional ownership. While managerial ownership has negative and significance association with CSR disclosure.
14	Akrout and Othman, (2016)	There is a positive and significance association between environmental disclosure and government ownership. While environmental disclosure has negative and significance association with family ownership
15	Sufian and Zahan, (2013)	Sample firms release very poor CSE information. There is a positive and significance association between CSR disclosure and ownership concentration. In contrast CSR disclosure have no association with foreign ownership, number of shareholder and board size.
16	Soliman, El Din and Sakr, (2013)	There is a positive and significance association between CSR disclosure with institutional and foreign ownership. In contrast CSR disclosure have negative and significant association with managerial ownership

This table provides a summary of prior developed countries studies on the association between ownership structure and environmental disclosure.

Source: Developed by the researcher

Appendix 19: Summary of prior studies on the association between ownership structure and environmental disclosure in Nigeria: Panel A

S/N	References	Country and year	Objectives	Theory	Industry	Observations	Source of report	Type of Disclosure	Measurement of Disclosure	Factors considered	Control variable	Techniques for data analysis
1	Egbunike and Efionayi, (2021)	2009 to 2018	Examine the association between corporate social responsibility disclosure and ownership structure on listed bank on Nigerian stock exchange.	Agency theory	Financial service	130 banks	Annual reports	Disclosure index	Corporate social responsibility disclosure quantity	Institutional, managerial and block holder ownership		OLS regression
2	Uwuigbo and Olusanmi, (2011)	To examine the association between	2006-2010	Agency theory		35 companies	Annual reports	Disclosure index	Voluntary disclosure	Managerial ownership		OLS regression

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This table provides a summary of prior studies in Nigeria on association between ownership structure and environmental disclosure.

Source: Developed by the researcher.

Appendix 20: Summary of prior studies on the association between ownership structure and environmental disclosure in Nigeria: Panel B

S/N	References	Result
1	Egbunike and Efionayi, (2021)	There is a positive and significant association between corporate social responsibility disclosure and blockholder ownership. In contrast institutional ownership have negative and significant association with CSR disclosure. Lastly no association between CSR disclosure and managerial ownership.
2	Uwuigbe and Olusanmi, (2011)	Managerial ownership has a positive and significant association with CSR disclosure

This table provides a summary of prior studies in Nigeria on association between ownership structure and environmental disclosure.

Source: Developed by the researcher.