Sustainability reporting, board diversity, earnings management and financial statements readability: evidence from an emerging economy

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Abstract

Purpose – *This paper aims to investigate the moderating effect of sustainability reporting on the relationship between the independent variables of board diversity, and earnings management and the dependent variable of readability of financial statements.*

Design/methodology/approach – *The study panel data regression analysis involved 36 Kenyan-listed companies from 2016 to 2020.*

Findings – *Key findings were that increased board diversity was found to significantly improve the readability of financial statements. Discretionary earnings management was found to significantly reduce the readability of financial statements. Sustainability reporting was found to significantly increase the readability of financial statements, and it moderated the relationship between board diversity, earnings management and financial statements readability in Kenya.*

Research limitations/implications – *The study sample of 36 non-financial listed in the Nairobi Securities Exchange was very small; hence, caution should be adopted when interpreting the findings.*

Practical implications – *The Capital Markets Authorities (CMA) as a policymaker should enforce sustainability reporting by Kenyan listed firms as there is evidence that the reporting enhances the readability of financial statements. The Institute of Certified Public Accountants as a policymaker should closely monitor the published financial statements of firms for earnings management and punish the perpetrators, as there is empirical evidence that the practice reduces the readability of financial statements.*

Social implications – *Sustainability reporting is successful as a moderating variable between readability of financial statements and determinants of readability of financial statements.*

Originality/value – *This study contributes to knowledge by studying sustainability reporting as a moderating variable between the independent variables of board diversity and earnings management and the dependent variable of readability of financial statements and measured sustainability reporting using a dummy variable for the period before and after the enactment and release of CMA code of 2016 on corporate governance that required sustainability reporting by Kenyan listed companies.*

Keywords *Readability, Financial statements, Board characteristics*

Paper type *Research paper*

1. Introduction

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Given the devastating effects of climate change in the world now, the environmental, social and governance (ESG) agenda and the sustainability of operations of firms have become very important matters that each country and firm must give attention to (NSE, 2021; GRI, 2016). To reduce information asymmetry between management as preparers of financial reports and shareholders, some countries have made it mandatory to report ESG matters

including Denmark, France, India, Hong Kong, Singapore and South Africa (Krueger *et al.*, 2023). In Kenya, the Kenya Companies Act of 2017 mandates company directors to review ESG issues that may affect the future performance of the company. Also, the Nairobi Securities Exchange (NSE) in November 2021 issued ESG guidelines requiring that sustainability reports be prepared and reported by each listed firm at least annually (NSE, 2021).

For financial information to be useful to the readers and enable them to make informed financial decisions, it should have certain qualities including completeness, relevance, comparability, reliability and comprehensibility (Thoa and Nhi, 2022). A text is regarded as readable if it can be understood when read for the first time (Loughran and McDonald, 2014). Readability is associated with textual difficulty and is not varied by the reader's traits but is fixed for a specific text and is boosted by having shorter sentences in a text (Xu *et al.*, 2018). Text readability can also be enhanced by having fewer words in sentences and by having less jargon in the text (Bloomfield, 2002; Courtis, 1998).

Financial statements are required to conform to international financial reporting standards (IFRS) to effectively communicate the message that is intended in the financial statements (Loughran and McDonald, 2014). There are incentives for management as preparers of financial statements to deceive the users or readers of the financial statements using obfuscation tactics especially when the firm is performing poorly (Thiago *et al.*, 2023). Real earnings management can arise when there are changes in a firm's operations to enhance performance (Lo *et al.*, 2017). Accrual-based earnings management arises because opportunistic managers elect to adopt an aggressive accounting policy, standards and practices with the intent to deceive the users of financial statements by manipulating the firm's performance (Ball *et al.*, 2000; Goncalves *et al.*, 2022; Thiago *et al.*, 2023).

In the advent of ESG and the sustainability agenda, very few studies have researched the readability of sustainability reports and if they have done so, did not relate the readability of sustainability reports to board characteristics and included Smeuninx *et al.* (2020) who studied the measuring of the readability of sustainability reports in five jurisdictions, namely, the USA, UK, Europe (non-UK), Australia and India. Adhariani and du Toit (2020) studied the readability of sustainability reports in Indonesia; Nilipour *et al.* (2020) studied the readability of sustainability reporting in New Zealand. By not including the board diversity variable, these past studies created a conceptual research gap that this study sought to fill.

Some past studies related readability to board characteristics in developed economies including Beretta *et al.* (2023) who studied board composition and textual attributes of non-financial disclosure in the banking sector in Italy; Cervantes (2020) studied communication from the board of directors on readability in the Spanish language on sustainability reporting in Spain. By concentrating only on the developed economies, a contextual research gap for this study to fill.

The key findings of this study were that the financial statements in Kenyan non-financial listed companies were very difficult as per the Flesch readability index. Board diversity components of female directorships, age of directors and the independence of directors were found to significantly improve the readability of financial statements in Kenyan listed companies. Earnings management as measured by discretionary accruals was found to significantly reduce the readability of financial statements. Sustainability reporting as the moderating variable was found to significantly increase the readability of financial statements in Kenyan listed companies.

This study contributes to knowledge by studying sustainability reporting as a moderating variable between the independent variables of board diversity and earnings management and the dependent variable of readability of financial statements and measured sustainability reporting using a dummy variable for the period before and after the enactment and release

of CMA code of 2016 on corporate governance that required sustainability reporting by Kenyan listed companies.

The rest of the study is organized as follows: Section 2 comprises literature review, Section 3 comprises the research methodology, Section 4 presents the findings and discussion, and Section 5 has the conclusion and recommendations.

2. Institutional setting

Mandatory ESG and sustainability disclosures are expected to reduce information asymmetry in this study which is needed for improving the readability of financial statements after the interests of management and shareholders become aligned (Krueger *et al.*, 2023). The Global Reporting Initiatives (GRI) Sustainability Reporting Standards (SRI) released in the year 2016 require a shift in focus from a 1D view that only focuses on corporate financial performance to a more holistic view that focuses on both the financial and non-financial performance of corporates (GRI, 2016).

Kenya is also among the few countries in the world that has banned the use of plastic bags in the year 2017 which are considered harmful to the environment (GOK, 2017). The Capital Markets Authority of Kenya (CMA) published the Code of Corporate Governance Practices for Issuers of Securities to the Public in March 2016 which required the boards of listed Kenyan companies to establish structures to promote the sustainability of the company (CMA, 2016). In November 2021, the NSE issued the Nairobi Securities Exchange ESG Disclosures Guidance Manual aimed at improving and standardizing ESG information reported by listed companies in Kenya that meet international standards on ESG reporting (NSE, 2021). The CMA guidelines on corporate governance in 2016 advocated for increased board diversity in Kenyan-listed companies in terms of academic qualifications, technical expertise, relevant industry knowledge, experience, nationality, age, race and gender in the Kenyan listed companies (CMA, 2016). The CMA corporate governance code of 2016 also prescribed the need for boards of listed companies to prepare financial statements that comply with the IFRS which implies financial statements that are free from manipulation and false accounting and by extension, financial statements that are free from earnings management (CMA, 2016).

2.1 Theoretical review

The agency theory by Jensen and Meckling (1976) opines that the separation of shareholders from the management of companies creates opportunistic behavior in management who take advantage of the information asymmetry between them and shareholders to manipulate financial statements to present a better picture of the firm performance than the actual performance. As per the agency theory, board diversity and other corporate governance mechanisms are associated with the reduction of information asymmetry between a firm's directors and its shareholders (Abad *et al.*, 2017). Agency theory supports the board diversity and earnings management variables in this study.

The incomplete revelation hypothesis by Bloomfield (2002) and the obfuscation hypothesis by Courtis (1998) posit that the level of readability of financial statements is inversely related to the financial performance of firms. Hence, opportunistic management may have an incentive to make financial statements less readable if the firm has posted poor financial performance and vice versa. The incomplete revelation and obfuscation hypothesis support the readability of the financial statements as a variable in this study.

The signaling theory was developed by Spence (1973) and proposes that the management of a firm can also send signals to the market and reduce information asymmetry between management and the firm's stakeholders. If a firm performs well, management of the firm will want to communicate the good performance to stakeholders by presenting easy-to-read

financial statements but if the firm's performance is poor, management may become opportunistic and obfuscate financial statements to hide the poor performance (Thiago *et al.*, 2023). In this research, signaling theory supports the readability of financial statements variable. Signaling theory also supports the sustainability reporting variable since mandatory disclosure of ESG matters has been associated with reduced information asymmetry between management as the preparers of financial statements and the shareholders as the users or readers of the financial statements (Krueger *et al.*, 2023).

The legitimacy theory by Suchman (1995) proposes that firms should operate legitimately in society and should conform to societal values, norms and ethics to access societal resources without undue interruption. Hence, firms engage in corporate social responsibility (CSR) and corporate philanthropy and spend funds, time and other resources for the benefit of the society in which they operate. Firms that fail to conform to the expectations of the society they operate usually get into conflict with members of the society which can threaten their survival. Legitimacy theory has widely been used to explain ESG matters and disclosures and in this study, the legitimacy theory supports the sustainability reporting variable.

2.2 Empirical literature review

2.2.1 Board diversity and readability of financial statements. Board diversity has been found to reduce information asymmetry that may exist between management and owners of firms (Abad *et al.*, 2017). The reduction in information asymmetry is associated with improved readability of financial statements (Bloomfield, 2002; Courtis, 1998). Directors as the preparers of financial statements tend to be opportunistic and exploitative if not well monitored by shareholders who are the primary users of financial statements (Courtis, 1998; Thiago *et al.*, 2023).

Board diversity can be enhanced through gender diversity, the presence of more independent directors, and a mix of young and old directors (Ginesti and Drago, 2018; Elbadry *et al.*, 2015; Xu *et al.*, 2018). It is opined that there is a decline in stakeholder conflict in workplaces that promote gender equality and diversity (Adams *et al.*, 2011). Female directors are associated with opinions and questions that are different from those of male directors and tend to incline transparency and disclosure and hence the reduction in exploitative practices that are associated with earnings management (Abad *et al.*, 2017). Some scholars opined that if female directors are included on a board for the wrong reasons like tokenism and societal pressure, their presence can be counter-productive and lead to increased agency conflict and a reduction in cooperativeness among board members (Ginesti and Drago, 2018).

Abad *et al.* (2017) studied the relationship between gender diversity on boards and information asymmetry in the equity markets in Spain and used 531 firm-year observations during years 2004 to 2009. The Generalized Method of Moments methodology was used, and the findings indicated board gender diversity reduced information asymmetry between directors and financial statement users. These findings were consistent with those of Loukil *et al.* (2020) who studied all listed firms in the SBF 120 index in France during 2002 and 2012. The findings were that gender diversity reduced information asymmetry problems which implied more readable financial statements.

The findings by Abad *et al.* (2017) and Loukil *et al.* (2020) were consistent with those of Ginesti and Drago (2018) in Italy who studied 435 annual reports and employed the FOG readability index and found that the participation of female directorships significantly improved on the readability of financial statements. The findings by Ginesti and Drago (2018) agreed with those of Harjoto *et al.* (2020) who carried out a study on whether the gender of the executives signing CSR reports affects their readability. The study involved 346 firms listed in the Standard and Poor's 500 index in the USA during the years 2006 to 2015 and

readability was measured using SMOG and FOG indices. The findings indicated that CSR reports that had been signed by female executives were significantly more readable than reports signed by their male counterparts.

However, the findings by Ginesti and Drago (2018) and Harjoto *et al.* (2020) conflicted with the findings of Efretuei (2013) in the UK who studied 622 annual reports from 2000 to 2011 and employed the FOG readability index and found that there was no significant relationship between female directorships and the readability of financial reports. The findings of Ginesti and Drago (2018), Harjoto *et al.* (2020) and Efretuei (2013) disagreed with those of Sun *et al.* (2022) who employed the FOG readability index in China in a sample that comprised 3152 firms over a period of during 2007 to 2017 and found that female directorships significantly make financial statements less readable.

Xu *et al.* (2018) opined that older directors tend to be more honest and truthful and are unlikely to engage in acts to mislead users of financial statements through obfuscation strategies. This was after studying the executive age and readability of financial reports of 530 firms in the USA and measured readability using the FOG, Flesch, Kincaid indices and in terms of length of sentences and number of words. The findings indicated that the age of directors had significantly eased the readability of financial reports. The findings by Xu *et al.* (2018) agreed with the findings of Sun *et al.* (2022) in China but disagreed with the findings of Efretuei (2013) in the UK who found that older directors were associated with more difficult-to-read financial statements.

Independent directors are unlikely to be manipulated and are associated with improved readability by monitoring management (Elbadry *et al.*, 2015). Independent boards are associated with actions that promote transparency and reduction of opportunistic practices that are self-seeking including earnings management and hence improvement in corporate reporting (Jensen and Meckling, 1976). The view that independent directors are associated with improved corporate reporting readability agreed with that of Harjoto *et al.* (2020) in the USA. Elbadry *et al.* (2015) and Harjoto *et al.* (2020) agreed with the findings of Prabhawa and Harymawan (2022) in Indonesia during 2014 to 2018 and studied 758 companies and found that independent directorships in firms significantly enhanced the relationship between readability of financial statements as measured by FOG index and audit fees.

However, the positive relationship between independent directorship and readability of financial statements findings were contradicted by Ezat (2019) who studied the impact of earnings quality on the association between readability and cost of capital in Egypt and found that independent directorships had no significant effect on the readability of financial statements a finding that was consistent with that of Dalwai *et al.* (2021) in Oman who studied the impact of intellectual capital and corporate governance on annual report readability in Oman and used Flesch ease index, Flesch Kincaid indices and file size to measure readability, which was then regressed against board and firm characteristics using annual reports of 30 listed firms during 2014 to 2018. The findings indicated that board independence lacked a significant effect on annual report readability. On the contrary, Sun *et al.* (2022) found that independent directorships made it difficult to read financial statements in China.

Based on the agency and signaling theories and the incomplete revelation hypotheses which advocate for the reduction in information asymmetry between directors and shareholders of companies (Jensen and Meckling, 1976; Spence, 1973; Bloomfield, 2002) and based on the CMA code on corporate governance of 2016 which advocated for board diversity in Kenyan listed firms and also based on the conflicting findings in the related past studies which are limited in the Kenyan context, following hypothesis was developed:

H1. Increased board diversity has a significant increase in the readability of financial statements in Kenya.

2.2.2 Earnings management and readability of financial statements. There is inconclusiveness in the findings from past studies that assessed the relationship between earnings management as measured by discretionary accruals and the readability of financial statements. Ajina *et al.* (2016) studied the provision of guidance on the relationship between the readability of financial statements and earnings management in France and used the modified Jones discretionary accruals model, the FOG readability index. A sample of 163 listed firms was employed between 2010 and 2013. The findings indicated that earnings management reduced the readability of financial statements in the listed companies.

Similarly, Lo *et al.* (2017) studied earnings management and annual report readability in the USA and used the FOG index, Jones 1991 discretionary accruals model, and the meet or beat (MBE) earnings management measures to study 4,855 firms listed in SEC between 2000 and 2012. The findings also indicated firms with low financial statement readability had high levels of earnings management.

The findings of Ajina *et al.* (2016) and Lo *et al.* (2017) agreed with those of Cheng *et al.* (2018) who measured readability using the FOG index and measured earnings management using the modified Jones 1995 model in a study whose sample comprised 1,163 companies listed in China. The findings were that earnings management significantly reduced the readability of financial statements in the China-listed companies. Similarly, Sambuaga *et al.* (2022) studied the effect of profit management on annual report readability in Indonesia during the years 2014 to 2018 after the MBE model of earnings management and a combination of MBE and Kothari discretionary accruals earnings management model. The sample had 165 companies and the findings indicated earnings management as measured by MBE significantly reduced the readability of financial statements in Indonesia.

However, Thiago *et al.* (2023) found no significant relationship between accruals earnings management and the readability of financial statements in Brazil. The modified Jones 1995 discretionary accruals model and MBE earnings management measures were employed. The Flesch Index readability model and 121 companies were also used during the years 2010 and 2018. The study findings of Thiago *et al.* (2023) were consistent with those of Goncalves *et al.* (2022) who found no significant relationship between earnings management and the readability of financial statements in Europe after employing the modified Jones 1995 earnings management model. Readability was measured using file size, and a sample of 2,953 was studied during the years 2012 to 2018.

El-Sayed Ebaid (2012) studied earnings management using the MBE threshold methodology in listed companies in Egypt and found that there were very few observations that appeared immediately below zero profits and very many observations that appeared immediately above zero profits, and this implied that many Egyptian listed firms engaged in earnings management to avoid reporting losses or earnings decrease. The findings by El-Sayed Ebaid (2012) were not consistent with the findings by Gbadebo *et al.* (2022) who studied earnings manipulation in Nigerian firms and employed the MBE technique. Their study involved 161 Nigerian listed firms from 2002 to 2019 and found there was no sufficient evidence associating change in earnings benchmarks with earnings discretions in the listed firms. The Gbadebo *et al.* (2022) findings concurred with those of Pududu and Villiers (2016) studied earnings management through loss Avoidance or MBE method in South Africa and used 355 companies listed on the Johannesburg Stock Exchange (JSE) from 2003 to 2011 and found no evidence that managers of South Africa listed firms engage in earnings management by avoiding reporting small losses or small decreases in earnings. Loh *et al.* (2017) studied sustainability reporting and firm value: evidence from Singapore-listed companies. The sample size comprised of 502 listed companies that published reports in December 2015. The findings revealed that disclosures about sustainability were

positively related to the market value of a firm and that the link was even stronger with high-quality sustainability disclosure.

The past studies findings of Smeuninx *et al.* (2020), Nilipour *et al.* (2020), Shuili and Yu (2020) and Loh *et al.* (2017), agreed with the findings of Githaiga (2023) in the Kenyan context, who studied sustainability reporting, board gender diversity and earnings management and used 117 listed companies across East Africa. In his study, sustainability reporting was used as an independent variable and measured using the sustainability disclosure index. The findings were that both sustainability reporting and board gender diversity had a significant and negative effect on earnings management and that board gender diversity moderated the relationship between sustainability reporting and earnings management in East African listed companies.

Based on the 2016 CMA corporate governance code that condemns manipulation of financial statements and encourages compliance with IFRS and based on the incomplete revelation and obfuscation hypotheses that encourage the readability of financial statements (Bloomfield, 2002; Courtis, 1998) and also based on the inconclusiveness in the related past studies concerning the relationship between earnings management and the readability of financial which are scarce in the Kenyan context, the following hypothesis was developed:

H2. Increased earnings management has a significant reduction in the readability of financial statements in Kenya.

2.2.3 Moderating effect of sustainability reporting on the relationship between board diversity and readability of financial statements. Past studies have focused on investigating the readability of sustainability reports including Smeuninx *et al.* (2020) who studied measuring the readability of sustainability reports: a corpus-based analysis through standard formulae and natural language processing. The FOG, Flesch and Flesch–Kincaid grade indices and lexical density metric were employed to measure the readability of approximately 2.75 million words and 470 texts. The results revealed that despite its wider readership, sustainability reports are very difficult and to read sometimes more difficult than financial reporting.

Githaiga (2023) on the other hand studied sustainability reporting, board gender diversity and earnings management in the East African community and used a sample of 71 publicly traded companies that were studied from 2011 to 2021. The findings were that sustainability reporting and board gender diversity had a negative and significant effect on earnings management and that board gender diversity moderated the relationship between sustainability reporting and earnings management. This study had the dependent variable as financial statement readability was while the Githaiga (2023) had earnings management as the dependent variable. Sustainability reporting in this study was measured using a dummy variable for the period before and after announcement of sustainability reporting regulations by the CMA in the year 2016, while Githaiga (2023) employed the content analysis method to measure sustainability reporting and thus methodological research gaps were focused upon by the present study.

The findings of the Githaiga (2023) study were consistent with the findings of Nilipour *et al.* (2020) who studied the readability of sustainability reporting in New Zealand over time and had a sample of 264 reports from 37 companies for 10 years from 2007 to 2016. The automated readability measure and the FOG, Flesch and Flesch–Kincaid grade indices were employed. The findings also revealed environmentally sensitive firms published more readable sustainability reports. Shuili and Yu (2020) studied whether CSR reports convey value-relevant information in terms of report readability and tone. The data was collected from Fortune 500 companies that prepared standalone CSR reports during the years 2002 to 2014 and the findings indicated that CSR performance was positively associated with changes in the readability and tone of CSR reports.

During a period of poor financial performance in firms, the directors can be opportunistic and thus manipulate financial statements to hide the poor performance as per the obfuscation and the incomplete revelation hypotheses (Bloomfield, 2002; Courtis, 1998). The legitimacy theory advocates that firms should legitimately operate in society and should promote societal values, norms and ethics to access societal resources (Suchman, 1995). The NSE ESG guidelines of the year 2021 advocated for improved ESG disclosures by Kenyan listed companies.

Based on the CMA (2016) corporate governance code in Kenya promoted sustainability reporting by of the listed companies, diversity in boards and compliance with IFRS in the preparation of financial statements based on the obfuscation and the incomplete revelation hypotheses (Bloomfield, 2002; Courtis, 1998), legitimacy theory (Suchman, 1995) and on based on the mixed findings in the past related studies that are limited in the Kenyan context, the following hypothesis was developed:

H3. Sustainability reporting has a significant moderating effect on the relationship between board diversity and the readability of financial statements in Kenya.

3. Methods

3.1 Population and sampling

During the years 2016–2020, securities exchanges in Kenya had 36 listed non-financial firms distributed over the 11 sectors of the NSE. This study thus involved 180 firm-year observations.

3.2 Data collection

The study was based on secondary data from annual financial reports of the listed non-financial companies and from the websites of the NSE non-financial listed companies. The definition of assets and liabilities in financial firms differs from that of non-listed firms (Ginesti and Drago, 2018; Sambuaga *et al.*, 2022).

3.3 Data analysis

3.3.1 Readability of financial statements. This study has used the Flesch reading ease level (FRI) readability index which is a widely used measure of the readability of texts and the higher the Flesch index, the higher the reading ability of a text (Xu *et al.*, 2018; Smeuninx *et al.*, 2020: Dalwai *et al.*, 2021). For robustness tests, the Gunning Fog readability index was employed as the dependent variable due to its appropriateness in measuring complex texts (Loughran and McDonald, 2014). The higher the Fog index the less the text readability (Sambuaga *et al.*, 2022; Lo *et al.*, 2017).

3.3.2 Earnings management. Discretionary accruals form of earnings management is not permissible as it involves managers using their discretion to elect some accounting practices and standards to manipulate the reported earnings to deceive the users or readers of financial statements (Ball *et al.*, 2000; Goncalves *et al.*, 2022; Thiago *et al.*, 2023). In this research, the Kothari *et al.* (2005) model of discretionary accruals earnings management was used as the model includes return on assets (ROA) to correct misspecifications in the Jones and modified Jones models which do not include ROA and may be affected by large estimated discretionary accruals measure during periods of extreme growth in a firm (Lo *et al.*, 2017; Goncalves *et al.*, 2022; Sambuaga *et al.*, 2022). The Kothari *et al.* (2005) model is specified as follows:

$$NDACC_{it} = \alpha_1\left(1/A_{it-1}\right) + \alpha_2(\Delta REVi_t/A_{it-1}) + \alpha_3\left(PPE_{t/}A_{it-1}\right) + \alpha_4(ROA_{it}/A_{it-1}) + \varepsilon_{it} \quad (1)$$

$$TACC_{it} = E_{it} - CFO_{it} \tag{2}$$

$$DACC_{it} = TACC_{it} - NDACC_{it} \tag{3}$$

where:

$NDAC_{it}$ = non-discretionary accruals in firm i at time t;

$DACC_{it}$ = discretionary accruals in firm i at time t;

$TACC_{it}$ = total accruals in firm i at time t;

A_{it-1} = total assets in firm i at time t lagged for 1 period;

E_{it} = earnings = net income = profit after tax for firm i at time t;

ΔREV_{it} = current revenue – revenue in firm i at time t lagged for 1 period;

PPE_{it} = property plant and equipment in firm i at time t; and

CFO_{it} = current cash flow from operations in firm i at time t.

In this study, the MBE measure was also used to assess the possible manipulation of financial statements by management who may be under pressure to MBE internally set earning targets or targets that are set outside the firm by market analysts (Sambuaga *et al.*, 2022). MBE can be measured using the delta of earnings per share (EPS) which comprises a firm's current period EPS less the EPS of the previous period. Earnings management is suspected to have occurred and thus MBE = 1, if EPS delta is marginal and positive and lies between one to three cents, otherwise MBE = 0 (Lo *et al.*, 2017). Possible earnings management is also suspected to occur in firms that marginally met or beat the previous period's earnings which in this study was proxied using a dummy variable where MBE = 1 if the EPS delta is more than zero, otherwise MBE = 0 (Sambuaga *et al.*, 2022; El-Sayed Ebaid, 2012; Pududu and Villiers, 2016).

3.3.3 Sustainability reporting as a moderating variable. In this study, sustainability reporting has been proxied by a dummy variable to measure the use of pre and post-regulatory CMA (2016) corporate governance code release. The past related studies by Smeuninx *et al.* (2020) in the UK, Australia, India and all non-UK European countries; Nilipour *et al.* (2020) in New Zealand; Shuili and Yu (2020) in Fortune 500 companies, used the sustainability reporting disclosure index to measure sustainability reporting. The use of pre- and post-reform as a moderating variable was advocated for by Barry and Kenny (1986) in their paper on moderating and mediating variables and has been employed in various past studies Tariqul *et al.* (2019), Black and Khanna (2007), Dhammika (2012), Puneeta (2018), Locke and Duppati (2014) and Mews (2021) in event studies.

3.3.4 Control variables. File size has been employed as a control variable in this study. Corporate financial statements are technical contain complex words with more than two syllables and are guided by IFRS. The simplification of complex words used in financial statements may confuse readers. Larger file sizes are expected to contain more complex words and hence are more unreadable compared with financial statements that have small file sizes (Goncalves *et al.*, 2022; Loughran and McDonald, 2014; Thomas *et al.*, 2016; Guay *et al.*, 2016). The market-to-book (MTB) ratio has also been employed as a control variable in this study. Firms with high MTB ratios are deemed to have more growth opportunities and thus have the incentive to reduce information asymmetries and make financial statements more readable by prospective investors (Goncalves *et al.*, 2022; Guay *et al.*, 2016).

3.3.5 Panel regression modelling. This study involved 36 non-financial listed companies in the NSE from the year 2016 to the year 2020. The panel regression models were used for the equilibrium and robustness tests as follows:

The panel regression model with FRI as the dependent variable was as follows:

$$FRI_{it} = \beta_0 + \beta_1 LNFD_{it} + \beta_2 LNDA_{it} + \beta_3 LNID_{it} + \beta_4 DACC_{it} + \beta_5 MBE_{it} + \beta_6 FSZ_Control_{it} + \beta_7 FAGE_Control_{it} + \beta_8 MTB_Control_{it} + \varepsilon_{it} \quad (4)$$

$$FRI_{it} = \beta_0 + \beta_1 LNFD_{it} + \beta_2 LNDA_{it} + \beta_3 LNID_{it} + \beta_4 DACC_{it} + \beta_5 MBE_{it} + \beta_6 SR_{it} + \beta_7 LNFD * SR_{it} + \beta_8 LNDA * SR_{it} + \beta_9 LNID * SR_{it} + \beta_{10} FSZ_Control_{it} + \beta_{11} FAGE_Control_{it} + \beta_{12} MTB_Control_{it} + \varepsilon_{it} \quad (5)$$

For robustness tests, the panel regression model with the dependent variable being the FOG readability index was as follows:

$$FOG_{it} = \beta_0 + \beta_1 LNFD_{it} + \beta_2 LNDA_{it} + \beta_3 LNID_{it} + \beta_4 DACC_{it} + \beta_5 MBE_{it} + \beta_6 FSZ_Control_{it} + \beta_7 FAGE_Control_{it} + \beta_8 MTB_Control_{it} + \varepsilon_{it} \quad (6)$$

$$FOG_{it} = \beta_0 + \beta_1 LNFD_{it} + \beta_2 LNDA_{it} + \beta_3 LNID_{it} + \beta_4 DACC_{it} + \beta_5 MBE_{it} + \beta_6 SR_{it} + \beta_7 LNFD * SR_{it} + \beta_8 LNDA * SR_{it} + \beta_9 LNID * SR_{it} + \beta_{10} FSZ_Control_{it} + \beta_{11} FAGE_Control_{it} + \beta_{12} MTB_Control_{it} + \varepsilon_{it} \quad (7)$$

Refer to Table 1 for abbreviation, definition, measurement and source of the variables in the regression models.

4. Findings and discussions

4.1 Findings on descriptive statistics

The descriptive statistics findings in Table 2 indicate that the average Flesch readability ease score in Kenyan listed firms was 15.77% which implies that the financial statements of Kenyan listed companies are very difficult to read which was comparable to the Ginesti and Drago (2018) in Italy which found that financial statements are hard to read using the Fog measure of 15.1%. As per the descriptive statistics findings in Table 2, female directors constituted 31.1% of board members which was higher than the female directorship proportion in Italy which stood at 7% (Ginesti and Drago, 2018) and 23.2% in China (Sun *et al.*, 2022). The average age of directors in Kenyan listed firms is 59 years as per Table 2 which is comparable with other countries such as the USA which is 53 years (Xu *et al.*, 2018) and 54 years in the UK (Efretuei, 2013). On average the proportion of independent directorships in the sampled firms was 46.2% as per Table 2 which was lower than that 70.1% in Egypt (Ezat, 2019) and higher than in China where it was 37.1% (Sun *et al.*, 2022).

4.2 Pearson's correlation matrix findings

Pearson's correlation matrix findings as per Table 3 indicate a negative association between the discretionary accruals and the readability of financial statements of firms listed in Kenya. This finding agrees with the findings by Thiago *et al.* (2023) in Brazil and Lo *et al.* (2017) in the USA. Table 3 correlation findings indicate a negative association between the readability of financial statements and female directorships in Kenyan listed companies. This finding concurred with that of Sun *et al.* (2022) in China but contradicted that of Efretuei (2013) in the UK. The correlation findings in Table 3 indicate a negative association between the age of directors and the readability of financial statements in Kenyan listed companies and agreed with the findings of Efretuei (2013) in the UK but conflicted with the findings of Sun *et al.* (2022) in China. Table 3 on correlation findings indicated a positive association between independence of directors and the readability of financial statements in Kenyan listed companies which agreed with the findings of Sun *et al.* (2022) in China.

Table 1 Variable definitions

Variable	*Abbreviation*	*Measurement*	*Source*
Dependent variables:			
Flesch Readability Index	*FRI*	=206.835 – [(1.015 * average sentence length) – (84.6 * average number of syllables per word)]	Thiago *et al.* (2023), Xu *et al.* (2018), Dalwai *et al.* (2021), Smeuninx *et al.* (2020)
Gunning Fog index (for robustness test)	*FOG*	=0:4 * (number of words per sentence + percent of complex words)	Ginesti and Drago (2018), Harjoto *et al.* (2020), Xu *et al.* (2018), Sambuaga *et al.* (2022), Lo *et al.* (2017)
Independent variables			
Female directors	*LNFD*	Natural log of the number of female directors on a board	Ginesti and Drago (2018), Harjoto *et al.* (2020), Adams *et al.* (2011), Efretuei (2013), Ezat (2019), Sun *et al.* (2022)
Independent directors	*LNID*	Natural log of the number of non-executive directors on a board	Dalwai *et al.* (2021), Elbadry *et al.* (2015), Prabhawa and Harymawan (2022), Ezat (2019)
Directors age	*LNDA*	Natural log of the number of the age in years since birth	Xu *et al.* (2018), Efretuei (2013)
Discretionary accruals	*DACC*	Total accruals – non-discretionary accruals	Ajina *et al.* (2016), Goncalves *et al.* (2022), Lo *et al.* (2017), Cheng *et al.* (2018), Sambuaga *et al.* (2022), Githaiga (2023)
Meet or beat earnings ratio	*MBE*	Dummy variable where: MBE = 1 if $EPS_t - EPS_{t-1} > 0$, otherwise MBE = 0	Sambuaga *et al.* (2022), Lo *et al.* (2017)
Moderating variable:			
Sustainability reporting	*SR*	Dummy variable 0 = before CMA corporate governance regulations release in March 2016 and 1 after the regulations were released in March 2016	Smeuninx *et al.* (2020), Nilipour *et al.* (2020), Shuili and Yu (2020), Loh *et al.* (2017), Githaiga (2023), (Tariqul *et al.* (2019), Black and Khanna (2007), Dhammika (2012), Puneeta (2018), Locke and Duppati (2014), Mews (2021)
Control variables			
Firm age	*LNFAge*	Natural log of the age of the firm in years	Lo *et al.* (2017), Goncalves *et al.* (2022), Efretuei (2013), Xu *et al.* (2018)
File size	*FLZ*	Natural log of the bytes in a text	Loughran and McDonald (2014), Thomas *et al.* (2016)
Market-to-book ratio	*MTB*	Market price per share/book value per share	Lo *et al.* (2017), Goncalves *et al.* (2022), Xu *et al.* (2018)

Source: Authors' own work

Table 2 Descriptive statistics

Variable	*Mean*	*Median*	*Maximum*	*Minimum*	*SD*	*Observations*
FRI	19.847	20.050	30.650	15.772	1.820	180
FD	0.311	0.286	0.600	0.111	0.152	180
DA	59.032	59.876	69.329	2.303	6.476	180
ID	0.462	0.444	0.857	0.111	0.231	180
DACC	16,261.1	0.598	3,825,626	–1,446,261	307,979.8	180
MBE_RATIO	0.167	0.000	1.000	0.000	0.374	180
SR	0.800	1.000	1.000	0.000	0.401	180
FSZ	8,257.805	2,121.020	287,738.500	2.226	28,037.580	180
FAGE	40.195	44.000	148.413	6.000	16.341	180
MTB_RATIO	42.663	11.950	630.000	0.058	90.253	180

Source: Authors' own work

Table 3 Correlation findings										
Variable	*FRI*	*LNFD*	*LNDA*	*LNID*	*DACC*	*MBE*	*SR*	*LNFSZ*	*LNFAge*	*MTB*
FRI	1									
LNFD	−0.033	1								
LNDA	−0.132	0.144	1							
LNID	0.074	0.088	0.085	1						
DACC	−0.052	0.05	−0.013	0.084	1					
MBE	0.150*	0.102	−0.134	−0.068	−0.094	1				
SR	0.045	−0.028	−0.026	−0.116	−0.147*	0.037	1			
LNFSZ	0.230**	0.056	0.434**	0.031	0.072	−0.053	0.011	1		
LNFAge	−0.006	0.072	0.179*	−0.015	0.025	−0.025	−0.046	0.181*	1	
MTB	0.282**	−0.118	−0.268**	−0.019	−0.012	0.12	−0.033	−0.003	−0.096	1

Notes: *Correlation is significant at the 0.05 level (2-tailed); **correlation is significant at the 0.01 level (2-tailed)
Source: Authors' own work

The correlation findings in Table 3 indicate a significant association between the market-to-book ratio and readability of financial statements and this finding agreed with that of Thiago *et al.* (2023) in Brazil but contradicted the findings of Lo *et al.* (2017) in the USA. Table 3 on correlation findings indicate a negative association between readability of financial statements and firm age, and this finding was consistent with that of Thiago *et al.* (2023) in Brazil but contradicted the findings of Lo *et al.* (2017) in the USA.

4.3 Findings on panel data regression analysis

Table 4 on regression findings showed that the age of directors had significantly reduced the readability of financial statements ($\beta = -1.731$, *Z*-value = −3.434) before sustainability

Table 4 Findings on regression analysis				
Dependent variable FRI	*Random effects*	*Fixed effects*	*Random effects*	*Fixed effects*
Independent variables				
LNFD	0.069 (0.365)	0.205 (0.889)	0.460 (1.525)	0.757** (2.130)
LNDA	−1.731*** (−3.434)	−2.086*** (−3.913)	16.376*** (4.467)	14.640*** (3.698)
LNID	0.257 (1.501)	0.216 (1.174)	−0.135 (−0.434)	0.079 (0.225)
DACC	−0.001 (−1.566)	−0.001** (−2.078)	−0.001 (−1.278)	−0.001* (−1.884)
MBE	0.077 (0.785)	−0.169 (−0.487)	0.024 (0.086)	−0.078 (−0.234)
Moderating variable				
SR			75.261*** (5.010)	69.623*** (4.292)
Interacting variables				
LNFD*SR			−1.739 (−1.320)	−2.408 (1.587)
LNDA*SR			−18.431*** (−4.993)	−16.892*** (−4.247)
LNID*SR			1.156 (1.221)	0.290 (0.271)
Control variables				
LNFSZ	0.314*** (3.874)	0.070 (0.702)	0.292*** (3.719)	0.077 (0.807)
LNFAge	−0.005 (−0.028)	−0.039 (−0.150)	0.042 (0.260)	0.073 (0.296)
MTB	0.004*** (3.044)	0.008 (1.717)	0.004** (2.572)	0.005 (1.095)
Constant	23.961 (12.680)	27.243 (12.999)	−49.754 (−3.333)	−41.672 (−2.564)
Overall R squared	0.156	0.524	0.253	0.590
Adjusted R squared	0.116	0.374	0.200	0.444
F statistic	3.950	3.488	4.720	4.043
Prob. > F	0.000	0.000	0.000	0.000
Controls	YES	YES	YES	YES
Firm year observations	180	180	180	180

Notes: *, ** and *** denote significance at the 10, 5 and 1%, respectively. *Z*-values are in parentheses
Source: Authors' own work

reporting was considered. This indicated that older directors were associated with more difficult-to-read financial statements while younger directors were associated with easy-to-read financial statements and these findings agreed with those of Efretuei (2013) in the UK and Sun *et al.* (2022) in China but contradicted that of Xu *et al.* (2018) in the USA. Upon the inclusion of the sustainability reporting variable in the regression model, the findings indicated that older directors were associated with easy-to-read financial statements in Kenyan-listed non-financial companies ($\beta = 16.376$, *Z*-value = 4.467). This finding was consistent with the findings of Xu *et al.* (2018) in the USA but contrary to findings by Efretuei (2013) in the UK and Sun *et al.* (2022) in China.

The regression findings in Table 4, before the inclusion of the sustainability reporting variable in the regression model indicated that female directorship lacked a significant effect on financial statement readability ($\beta = 0.205$, *Z*-value = 0.889). However, after the inclusion of sustainability reporting in the regression model the findings indicated female directorship significantly improved the readability of financial statements in Kenyan-listed companies ($\beta = 0.757$, *Z*-value = 2.130). These findings agreed with those of Ginesti and Drago (2018) in Italy, Harjoto *et al.* (2020) in the USA, Abad *et al.* (2017) in Spain and Loukil *et al.* (2020) in France but contradicted the findings of Efretuei (2013) in the UK who found that female directorships lacked a significant effect on readability of financial statements. Sun *et al.* (2022) in China on the other hand found that female directorships made it difficult to read financial statements. Based on the findings on board diversity and readability of financial statements, *H1* was thus supported by the findings.

The significant increase in readability of financial statements due to increased board diversity implied the reduction in the problem of information asymmetry and its associated monitoring costs and thus extends the agency theory and obfuscation hypothesis which opine that management as the preparers of financial statements can become opportunistic and exploit the absence of shareholders in the company to manipulate financial statements (Jensen and Meckling, 1976; Bloomfield, 2002).

Table 4 on regression findings indicate that earnings management as measured significantly reduced the readability of financial statements before the inclusion of sustainability reporting in the regression model ($\beta = -0.001$, *Z*-value = -2.078). After the inclusion of sustainability reporting in the regression model, the regression findings revealed that earnings management as measured by discretionary accruals still significantly reduced the readability of financial statements ($\beta = -0.001$, *Z*-value = -1.884). The current findings agreed with those of Sambuaga *et al.* (2022), Ajina *et al.* (2016) in France; Lo *et al.* (2017) in the USA and Cheng *et al.* (2018) in China who found that earnings management had a significant reduced the readability of financial statements. However, the current findings contradicted those Thiago *et al.* (2023) and Goncalves *et al.* (2022) who both found that earnings management lacked significant influence on the readability of financial statements. *H2* was supported by the findings.

The association of earnings management with reduced readability of financial statements supports the agency theory and obfuscation hypothesis which posit that due to information asymmetry, management as preparers of financial statements can be opportunistic and exploitative by concealing poor firm performance unless monitored by the shareholders and regulatory agencies for compliance with accounting standards and other financial reporting requirements that prohibit earning management related practices (Jensen and Meckling, 1976; Spence, 1973; Bloomfield, 2002; Ball *et al.*, 2000; Goncalves *et al.*, 2022).

Table 4 findings find that sustainability reporting had a positive and significant moderating effect on the relationship between the independent variables on board diversity and earnings management and the readability of financial statements in Kenya ($\beta = 75.261$, *Z*-value = 5.010). This implied that the relationship between board diversity and earnings management in Kenyan listed firms improved in the presence of sustainability reporting and this finding was

supported by a slight improvement in the R square from 0.116 before the sustainability reporting moderating variable was included in the regression model to 0.200 after its inclusion. The interaction term between the age of directors and the sustainability reporting moderating variable (LNDA*SR) was significant and negative e ($\beta = -18.431$, Z-value $= -4.993$) which reversed the relationship between the age of directors and the readability of financial statements before the moderating variable of sustainability reporting was included in the regression model ($\beta = -1.731$, Z-value $= -3.434$). The overall finding was that sustainability reporting significantly improved the relationship between board diversity and readability of financial reports in Kenyan listed firms and this was consistent with the findings of Nilipour *et al.* (2020) in New Zealand which found that environmentally sensitive firms published more readable sustainability reports. *H3* was thus supported by the findings.

The association of sustainability reporting with an increase in the readability of financial statements supports the legitimacy theory by Suchman (1995) which opines that organizations should live in harmony with the society that accommodates them and can do so by implementing the ESG and sustainability agenda for the benefit of society (Nilipour *et al.*, 2020; Smeuninx *et al.*, 2020).

In the robustness test regression findings in Table 5, the readability of financial statements was measured using the Fog index and the findings indicated that female directorships significantly reduced the readability of financial statements before sustainability reporting moderating variable was included in the regression model ($\beta = 0.433$, Z-value $= 2.096$) and after inclusion of sustainability reporting as a moderating variable in the regression model ($\beta = 1.150$, Z-value $= 3.548$). These findings agreed with the findings of Sun *et al.* (2022) in China. The robustness test regression findings in Table 5 also show that the interaction term consisting of female directorships and sustainability reporting had a significant increase in the readability of financial statements ($\beta = -4.792$, Z-value $= -3.419$) which was consistent

Table 5 Findings on robustness test regression findings

Dependent variable FOG	*Random effects*	*Fixed effects*	*Random effects*	*Fixed effects*
Independent variables				
LNFD	0.433** (2.096)	0.235 (1.062)	1.150*** (3.548)	0.984** (2.842)
LNDA	−0.266 (−0.533)	−0.099 (−0.194)	−3.110 (−0.830)	−4.037 (−1.046)
LNID	0.738*** (4.314)	0.621*** (3.533)	1.243*** (3.820)	0.996** (2.908)
DACC	−0.000 (0.060)	0.000 (0.207)	0.000 (−0.164)	0.000 (0.023)
MBE	0.184 (0.595)	0.213 (0.642)	0.310 (1.028)	0.377 (1.163)
Moderating variable				
SR			−9.241 (−0.602)	−14.179 (−0.897)
Interacting variables				
LNFD*SR			−4.792*** (−3.419)	−4.468*** (−3.022)
LNDA*SR			2.982 (0.791)	4.087 (1.054)
LNID*SR			−2.415** (−2.431)	−1.730* (−1.660)
Control variables				
LNFSZ	0.086 (0.963)	0.039 (0.408)	0.036 (0.413)	−0.012 (−0.129)
LNFAge	0.219 (1.060)	0.119 (0.477)	0.199 (0.982)	0.142 (0.593)
MTB	−0.002 (−0.993)	0.002 (0.453)	−0.002 (−1.067)	0.000 (−0.039)
Constant	19.532 (10.127)	19.657 (9.788)	30.154 (1.967)	34.806 2.198
Overall *R* squared	0.125	0.687	0.231	0.721
Adjusted *R* squared	0.084	0.588	0.175	0.622
F statistic	3.045	6.948	4.174	7.266
Prob. > *F*	0.003	0.000	0.000	0.000
Controls	YES	YES	YES	YES
Firm year observations	180	180	180	180

Notes: *, ** and *** denote significance at the 10, 5 and 1%, respectively. *Z*-values are in parentheses
Source: Authors' own work

with past studies by Ginesti and Drago (2018) in Italy, Harjoto *et al.* (2020) in the USA but conflicted with Sun *et al.* (2022) in China.

Table 5 on robustness findings also indicate the directors' independence significantly reduced the readability of financial statements in Kenyan listed companies before sustainability reporting moderating variable was considered in the regression ($\beta = 0.738$, *Z*-value $= 4.314$) and after sustainability reporting moderating variable was considered in the regression analysis ($\beta = 1.243$, *Z*-value $= 3.820$). These findings agreed with those of Sun *et al.* (2022) in China. However, the robustness findings in Table 5 show that the interaction term between directors' independence and sustainability reporting had significant improvement on the readability of financial statements ($\beta = -2.415$, *Z*-value $= -2.431$) which agreed with the findings of Harjoto *et al.* (2020) in the USA and Dalwai *et al.* (2021) in Oman but disagreed with those of Sun *et al.* (2022) in China.

5. Conclusion and recommendations

This set out to investigate the moderating effect of sustainable reporting on the relationship between board diversity, earnings management and the readability of financial statements in companies listed in Kenya during the years 2016 to 2020. An explanatory research design was employed, and the data was analyzed using panel data regression analysis. Data were collected from 36 non-financial companies listed in the NSE. Board diversity is comprised of the proportion of female directors, directors' age and the proportion of independent directors in the Kenyan listed firms. The readability of financial statements was measured using the Flesch readability ease readability index. Earnings management was measured using the Kothari *et al.* (2005) discretionary accruals and MBE metrics. Sustainability reporting was measured using a dummy variable where 0 represented the period before the enactment of sustainability reporting regulations in March 2016 in the NSE, while 1 represented the period after the enactment of the sustainability reporting regulations.

The study concludes that financial statements in Kenyan non-financial listed companies were very difficult as per the Flesch readability index. Board diversity in terms of female directorships, age of directors and the independence of directors were found to have significant effects of the readability of financial statements in Kenyan listed companies. According to the findings, the sustainability reporting moderating variable reversed the direction of the relationship between the board diversity constituents of female directorships, the age of directors and the independence of directors before and after the inclusion of the moderating variable in the regression analysis. Earnings management as measured by discretionary accruals was found to significantly reduce the readability of financial statements before and after the inclusion of sustainability reporting moderating variable in the regression analysis. Sustainability reporting as the moderating variable was found to significantly improve on the readability of financial statements in Kenyan listed companies.

This study supports and extends the legitimacy theory by Suchman (1995) such that not only do ESG compliant firms benefit from good relations with the society in which they operate, but due to sustainability reporting whether voluntary or involuntary, the financial statements of the compliant firms become more readable as per the empirical evidence in this study. The increased readability of financial statements due to enhanced board diversity and the association of earnings management with reduced readability of financial statements both support the agency theory and obfuscation hypothesis which opine that because of information asymmetry, management can be opportunistic and exploitative leading to manipulation of financial statements to conceal poor firm performance. Hence, the need for monitoring of management by the shareholders and regulatory agencies to prohibit obfuscation of facts and earning management practices (Jensen and Meckling, 1976; Spence, 1973; Bloomfield, 2002; Ball *et al.*, 2000; Goncalves *et al.*, 2022).

This study further contributes to knowledge methodologically by studying sustainability reporting as a moderating variable between the independent variables of board diversity

and earnings management and the dependent variable of readability of financial statements and by measuring sustainability reporting using a dummy variable for the period before and after enactment and release of CMA code on corporate governance in Kenya and required listed firms to include sustainability reporting in their financial statements.

For managerial recommendations, the persons charged with corporate governance or company directors should diversify their boards more to enhance the readability of financial statements as there is empirical evidence that increased board diversity significantly enhances the readability of financial statements. For policy recommendations, the Institute of Certified Public Accountants as a financial reporting regulator, should closely monitor the published financial statements of firms for earnings management and punish the perpetrators as there is empirical evidence that the practice reduces the readability of financial statements. The Capital Markets Authorities (CMA) Kenya also as a policymaker, should continue with efforts to regulate sustainability reporting by listed firms in Kenya, especially at this time when the world is suffering from global warming and the destruction of the environment (NSE, 2021; GRI, 2016), to boost the welfare of the society in general. Future researchers can focus on primary data in a related study and others can focus on financial listed companies and unlisted firms.

Key limitations of the current study were that only secondary data was collected from financial statements and financial statements are vulnerable to biases of the preparers (Ocansey, 2017). There were few non-financial companies in the NSE which is affected by the problem of thin trading being an emerging market (Mlambo and Biekpe, 2005).

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