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EDITORIAL: Role of boards of directors as a corporate governance mechanism to "ensure" and "enhance" quality of financial reporting in the age of artificial intelligence

Dear readers!

On behalf of the Editorial team, I feel proud to introduce the first issue of the first volume of the *Reporting and Accountability Review* journal. This is another milestone achieved by Virtus Interpress in the pursuit of its mission to spread the virtues of high-quality research. The current issue comprises scholarly articles in the domain of a wide range of research themes, for example, corporate governance mechanisms, financial reporting quality, corporate efficiency, boards of directors, and corporate social responsibility (CSR). All the articles published in the current issue have highlighted interesting, diverse, and thought-provoking research problems.

The enhanced scrutiny by the stakeholders (e.g., shareholders, debtholders, and regulators), on the one hand, leads to the strengthening of corporate governance mechanisms and, on the other hand, underlines the reflection of higher standards of corporate governance standards. This mutual causation is interesting and challenging at the same time. Several new developments in the ambit of corporate governance, such as the influx of technology and the rising relevance of sustainability, have either created new equations or changed existing ones. The roles and responsibilities of boards of directors are evolving faster than ever. The traditional theories are not fully capable of encapsulating new equations. Therefore, theoretical developments are much needed in the given framework of corporate governance along with producing empirical evidence.

Financial reporting quality is an important element of internal control mechanisms. Financial reporting underlines the ethos of comprehensiveness, truthfulness, reliability, timeliness, understandability, prudence, and relevance. There are several determinants of financial reporting quality broadly categorized as internal and external determinants. Internal determinants are inclusive of internal control structure, accounting information system, and compliance with accounting standards, whereas external determinants are comprised of conditions laid down by investors, regulatory systems, industry characteristics, firm size, and characteristics of the capital market. The role of corporate boards of directors is of utmost importance to apply both types of determinants to improve the quality of financial reporting.

In the first article, *Robert Oguti Etengu, Bosco Opio*, and *Joshua Oder* explored the effect of corporate disclosure (CD) on earnings management (EM) among listed firms at the Uganda Securities Exchange (USE) during the period 2012–2019. Authors have used the magnitude of discretionary accruals (DACC) as a proxy for EM. The literature review, in principle, is based on the agency theory highlighting information asymmetries between the principals and the agents arising in situations where the agents possess superior information relative to the principals (Jensen & Meckling, 1976). The study finds that audit committee (AC) characteristics have a negative and significant moderating effect on the association between CD and EM.

In the next paper, *Alba Maria Gallo* and *Ubaldo Comite* examined the application of artificial intelligence (AI) to improve the reporting and administration efficiency of the National Recovery and Resilience Plan (NRRP). The authors explained that AI automates data collection and analysis, detects fraud, and ensures regulatory compliance, therefore, contributes significantly to improving transparency and effectiveness of reporting and disclosures. The study underpinned the need for appropriate regulatory frameworks to address various challenges such as maintaining data quality and clear decision-making. A major contribution of the study is that it deepens the understanding of technology adoption in the public sector and offers insights into using AI to modernize public administrations and optimize control processes.

In the third study, *Amer Al Fadli* examined the impact of board size, presence of an AC, and chief executive officer (CEO) duality on the level of CSR reporting in Jordan. The sample firms belong to industrial and service sectors listed on the Amman Stock Exchange (ASE) for the period 2006–2015. The study covered the impact before and after the issuance of the Jordanian Corporate Governance Code (JCGC) (Jordan Securities Commission [JSC], 2009). The empirical findings underpin that firms having larger boards increase the board's power to encourage management to report on CSR to enhance the legitimacy of the company. The presence of an AC on the board influences decision-making by monitoring and tracking the disclosure process in companies.

I hope that scholars in the relevant disciplines will find all the published articles in the current issue highly useful and they will utilize the contributions, and overcome the limitations identified in these publications in their future research endeavours.

My sincere thanks and best wishes to the authors, readers, reviewers, editorial team, and support team of Virtus Interpress. I wish the *Reporting and Accountability Review* journal a great success!

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CONTENTS

CORPORATE DISCLOSURE AND EARNINGS MANAGEMENT: THE MODERATING ROLE OF CORPORATE GOVERNANCE MECHANISMS

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Abstract

Notwithstanding the enormous amount of regulation and standards governing the financial reporting process, corporate failures and prior research have strongly indicated that earnings management (EM) is becoming a regular business practice in most firms today. Although this practice is more common in developed economies, there is limited research on corporate governance (CG) failures that have occurred in East Africa's emerging economies. In this study, therefore, we examine whether corporate governance mechanisms (CGM) moderate the association between corporate disclosure (CD) and EM using evidence from listed firms at the Uganda Securities Exchange (USE). We employ disclosure and corporate governance indices to measure the extent of CD and corporate governance. Additionally, we use the magnitude of discretionary accruals (DACC) obtained from the modified Jones model as a proxy for EM. We find that audit committee (AC) characteristics have a negative and significant moderating effect on the association between CD and EM. Our study contributes to the growing strand of literature on the moderating or complimentary effect of CGM in constraining EM in the context of an emerging economy.

Keywords: Corporate Disclosure, Corporate Governance, Earnings Management

Authors' individual contribution: Conceptualization — R.O.E.; Methodology — R.O.E. and B.O.; Formal Analysis — B.O.; Investigation — R.O.E. and J.O.; Resources — R.O.E., B.O., and J.O.; Writing — Original Draft — B.O.; Writing — Review & Editing — R.O.E. and J.O.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

1. INTRODUCTION

This study examines the effect of corporate disclosure (CD) on earnings management (EM) among listed firms at the Uganda Securities Exchange (USE) during the period 2012–2019. In particular, we examine whether corporate governance mechanisms (CGM) have a moderating effect on the association between CD and the magnitude of discretionary accruals (DACC) as a proxy for EM. According to Sun and Al Farooque (2018), the issue of corporate governance (CG) has received much attention throughout the world to the extent that every country has been trying to implement good CG practices in its corporate sector. Prior studies have raised concerns about the quality of accounting information reported and disclosed in the annual reports of financial statements (Adams, 2011). CD and governance are monitoring tools that operate within the governance system of a firm and seem to be useful in reducing information asymmetry as well as agency costs (Arcot & Bruno, 2011; Holm & Schøler, 2010), and consequently the practice of opportunistic earnings manipulation. To create disincentives for managers to engage in EM and mitigate agency costs, there is a need for strong disclosure transparency and effective CGM (Sun & Al Farooque, 2018).

Relative to previous studies, we employ disclosure and CG indices to measure the extent of CD and CG. EM is measured using the modified Jones model (Dechow et al., 1995). We find that audit committee (AC) characteristics have a negative and significant moderating effect on the relationship between CD and EM. However, the interaction effect between CD and the board of directors (BoD) characteristics and ownership structure (OS) features is not positively significant.

The study contributes to the literature on CD, CGM and EM in several ways. First, a majority of studies in this line of research have been conducted in the context of the UK (Katmon & Al Farooque, 2017; Sun et al., 2010), France (Ajina et al., 2019; Lakhal, 2015) and the U.S. (Khlifi & Zouari, 2022; Liu et al., 2017). The extent to which the UK, French and U.S. managers manage earnings is significantly higher than their counterparts in Uganda. Second, unlike prior CD research (Bauer & Boritz, 2013; Boesso & Kumar, 2007; Katmun, 2012) that exclusively uses disclosure scores related to financial analysts such as the investor relations magazine award, and the analyst forecast accuracy, this study employs the manual measurement for CD. Moreover, such manual measures have rarely been used in studies on CD and EM at the USE. Based on the aforementioned considerations, the present study has a strong incentive to shed more light on the potential moderating role of CGMs on the association between CD and EM in the Ugandan context.

The subsequent sections of this paper cover a review of the relevant theoretical perspectives, provide an empirical review of the literature on CD, CGM and EM, and present the testable hypothesis in Section 2. This is followed by the methodology in Section 3, results and discussion in Section 4 and a conclusion in Section 5.

2. LITERATURE REVIEW

2.1. Theoretical review

Previous studies on the moderating effect of CGM on the relationship between CD and EM (Katmon & Al Farooque, 2017; Lakhal, 2015) have highlighted various propositions provided by agency theory (Jensen & Meckling, 1976) with an emphasis on information asymmetry. Agency theory refers to a contract under which the principal engages an agent to achieve some service on their behalf; that includes delegating some decision-making authority to the agent (Alqatamin, 2016). The theory suggests that the separation of ownership and control leads to agency costs by way of the assumption of information asymmetry between the principals and the agents (Kılıç & Kuzey, 2018). Information asymmetry arises in a situation where the agents possess superior information relative to the principals (An et al., 2011).

According to Almahrog et al. (2018), managers could undertake opportunistic EM to achieve their objectives, which in turn, increases the firm's agency costs. This can be achieved by misleading shareholders through the manipulation of financial statements for their selfish interests, which in the end influences the quality of earnings (Asogwa et al., 2019). EM occurs less in firms that disclose more information, because when transparency of information is increased, information asymmetry between managers and shareholders decreases, which in turn enables investors to detect EM (Jo & Kim, 2007). Thus, the disclosure of corporate information can act as an instrument of control for shareholders, as well as a mechanism of legitimacy for managers. Despite the contribution of agency theory to this study, the theory is limited to only the principals and the agents. Furthermore, the theory overlooks other stakeholders of corporate reports such as communities in the governance earnings quality (EQ) relationship (Asogwa et al., 2019).

2.2. Empirical review of literature and hypothesis development

Concerning studies undertaken on the moderating effect of CGM on the association between CD and EM, Sun et al. (2010) explore the association between corporate environmental disclosure (CED) and EM and the effect of CGMs on that association in the UK. The study employs the performance-matched DACC to proxy for EM. Ordinary least squares (OLS) regression with robust standard errors was used to examine the association between CED and EM for a sample of 245 UK non-financial companies in the financial year ended March 2007. The authors find that CG attributes affect the association between CED and EM.

In the context of the UK, Katmon and Al Farooque (2017) studied the effect of internal corporate governance (ICG) on the association between disclosure quality and EM for a period of four years (2005–2008). The sampled firms comprised 170 firms with 145 matched-pair samples equivalent to 290 firm-year observations. Financial data relating to the control variables, disclosure information and CGM was collected manually from the annual reports. The modified Jones model was used to test the hypotheses of the study on matched-pair sample data of investor relations magazine award-winning and non-winning firms. Their findings demonstrated that disclosure quality is significantly and negatively related to EM relative to internal corporate governance mechanisms (ICGM).

Lakhal (2015) examines the association between CD practices, OS features, and EM using a sample of 170 quoted companies in the SBF 250's index in France during the year 2008. The researcher measures the level of CD using a disclosure index and estimates EM using the modified Jones and the Kothari et al.'s (2005) models. The results of the study revealed that CD and OS negatively affect EM.

Susanto (2016) studies the moderating effect of female AC on the association between corporate social and environmental responsibility disclosure (CSERD) and EM. The population of her study comprised 121 manufacturing quoted companies on the Indonesian Stock Exchange during the period 2010–2012. She samples 61 manufacturing firms using the purposive sampling method. CSERD was measured using content analysis while EM was estimated using the modified Jones model. The results of her study show that female AC has a negative influence on the association between CSERD and EM.

Liu et al. (2017) examined the moderating effect of family involvement in corporate ownership, management, and/or governance on the association between the disclosure of corporate social responsibility (CSR) activities and EM using a sample of S&P 500 companies listed on the U.S. stock markets during 2003–2010. The findings revealed an insignificant relationship between CSR disclosure and EM when family involvement is accounted for, hence, suggesting that the association between CSR performance and family involvement is the primary driver of the relation between CSR performance and EM.

Ajina et al. (2019) investigated the moderating effect of good CG on the relationship between EM and CSR using a panel of data for a sample of 101 French-listed companies between 2010 and 2013. Financial data was gathered from the Thomson One Banker database and social responsibility information was collected from the CSR Hub database. EM was measured by DACC estimated using the models of Dechow et al. (1995) and Kothari et al. (2005) to enhance the robustness of their study. The results of the moderating effect of CG attributes on the relationship between CSR and EM show that CSR activities reduce EM particularly, in small and highly independent boards. They also found that institutional investors control strategic decisions and investments in CSR to mitigate EM.

Gerged et al. (2023) examine whether ICGMs moderate the relationship between a firm's engagement in CED and EM practices in Jordan as an emerging economy. The population of the study consisted of all non-financial firms listed on the Amman Stock Exchange, with complete data for a period of five years (2010 to 2014). The final sample comprised 100 firms (50 services companies and 50 industrial companies). CED in annual reports was measured using both unweighted and weighted disclosure indices while DACC as a proxy for the possible incidence of EM were estimated following Kothari et al. (2005). Their findings reveal that board size, managerial, and institutional OS have moderating effects on the CED-EM nexus.

Khlifi and Zouari (2022) examine the moderating effect of good CG on the relationship between CSR and real earnings management (REM) in innovative firms during mergers and acquisitions transactions. The final sample included 113 companies in the U.S. S&P 500 index for the period between 2015 and 2021 and adopted a sampling process that divided the total sample into two sub-samples, that is, a test sample and a control sample. The regression results show that CSR and good CG scores have a negative and significant effect on REM for the full and test samples but non-significant for the control sample. Moreover, good CGMs strengthen the BoD and the management of the firm to achieve its objectives by maximizing the wealth of the shareholders' interests.

Xi and Xiao (2022) examine the relationship among CED, EM practices and accounting conservatism in Chinese listed firms and further determine how ICGM moderates these relationships. The study focused on both accrual-based EM and REM. The final sample consisted of 1,619 observations, documented over the period 2015 to 2019. The sample selected for the study was obtained from the China Stock Market and Accounting Research (CSMAR) database. The study found that independent director ratio, institutional ownership and state-owned entities positively moderate the relationship between environmental disclosure index and accounting conservatism by 21.3%, 11.7% and 9.6%, respectively. The conclusion they drew is that CG strengthens the relationship between CED and EM practices. Based on the aforementioned review the hypothesis to be tested is thus formulated as follows:

H1: Ceteris paribus, there is a negative moderating effect of CGM on the association between CD and EM among non-financial listed firms at the USE.

3. METHODOLOGY

3.1. Data and data collection

In order to examine the moderating effect of CGM on the association between CD and EM, a census of all the listed firms at the USE was used. This was deemed large enough to perform the empirical part of this study given that no single investigation has been conducted on CD and EM with such large amounts of data on listed companies at the USE.

The use of large and industrially diverse samples permits a more comprehensive exploration and analysis of the relationship in question and allows greater generalisability of results (Aburaya, 2012). The inclusion criteria for firms in the final analysis were: 1) all the eligible firms for the analysis must have had eight consecutive years of income statement and statement of financial position data, and 2) the firm's annual reports have to be available for all the eight years, either on the USE website, the archives of the Registrar of Companies, the firms' website. Firms with missing reports were contacted by telephone and e-mail as suggested by Elghuweel (2015) or by physically going to their address to obtain the missing reports. To ensure that the secondary data collected was complete for purposes of computing disclosure indices and DACC, three firms were excluded due to insufficient financial information.

According to Oluoch (2015), the normal approach to studies that use secondary data is to identify the number of firm years which is taken to mean 12 consecutive months that incorporate a financial year for each of the accounting entities under evaluation. Accordingly, if 14 firms out of the listed 17 firms under study are evaluated for all the financial years, this would translate to 112 firm-year observations over the eight-year period, from 2012 to 2019.

The year 2012 was selected for the purposes of comparing the effect of CD on EM practices with the findings of other related Ugandan studies (Sejjaaka, 2007) which were conducted shortly after the mandatory International Financial Reporting

Standards (IFRS) adoption period. Moreover, this period is synchronized with key changes to disclosure regulations in the Companies Act (amended 2012)[1]. Therefore, the findings from the time frame selected (2012–2019) will not only shed light as to whether the recommendations related to EQ in the CG reforms in Uganda such as the adoption of IFRS and the amendments to the Companies Act, along with the market fluctuations have had any significant effect on the CD-EM nexus but also collect the timeliest information available.

3.2. Measurement of earnings management

According to Alzoubi (2016), accruals have been shown to be the most popular method of EM. Following past studies (Katmon & Al Farooque, 2017; Mouselli et al., 2012; Rajgopal & Venkatachalam, 2011), EM is measured based on DACC using the modified Jones model (Dechow et al., 1995) because of its superior specification and less restrictive data (DeFond & Jiambalvo, 1994). However, in order to calculate DACC, it was first necessary to calculate total accruals ($TACC_{i,t}$) measured as the difference between the net income ($NI_{i,t}$) and the net cash flows from operations ($CFO_{i,t}$) using the cash flow approach defined as follows:

$$TACC_{i,t} = NI_{i,t} - CFO_{i,t} \tag{1}$$

Having ascertained the value of $TACC$ in Eq. (1), the coefficients β_1, β_2 and β_3 are estimated using the following pooled OLS equation (Eq. 2):

$$\frac{TACC_{i,t}}{A_{i,t-1}} = \beta_1\left(\frac{1}{A_{i,t-1}}\right) - \beta_2\left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}}\right) + \beta_3\left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \tag{2}$$

where, $TACC_{i,t}$ is the value of total accruals for firm i in year t, $\Delta REV_{i,t}$ is the variation in the net revenue of firm i from time t - 1 to time t, $\Delta REC_{i,t}$ is the variation in the accounts receivable of firm i from time t - 1 to time t, $PPE_{i,t}$ is gross property, plant and equipment of firm i in year t, and $\varepsilon_{i,t}$ is the error term of firm i in year t. All the variables are scaled by the lagged value of total assets in year t - 1 $A_{i,t-1}$ and regressed on total accruals.

Using the estimated coefficients β_1, β_2 and β_3 of each firm-year (Eq. 2), the non-discretionary accruals ($NDACC_{i,t}$) were computed. The probable explanation for excluding non-discretionary accruals (*NDACC*) has been provided by Islam et al. (2011), who argue that they are used to reflect the business condition subject to the firm's condition and sales growth thus, cannot be controlled by managers. *NDACC* is calculated as follows:

$$NDACC_{i,t} = \beta_1\left(\frac{1}{A_{i,t-1}}\right) - \beta_2\left(\Delta REV_{i,t} - \Delta REC_{i,t}\right) + PPE_{i,t} \tag{3}$$

The absolute value of DACC ($DACC_{i,t}$) represents the difference between total accruals ($TACC_{i,t}$) and $NDACC_{i,t}$ as follows:

$$DACC_{i,t} = TACC_{i,t} - NDACC_{i,t} \tag{4}$$

The study uses the absolute value of DACC to proxy for the mixed effect of upward or downward earnings since managers might have incentives to engage in either income-increasing or income-decreasing EM (Etengu et al., 2019).

3.3. Measurement of corporate disclosure

Consistent with prior mandatory disclosure studies (Alfaraih, 2009; Hassaan, 2013; Popova et al., 2013) and voluntary disclosure studies (Al-Akra et al., 2010; Alotaibi, 2014; Lan et al., 2013), the extent of CD was measured by a disclosure index. The index consists of an exhaustive list of 218 items classified as follows: IASs/IFRSs (185 items), corporate and strategic information (15 items), financial and capital market data (6 items), and forward-looking information (12 items).

The study uses the dichotomous unweighted approach due to widespread criticisms labeled against the use of the dichotomous weighted approach, the qualitative unweighted approach and the qualitative weighted approach in academic accounting literature, particularly the subjectivity inherent in any individual scoring of disclosure index items that are apparent in them (Biobele et al., 2013). However, the major problem with this type of scoring is that some companies might be penalized by assigning a zero score to an undisclosed item when it is not required to disclose that item (Alias, 2011). Due to this weakness, the researcher found it necessary to use a relative scoring approach whereby the disclosure index for each firm is assessed as the ratio of actual disclosure scores computed to the total number of items required to be disclosed by the firm. The relative CD index (*CDINDEX*) for each firm is mathematically represented as:

$$CDINDEX_{i,t} = \frac{Actual\ number\ of\ disclosed\ items}{Maximum\ possible\ disclosure\ items} \tag{5}$$

where, $CDINDEX_{i,t}$ is the corporate disclosure index for firm i in year t.

3.4. Measurement of corporate governance mechanisms

In this study, three CGM were included as moderating variables. These variables are gleaned from previous studies and include BoD characteristics, AC characteristics, and OS features. Following Bekiris and Doukakis (2011), an index of 15 items was created and data on CGM was manually collected from the annual reports of listed companies. The decision not to use questionnaires was taken to avoid the possibility that the data collected would be biased and subjective (Constantatos, 2018).

To develop the corporate governance index (*CGINDEX*), a weighted dichotomous approach based on categorical coding is employed to score the CG disclosure items. As far as this approach is concerned, all items included in the governance

[1] https://ulii.org/akn/ug/act/2012/1

index checklist are equally valued regardless of their relevance to any particular stakeholder group. A dichotomous procedure was then conducted, whereby an item was awarded 1 point if the item of disclosure included in the checklist was disclosed, and 0 points if otherwise. The *CGINDEX* for each listed firm is estimated as follows:

$$CGINDEX_{i,t} = \frac{Actual\ CG\ disclosed\ items\ in\ each\ firm\ year}{Maximum\ score\ obtainable\ in\ each\ firm\ year} \quad (6)$$

where, $CGINDEX_{i,t}$ is the corporate governance disclosure index for firm *i* in year *t*.

3.5. Measurement of control variables

In addition to the main variables tested, we control for the use of variables that prior studies have found to be associated with EM to avoid the possible effect of puzzling factors (Constantatos, 2018). These variables are consistent with previous studies (Bekiris & Doukakis, 2011; Marra et al., 2011) and include firm size (*FSIZE*), profitability (*PRFT*) and leverage (*LEV*). It is expected that larger firms have more difficulty in conducting EM because they are more carefully monitored by the market (Marra et al., 2011). On the contrary, Bekiris and Doukakis (2011) reveal that larger firms find it easier to manage earnings because the complexity of their operations makes it difficult to detect EM. *FSIZE* is measured as the natural logarithm of total assets (Etengu et al., 2020).

Moreover, leveraged firms are likely to increase EM when they are close to the violation of binding debt agreements (Marra et al., 2011). *LEV* is proxied as the ratio of total debt to total assets. Furthermore, high profitability can be negatively related to EM because highly profitable firms make no EM effort to reach their earnings threshold (Katmun, 2012). *PRFT* is proxied as the ratio of net income to total assets (Etengu et al., 2019).

3.6. Model specification

To test the moderating effect of CGM on the relationship between CD and EM, the following panel regression model is estimated:

$$\begin{aligned} DACC_i = \beta_0 + \beta_1 LEV_i + \beta_2 PRFT_i + \beta_3 FSIZE_i + \beta_4 CDINDEX_i + \beta_5 BoDINDEX_i + \beta_6 ACINDEX_i + \beta_7 OSINDEX_i \\ + \beta_8 CDINDEX * BoDINDEX_i + \beta_9 CDINDEX * ACINDEX_i + \beta_{10} CDINDEX * OSINDEX_i + \varepsilon_i \end{aligned} \quad (7)$$

where, $DACC_i$ is the absolute value of discretionary accruals for sample *i* firm, β_0 is the intercept, β_1–β_{10} are the coefficients of the slope parameters, LEV_i is the ratio of debt to total assets for sample *i* firm, $PRFT_i$ is the ratio of net income to total assets for sample *i* firm, $FSIZE_i$ is total assets for sample *i* firm, $CDINDEX_i$ is the CD score for sample *i* firm, $BoDINDEX_i$ is the board of directors score for sample *i* firm, $ACINDEX_i$ is the audit committee score for sample *i* firm, and $OSINDEX_i$ is ownership structure score for sample *i* firm, $CDINDEX * BoDINDEX_i$ is the interaction effect between CD and BoD characteristics for sample *i* firm, $CDINDEX * ACINDEX_i$ is the interaction effect between CD and AC characteristics for sample *i* firm, $CDINDEX * OSINDEX_i$ is the interaction effect between CD and OS features for sample *i* firm, and ε_i is an error term for sample *i* firm.

4. RESULTS AND DISCUSSION

4.1. Descriptive statistics

Table 1 presents a summary of descriptive statistics for all the study variables. The mean and median values of *CD* are 0.583 and 0.558, respectively. The maximum *CD* score of 0.767 and the minimum *CD* score of 0.44 signifies a wide variation in *CD* among USE-listed firms, suggesting that some firms provide high-quality disclosures while others opt for low-quality disclosures.

The absolute value of *DACC* as a proxy for EM has a mean value of 0.026. This result suggests that the magnitude of EM in listed firms at the USE may be lower than those reported in previous studies such as Katmun (2012), Ugbede et al. (2013), Habbash et al. (2014), and González and García-Meca (2014), who found that the UK, Malaysian, Chinese and Latin American companies have an average absolute value of *DACC* of 0.065, 0.075, 0.066, and 0.11, respectively, whilst our evidence shows that USE listed firms practice income increasing accruals.

Table 1 also shows that the mean values of *LEV*, *PRFT* and *FSIZE* are 0.294, 0.113 and 26.562, respectively. For CGMs, the mean value of *BoD* is 0.884, while the *AC* characteristics have an average of 0.712. These results indicate that on average, 88.4% of USE firms have efficient boards, whereas 71.2% have efficient audit committees. In addition, the mean value of *OS* is 0.701 and is consistent value with the mean of *AC*.

Table 1. Descriptive statistics

Variable	*Mean*	*Min*	*Median*	*Max*	*St. dev*
CD	0.583	0.440	0.558	0.767	0.092
DACC	0.026	0.007	0.027	0.053	0.012
LEV	0.294	0	0.33	0.83	0.261
PRFT	0.113	-0.165	0.095	0.403	0.144
FSIZE	26.562	24.728	26.319	29.397	1.667
BoD	0.884	0.667	0.917	1	0.094
AC	0.712	0.125	0.75	1	0.207
OS	0.701	0.375	0.688	0.875	0.109

Note: N = 112. *CD refers to corporate disclosure score; DACC is the absolute value of discretionary accruals from the cross-sectional version of the modified Jones model (Dechow et al., 1995); LEV is the ratio of debt to total assets; PRFT is the ratio of profit before tax to total assets; FSIZE is the natural log of total assets; BoD collectively refers to the board size, board activity, board independence, board size, representation by non-executive directors on the board, and chief executive officer (CEO) duality; AC represents audit committee size, audit committee independence, audit committee competence, and audit committee activity; OS is the proportion of the shares held by directors, families, locals institutions, foreign institutions, the state, local individuals, foreign individuals, and the state.*

Table 2 presents a pairwise correlation matrix for all the variables used in the robust regression analysis. From the table, it can be noted that the highest correlation is between *DACC* and *LEV* with a coefficient of 0.527 at a 0.05 significance level. Moreover, multicollinearity does not exist between the variables because the coefficients of correlation obtained in Table 2 are less than the plus or minus 80% beginning at which multicollinearity might exist as suggested by Almahrog et al. (2018).

It is also noted that the variations in *BoD* characteristics are positively correlated with the variations in *CD*, suggesting that large boards enhance the quality of *CD*. In addition, *PRFT* shows a negative relationship with *DACC* at approximately 59%. This is in tandem with Sun et al. (2010) who argue that it is important to consider firm performance when measuring DACC.

Table 2. Pair-wise correlation matrix

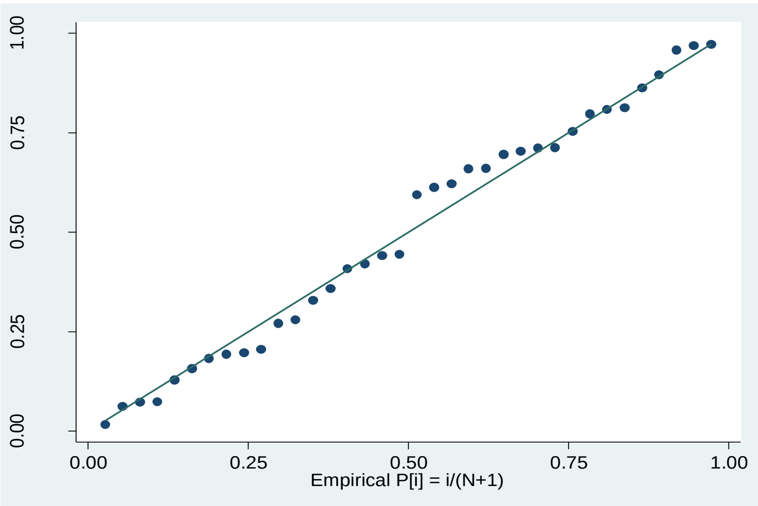
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) CD	1.000							
(2) DACC	0.044	1.000						
(3) PRFT	0.002	-0.593*	1.000					
(4) LEV	0.137	0.527*	-0.398*	1.000				
(5) FSIZE	-0.302	0.305	-0.169	0.477*	1.000			
(6) BoD	0.404*	-0.014	0.257	-0.220	-0.342	1.000		
(7) AC	-0.220	-0.330	0.401	-0.436*	0.295	0.088	1.000	
(8) OS	0.235	0.259	-0.573*	0.078	-0.175	-0.216	-0.065	1.000

*Note: * Shows significance at the 0.05 level. CD refers to corporate disclosure score; DACC is the absolute value of discretionary accruals from the cross-sectional version of the modified Jones model (Dechow et al., 1995); LEV is the ratio of debt to total assets; PRFT is the ratio of profit before tax to total assets; FSIZE is the natural log of total assets; BoD collectively refers to the board size, board activity, board independence, board size, representation by non-executive directors on the board, and CEO duality; AC represents audit committee size, audit committee independence, audit committee competence, and audit committee activity; OS is the proportion of the shares held by directors, families, locals institutions, foreign institutions, the state, local individuals, foreign individuals, and the state.*

4.2. Model diagnostic tests

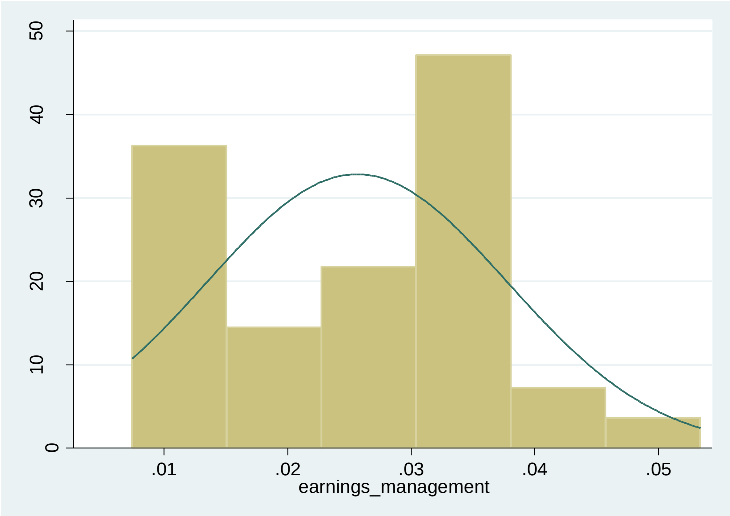
In a bid to allow for the use of multiple linear regression models, the OLS assumptions of normality and multicollinearity were carried out to ensure that the OLS regression coefficients are the best linear unbiased estimators. First, the error terms were tested to ascertain if they were normally distributed with a mean of zero and constant variance. The key issue here was whether the errors followed a normal distribution because if there was non-normality, we would get misleading regression coefficients and standard errors. This was done using *p–p* plots which is believed to be the most straightforward method of testing this assumption. As shown in Figure 1, there is a modest amount of linearity around the centre of the distribution because the *p-norm* graph is sensitive to non-normality in the middle range of data.

Figure 1. Normality of error terms



Two, the normality of the distribution had to be met in order to test for the hypothesis using multivariate OLS robust regression analysis. In this regard, the histogram (with normal curve) test was performed. As evident from the findings exhibited in Figure 2, it can be observed the histogram with the normal curve for EM is mildly skewed to the left. However, due to the fact that this problem is a very common phenomenon in CD research, the results are acceptable (Katmun, 2012).

Figure 2. Normality of the distribution



Three, the study ascertained whether the explanatory/predictor variables were highly correlated (the multicollinearity problem). In regression analysis, the problem of multicollinearity that arises due to a significant linear relationship between the explanatory variables can affect the estimation of the coefficients of the variables thus leading to imprecise results (Kjærland et al., 2020). To test the severity of multicollinearity in the data, a correlation matrix and the variance inflation factor (VIF) method were used. According to Brooks (2019), severe multicollinearity arises when the correlation between the two variables exceeds 0.80. Having run a correlation, the researcher manually observed the correlation coefficients between the independent variables.

As exhibited in Table 2 none of the correlations was more than 80% suggesting that multicollinearity was not present in the model. When the VIF was checked, the results (Table 3) revealed that the highest VIF is 7.13 and this belongs to *AC*, hence, suggesting that multicollinearity is not a serious problem because the general rule is that VIF should not be more than 10 (Katmun, 2012). Related to the VIF is the tolerance statistics which is a reciprocal of VIF (1 / VIF). As presented in Table 3, the tolerance statistics range from 0.140270 to 0.421402 indicating that multicollinearity does not exist in the data because only tolerance statistics below 0.1 indicate serious problems of multicollinearity.

Table 3. Multicollinearity test

Variables	*VIF*	*1 / VIF*
CD	3.01	0.312268
BoD	2.37	0.421402
AC	7.13	0.140270
OS	3.09	0.323587
FSIZE	5.60	0.178504
PRFT	3.04	0.328915
LEV	3.53	0.283433

Note: CD is the index for corporate disclosure; FSIZE is the natural log of total assets; BoD denotes board of directors characteristics, AC represents audit committee characteristics; OS represents ownership structure, FSIZE is the natural log of total assets, PRFT is the ratio of profit before tax to total assets; and, LEV is the ratio of debt to total assets.

Overall, the tests conducted show that the assumptions of the OLS regression analysis have been met and, therefore, the model developed in the study is statistically significant for explaining EM.

4.3. Regression analysis

To test the moderating effect of CGM on the relationship between CD and EM, a robust multivariate regression analysis was performed using three hierarchical models. Model 1 which tests for the effect of CDs on EM is stated as follows:

Model 1

$$DACC_i = \beta_0 + \beta_1 CDINDEX_i + \varepsilon_i + \quad (8)$$

where, $DACC_i$ is the value of EM for sample *i* firm, β_0 is the intercept to be estimated from the data, β_1 is the coefficient of the slope parameter, $CDINDEX_i$ is the CD score for sample *i* firm, and ε_i is the error term for sample *i* firm.

Model 2 which tests for the effect of CD on EM after incorporating the control variables (*LEV*, *PRFT*, and *FSIZE*) is stated as follows:

Model 2

$$DACC_i = \beta_0 + \beta_1 LEV_i + \beta_2 PRFT_i + \beta_3 FSIZE_i + \beta_4 CDINDEX_i + \varepsilon_i \quad (9)$$

where, $DACC_i$ is the value of EM for sample *i* firm, β_0 is the intercept to be estimated from the data, β_1–β_4 are the coefficients of the slope parameters, LEV_i is the ratio of debt to total assets for sample *i* firm, $PRFT_i$ is the ratio of net income to total assets for sample *i* firm, $FSIZE_i$ is the ratio of total assets for sample *i* firm, $CDINDEX_i$ is the CD score for sample *i* firm, and ε_i is the error term for sample *i* firm.

In Model 3, the moderating effect of CGM on the relationship between CD and EM is tested by incorporating three interaction variables of *BoD* with *CD*, *AC* with *CD*, and *OS* with *CD* by employing the following robust regression model:

Model 3

$$DACC_i = \beta_0 + \beta_1 LEV_i + \beta_2 PRFT_i + \beta_3 FSIZE_i + \beta_4 CDINDEX_i + \beta_5 BoDINDEX_i + \beta_6 ACINDEX_i + \beta_7 OSINDEX_i + \beta_8 CDINDEX * BoDINDEX_i + \beta_9 CDINDEX * ACINDEX_i + \beta_{10} CDINDEX * OSINDEX_i + \varepsilon_i \quad (10)$$

The results in Table 4 indicate changes in the adjusted R-square at each step of the regression as well as the significance of the beta weights (coefficients) for the predictor variable as stated and analyzed. The findings in Model 1 yielded an adjusted R-square of 0.2% which shows that about 0.2% of the changes in *EM* can be explained by *CD*. The model also shows that an increase in *CD* leads to a decrease in *EM* (coef. = -0.029) but *CD* is not a significant ($p > 0.05$) predictor of *EM*. This negative and insignificant result between the two variables is consistent with prior studies (Alzoubi, 2016; Bauer & Boritz, 2013).

In Model 2, the control variables were added to the *CD* dimensions to determine if they could predict *EM* when taken together. It can be observed that the control variables are a significant predictor of *EM* and explain an additional variance of approximately 41% (ΔAdj. $R^2 = 0.409$, $p \leq 0.01$) of the variation in *EM*. This suggests that the control variables add to the predictive ability of *CD* by 41%. However, collectively the control variables and *CD* account for 41.1% variance in *EM*. The study's adjusted R-square is higher than for previous studies (Dimitropoulos & Asteriou, 2010; Habbash, 2010) and lower than the findings of Alzoubi (2016) and Katmun (2012). It can also be seen from the model that there is a negative insignificant (coef. = -0.017, $p > 0.05$) relationship between *CD* and *EM* after controlling for *PRFT*, *LEV* and *FSIZE*. This result concurs with the results of Alzoubi (2016) who found a negative association between disclosure quality and DACC.

In Model 3, *CD* dimensions were added to *CGM* and the control variables to determine if they could predict *EM* when taken as a set. To begin with, it can be observed that *CGMs* explain an additional variance of about 19% (ΔAdj. $R^2 = 0.186$) of the variation in *EM*. This indicates that *CGMs* add to the predictive ability of the control variables by about 19%. However, collectively *CD*, the control variables and *CGMs* account for 59.7% of the variation in *EM*.

The results in Model 3 likewise show that the interaction effect between *CD* and *BoD* is negative and insignificant (coef. = -0.0169, $p > 0.05$). These results are contrary to the findings of Sun et al. (2010) who found a positive significant interaction effect between DACC and board size and Gerged et al. (2023) who found that the interaction effect between CED, board size and EM was significant. When the interaction effect between *CD* and *OS* is tested, a positive and significant relationship (coef. = -0.187, $p > 0.005$) was obtained. This result is consistent with the empirical evidence obtained by Xi and Xiao (2022) who found that institutional ownership among other CGMs positively moderates the relationship between CED and EM and is inconsistent with the results of Lakhal (2015) whose findings show that families, institutional investors and multiple large shareholders negatively influence EM, and hence, act as good CG devices to limit managerial discretion. Finally, the results in Model 3 depict that the interaction effect between *CD* and *AC* is negative and significant (coef. = -0.133, $p < 0.001$).

In summary, *H1* which stated that there is a negative moderating effect of *CGM* on the relationship between *CD* and *EM* among non-financial listed firms at the USE is supported with respect to *AC* characteristics. It can, therefore, be concluded that *H1* is only partially supported. Moreover, the results offer support to the agency theory predictions that *CD* acts as a controlling device leading to the alignment of management interests with those of the shareholders (Jensen & Meckling, 1976).

Table 4. Regression results

Variables	*Model 1 coefficient*	*Model 2 coefficient*	*Model 3 coefficient*
CD	-0.029	-0.017	0.591
PRFT		**-0.034***	-0.018
LEV		0.008	0.009
FSIZE		0.000	**0.005***
BoD			0.401
AC			**-0.111****
OS			0.155
*CD * BoD*			-0.169
*CD * AC*			**-0.133****
*CD * OS*			-0.187
Constant	**0.043****	0.031	-0.481
r2_a	0.002	0.411	0.597
Δr2_a	0.002	0.409	0.186

*Note: * p < 0.05; ** p < 0.01; *** p < 0.001. N = 112. r2_a = adjusted R-square; Δr2_a = change in adjusted R-square; CD = corporate disclosure; CD * BoD = interaction effect between corporate disclosure and board of directors; CD * AC = interaction effect between corporate disclosure and audit committee; and, CD * OS = interaction effect between corporate disclosure and ownership structure.*

5. CONCLUSION

This study examined the moderating effect of CGM on the association between CD and EM among listed firms at the USE during the period 2012–2019. We hypothesised that CGM has a negative moderating effect on the association between CD and EM. To support or reject our hypothesis, we employed disclosure indices to measure the levels of CD and CG. Our results show that out of the three CG variables (AC characteristics, OS features, and BoD characteristics), only AC characteristics had a positive and significant moderating effect on the association between CD and EM.

Given the voluntary nature of CG disclosure on a comply or explain basis in Uganda as an emerging economy in East Africa, the empirical findings of this study shed light on the crucial need for more concerted and deliberate efforts by the Government of Uganda, the USE, and other national regulatory bodies, such as the Capital Markets Authority of Uganda, to develop new enforcement avenues for CG provisions that may lead to a reduction in EM practices by the well-governed firms in Uganda.

The findings of this study also act as a basis for future researchers who might wish to study the moderating effect of CGM on the association between CD and REM in emerging economies. Moreover, the results of this study might act as a source of value-relevant information for regulators of corporate entities to understand better the combined effect of both CD and CGM in constraining the EM practices of firms.

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REPORTING AND IMPROVED EFFICIENCY THROUGH ARTIFICIAL INTELLIGENCE

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Abstract

This paper examines the use of artificial intelligence (AI) to improve the reporting and administration efficiency of the National Recovery and Resilience Plan (NRRP). Focused on a performance-based financing model, it shifts from tracking expenses to achieving tangible results. AI automates data collection and analysis, detects fraud and ensures regulatory compliance, thus improving transparency and effectiveness. It also addresses challenges like maintaining data quality and clear decision-making using AI, highlighting the need for appropriate regulatory frameworks. This study will deepen the understanding of technology adoption in the public sector and offer insights into using AI to modernize public administrations and optimize control processes.

Keywords: Artificial Intelligence, Performance Monitoring, Administrative Reporting

Authors' individual contribution: Conceptualization — A.M.G. and U.C.; Methodology — A.M.G. and U.C.; Software — A.M.G.; Validation — A.M.G.; Formal Analysis — A.M.G.; Investigation — A.M.G. and U.C.; Resources — A.M.G.; Data Curation — A.M.G.; Writing — Original Draft — A.M.G.; Writing — Review & Editing — A.M.G. and U.C.; Visualization — A.M.G. and U.C.; Supervision — U.C.; Project Administration — A.M.G. and U.C.

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1. INTRODUCTION

In the recent period, the incorporation of artificial intelligence (AI) into public administration has raised many concerns and revealed many opportunities.

Some studies in the literature have expressed doubts and concerns, suggesting that the adoption of AI in public administrations could lead to overly technocratic management, compromise privacy, exacerbate inequality, and threaten democracy (Janssen & Kuk, 2016; Maciejewski, 2017; Eubanks, 2017; O'Neil, 2016).

In the European context, the adoption of the AI Act[1] (Regulation (EU) 2024/1689 establishing harmonized rules regarding AI), the world's first on AI, has defined an essential regulatory framework to ensure that AI systems adopted in the European market are secure and respect fundamental rights and the values of the European Union (EU). This regulation is set to have a profound impact on the ethical and safe adoption of AI in public administrations, enhancing their ability to address complex challenges and innovate in public services.

The literature on the subject is extensive, and numerous studies highlight the benefits of using AI in the public sector. With the advancement of hardware technologies and access to large datasets, AI has the potential to improve decision-making and predictive ability, facilitate interaction between government and citizens, personalise public services, lighten administrative burdens, and ultimately elevate citizens' quality of life (Ulnicane et al., 2021; Margetts & Dorobantu, 2019; Hitz-Gamper et al., 2019; Androutsopoulou et al., 2019).

In this context, the digitalization of public services emerges as a critical component of

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32024R1689

the modernisation of public administration, a process that has already been underway for years (Borgonovi, 2004).

Italy has taken significant steps towards the digitisation of its administrations, emphasising the importance of this transformation to promote economic development and national growth (Cepiku, 2018; Belisario & Cassano, 2023; Bonomi Savignon et al., 2023).

The use of AI-based control systems has been recognised as an effective means of identifying and preventing fraudulent behaviour, reducing the workload of administrative staff and increasing the accuracy and efficiency of controls.

The aim of this study is to understand the adoption of technologies in the public sector and provide information on the use of AI to modernize public administrations and optimize control processes, as well as analyze steps to improve the efficiency of public sector services through the use of AI.

The remainder of the paper is structured as follows. Section 2 provides a literature review on the nature of AI and the factors that determine its successful implementation in public organizations. Sections 3 and 4 discuss the challenges of improving reporting efficiency using AI, followed by a conclusion in Section 5.

2. LITERATURE REVIEW

Although the field of AI research in the public sector has expanded considerably recently (de Sousa et al., 2019), a dearth of empirical studies persists (Campion et al., 2022; Sun & Medaglia, 2019).

There are a number of important studies that have looked at AI from the perspective of administrative discretion and transparency (Ahonen & Erkkilä, 2020; Bovens & Zouridis, 2002; Criado et al., 2020; de Boer & Raaphorst, 2023; Peeters, 2020), organisational transformations related to the use of AI in predictive policing (Meijer et al., 2021), chief information officers (CIOs) perceptions and expectations of AI in the public sector (Criado et al., 2020), creating public value with AI (Wang et al., 2021) and the use of AI during the pandemic (Cheng et al., 2021). However, empirical studies investigating the determinants of successful AI implementation in public organizations are still limited (Campion et al., 2022; Chen et al., 2021; Schaefer et al., 2021; Sun & Medaglia, 2019). Considering the complexity of AI and its many potential areas of emerging application, regarding accountability and efficiency improvement through AI, the dearth of studies on AI adoption mechanisms is a major research gap. It is, therefore, crucial to obtain empirical evidence on the specific challenges and factors that facilitate the implementation of AI projects in public sector practice (Wirtz et al., 2021), in order to bridge the gap between theories of AI and its practical implementation.

Several initiatives have begun to integrate AI into government operations, highlighting the importance of a structured approach to effectively exploit these technologies (Bontempi, 2022). In an environment where transparent and accountable management of public resources is essential (Comite, 2012), robust and efficient control systems are essential. These systems not only monitor and regulate financial activities but also ensure that all administrative operations comply with established objectives of effectiveness and efficiency. Recent technological innovations have opened up new opportunities for fraud detection research.

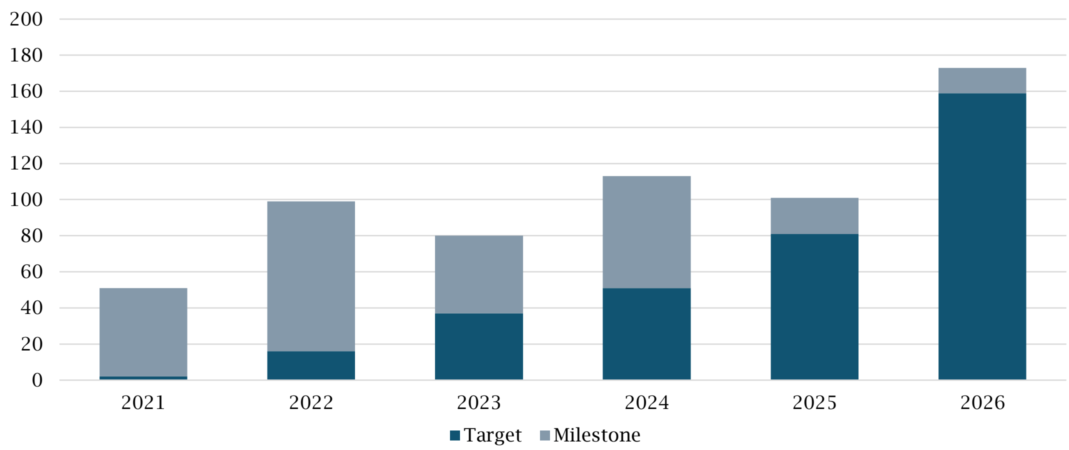
Recently, in Italy, there has been a significant increase in cases of misappropriation of public funds, making this issue particularly relevant for the administrations in charge of National Recovery and Resilience Plan (NRRP) management (Bontempi, 2022).

It is, therefore, imperative that administrations ensure appropriate and transparent use of the financial resources allocated to them, preventing fraud, conflicts of interest and illegal practices.

3. REPORTING AND IMPROVED EFFICIENCY

A key aspect of the NRRP concerns the reporting of milestones and achievements. Reporting on objectives and milestones means, in practice, communicating and documenting the achievement of specific objectives (targets) and milestones set in a programme or project. This approach is crucial in contexts such as the EU's NRRP, which differs from most other EU and national spending programmes in its emphasis on performance and results rather than spending levels.

Figure 1. European milestones and targets



Source: https://www.italiadomani.gov.it/content/sogei-ng/it/en/Interventi/milestone-e-target.html

The main difference lies in the fact that the NRRP adopts an "uncosted" funding model, i.e., a "performance-based" approach, whereby funds are disbursed based on the achievement of certain results and not in relation to expenditure incurred. This mechanism, provided for in Article 125 of the EU Financial Regulation[2], represents a significant change compared to the traditional management of structural funds, where funding is typically linked to documentation and reimbursement of costs incurred (Centurelli, 2023).

The innovativeness of this approach, however, may encounter cultural and comprehension limits both on the part of the administrations managing the funds and the citizens (Centurelli, 2022). Indeed, there is often a tendency to evaluate funding programmes based on the expenditure made rather than the results achieved, which may make it more difficult to fully appreciate the specificities and advantages of the model adopted by the NRRP. A key aspect that distinguishes the NRRP from the traditional European Structural and Investment Funds (ESIF) is the reporting mechanism. Unlike the ESIF, which is based on expenditure-related reporting, the NRRP adopts an innovative approach focused on the achievement of specific objectives defined as "milestones" and "targets" (Centurelli, 2022). This funding method, defined as "non-cost-related", thus, moves away from simple expenditure control to focus on performance, on achieving specific results within pre-established deadlines. This paradigm shift implies a significant challenge for the institutions involved: it is not enough to spend according to plan, but it is important to ensure that this spending actually leads to the achievement of the objectives set by the NRRP (Gallo, 2024). Although the focus is on results rather than spending, the importance of not neglecting the protection of the EU's financial interests is emphasised.

Member States must, therefore, take strict measures to ensure that the use of funds complies with the principles of legality, preventing and correcting possible cases of fraud, corruption, conflicts of interest and double funding. This requires the implementation of a robust internal control system and the establishment of procedures for the recovery of any incorrect amounts.

In essence, managing the NRRP requires a balance between the desire for ambitious results and the need to maintain strict financial integrity. The challenge for institutions involved in the NRRP is not only to plan and execute projects in line with European and national objectives but also to adopt a reporting approach that is flexible, results-oriented and strict in terms of compliance. This represents a significant change in the approach to European funds, which could pave the way for future European funding programmes.

Despite reporting based on milestones and targets, Member States must still take strict measures to protect the EU's financial interests. This includes implementing effective and efficient internal management and control systems, similar to those required for structural funds, to prevent fraud, corruption, conflicts of interest and double funding. States are also required to recover amounts unjustifiably paid or misused.

Article 8 of Decree-Law No. 77/2021[3] provides that each central administration responsible for the interventions of the NRRP must ensure the coordination, monitoring, reporting and control of activities related to investments and reforms under its responsibility. This implies the adoption of a management and control system that includes effective measures to prevent, identify and correct fraud, corruption, conflicts of interest and duplication of funding.

The State General Accounting Department (*Ragioneria generale dello Stato* — RGC) Circular No. 9[4] dated February 10, 2022, provided further details on how to set up the organisation and procedures and how to develop the descriptive document of the management and control system. This system, similar to that provided for the ESIF, is essential for describing the structure, functions and procedures implemented for the management and control of the NRRP. Through these procedures, the aim is to ensure coherent action and effective strategic direction, as well as working methodologies and tools to ensure efficient and effective management of NRRP interventions. The aim is also to ensure the complementarity of these interventions with other national and European funding instruments, in particular, the Next Generation EU (NGEU) priorities, the Complementary National Plan (approved by Decree-Law No. 59 of May 6, 2021) and the instruments of the Cohesion Policy legislative package 2021–2027.

The debate on control in the context of the NRRP highlights the tension between the need to ensure the proper use of funds through detailed control and the need not to stifle the implementation of interventions with excessive administrative burdens. The tendency towards extreme capillary control, which focuses not only on performance but also on procedures and expenditure, risks creating a significant impact on the time and resources dedicated to the implementation of the investments envisaged in the Plan.

Experience shows that the administrative burdens required, especially on the part of beneficiaries such as companies and municipalities, even the smallest ones, can exceed their capacity to provide a rapid and effective response, leading to delays in the implementation of interventions and possibly to the cessation of funding (Gallo, 2024).

4. REPORTING AND IMPROVED EFFICIENCY THROUGH AI: A BREAKTHROUGH CHALLENGES

To address these challenges, it is essential to move forward with a simplification of the process that includes uniform implementation rules and enhanced support and mentoring at all levels while respecting the principle of proportionality and a single audit. These principles are already provided for in the Structural Funds regulations for cohesion policies and can offer a significant reduction in the administrative burden of control activities.

It is also important to consider that the NRRP resources are not the only ones available.

[2] Regulation (EU, Euratom) 2018/1046 of the European Parliament and of the Council, 18 July 2018 (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1046).

[3] https://www.gazzettaufficiale.it/eli/id/2021/05/31/21G00087/sg

[4] https://www.rgs.mef.gov.it/VERSIONE-I/circolari/2022/circolare_n_09_2022/

In the context of overall programming, additional funding from EU and national sources is expected to be significant. Unified management of these resources through single management centres that implement development policies regardless of the financial source, becomes crucial to maximise the effectiveness and sustainability of interventions.

A key element for the success of this strategy is the continuous strengthening of administrative capacity at all levels through increased staffing, improved skills, clear organisational rules and effective tools. Well-trained and competent staff are essential to implement projects and programmes correctly and on time, thus meeting the challenges associated with the turnover freeze of recent years and responding to the complex management rules that characterise the current financial environment (Gallo, 2024).

In this complex and dynamic framework, AI can make significant improvements to actuator signalling in various ways, exploiting its ability to process large volumes of data with high accuracy and speed. Below are some practical examples of how AI could be used to optimise this process:

- *Reporting automation*: AI can automate the collection, organisation and analysis of data required for reporting. Machine learning algorithms can be trained to recognise, classify and process expense items, reducing the time it takes to prepare reports and minimising human error.
- *Fraud and discrepancy detection*: Advanced AI systems can analyse spending patterns and transactions to identify anomalies, potential fraud, double funding or conflicts of interest. This type of predictive analysis helps prevent irregularities before they become problematic.
- *Compliance verification:* Through text analysis and machine learning, AI can be used to ensure that spending practices and funded projects comply with conditionalities and legislative requirements, including those specific to the NRRP. This includes compliance with environmental and social principles, such as the "do no significant harm" (DNSH) principle.
- *Improved data transparency and accessibility:* AI can help create interactive dashboards and accessible reports, facilitating the monitoring of expenditure and project progress in real-time for both managers and the public. This improves transparency and promotes greater citizen participation and trust.
- *Forecasting and planning:* Using historical data and current trends, AI can help predict future spending needs and potential areas of risk. This enables organisations to implement more effective planning, optimising resource utilization and improving overall project performance.
- *Decision support:* With the ability to analyse complex data networks, AI can provide data-driven insights and recommendations to support the strategic decisions of implementing organisations, ensuring optimal resource allocation to meet NRRP goals.
- *Training and assistance to users:* With AI-powered chatbots and virtual assistants, organisations implementing the system can provide immediate training and assistance to their employees on reporting issues, improving the accuracy and compliance of reports.

By incorporating AI into their reporting practices, implementing organisations can not only improve the efficiency and accuracy of their processes but also strengthen the prevention of irregularities and promote greater transparency and trust in the public funds management system.

The use of AI in executive agency reports, such as the NRRP, presents several challenges, ranging from data integrity to transparent decision-making. These technologies, while offering advantages in terms of efficiency and analytical capacity, raise complex issues that require careful management (Gallo, 2024).

A primary challenge concerns data quality and integrity. Reports based on AI are highly dependent on the accuracy and completeness of the input data. Inaccurate or incomplete data can lead to misleading results, negatively affecting decisions based on these analyses. Ensuring the cleanliness, reliability, and up-to-date data, therefore, becomes crucial and requires robust data collection and verification systems.

Transparency and understandability of automated decision-making processes are another major challenge. AI algorithms can function as black boxes, making it difficult to understand the logical path that led to a particular decision. This raises concerns in terms of accountability and trust, especially when decisions have a significant impact on funding or resource allocation. It, therefore, becomes crucial to make these processes more transparent and interpretable, possibly through the adoption of explainable AI (XAI) techniques.

Regulatory compliance is a further challenge. Current data privacy laws, such as the EU General Data Protection Regulation (GDPR), impose strict requirements on the handling of personal data. Implementing organisations must ensure that the use of AI in reporting complies with these regulations, protecting people's privacy and ensuring data security.

Finally, the training and skills required to effectively manage AI represent a non-negligible challenge. Implementing agencies must invest in training staff and developing specific skills to implement, manage and supervise AI systems, a task that requires significant resources and a constant commitment to technological upgrading.

The use of AI by plan implementers for reporting and in public administration for administrative control represents a significant evolution towards modernisation and efficiency in the public sector. This technological transformation offers unique opportunities to improve accuracy, speed up processes and optimise resource management. However, the integration of AI also poses complex challenges that require careful attention and management.

From an accountability perspective, AI can revolutionise the way performance organisations collect, analyse and present data, offering the opportunity to automate repetitive tasks and improve the quality of financial analysis. This could lead to greater transparency and accountability, as well as provide valuable insights that can guide better strategic decisions. The main challenge in this area concerns data quality and the need to ensure that AI systems are fed with accurate and complete information to avoid incorrect or misleading conclusions.

In terms of administrative control, AI has the potential to make inspection processes more efficient and less prone to human error, enabling real-time monitoring and the ability to detect anomalies or potential irregularities with unprecedented accuracy. Issues of transparency, algorithm functionality, and accountability of automated decisions become central, as it is essential to maintain trust in the system and ensure that decisions can be understood and challenged.

Both of these AI applications address the issue of "algorithmic legality", i.e., the need to ensure that the use of algorithms complies with the principles of legality, fairness and transparency that govern administrative actions. This implies the development of appropriate regulatory frameworks that can effectively regulate the use of AI while ensuring that technological innovation can take place in a responsible and ethical manner. The adoption of AI by implementing organisations for reporting purposes and by paying agencies for administrative control purposes is a promising avenue for efficiency and innovation. However, proactively addressing the challenges of data quality, transparency, accountability and regulation is essential to successfully tackle this transition. Only in this way will it be possible to fully exploit the benefits of AI, maintaining public trust and ensuring that decisions made remain fair, understandable and consistent with the core values of society. In the context of the NRRP's in-depth study, 2024 is a turning point when managing unprecedented resources will become a major challenge for those implementing them. The latter find themselves having to navigate in a sea of often inconsistent regulations, circulars and controls, dealing with a complexity that risks slowing down the effective implementation of projects. The simultaneous implementation of the new cohesion policy programmes for the period 2021–2027 adds further layers of complexity, heralding even more intense years than in the past (Centurelli, 2021).

Reporting, monitoring and resource management emerge as particularly treacherous terrains, where the multiplication of rules and the excessive differentiation of operational tools can generate confusion and not inconsiderable administrative burdens. In particular, the low administrative capacity of some authorities and the remoteness of technical support from the territories, especially for smaller local administrations, represent significant obstacles to the effectiveness of the NRRP.

To address these critical issues, recent literature on the topic suggests a number of measures to simplify the process, strengthen administrative capacity, and make technical support more accessible and tailored to local needs. Among these, the revision of guidelines to reduce their complexity and the promotion of a proportional control system are key measures to reduce the administrative burden and focus on the actual implementation of projects.

The idea of creating committees or task forces to coordinate and integrate technical assistance and capacity-building initiatives is particularly promising. These bodies could generate complementarities and synergies between the various resources allocated, maximizing the use of investments and targeting them to the real needs of the territory. At the same time, the definition of single standards for participation in calls for proposals and project management could significantly reduce the variability and complexity that currently burden beneficiary bodies, simplifying their path to obtaining and using funds. A change of pace is needed in the approach to managing the NRRP and development policies in general. The proposals put forward aim to simplify the entire system and make it more efficient, overcoming the bureaucratic and operational barriers that currently limit the ability of entities to transform the funds received into concrete projects with an impact on local communities.

AI is a transformative force that can address the complexity and criticality of the NRRP implementation process. Through automation and predictive analytics, AI can simplify the management of multiple guidelines and circulars, making information more accessible and understandable to end users. This not only reduces complexity for authorities but also makes it easier to navigate the rules.

AI has the potential to optimise controls, identify areas of increased risk and enable targeted activities, easing administrative burdens and preventing duplication. In this sense, it can contribute to the creation of a "single audit" environment, coordinating information between different control bodies for a more efficient and less redundant approach.

By enhancing administrative capacity, AI can customise learning and training through online platforms that provide support and content tailored to meet the specific needs of professional auditors. Virtual assistants and chatbots can offer instant advice, overcoming geographical barriers and making technical support more flexible and less dependent on physical presence.

In terms of standardization of operational tools, AI can play an important role in analysing and comparing documents to identify discrepancies and promote common, uniform standards. This automated process not only facilitates the creation of standardised formats but also reduces variability and administrative burden for the entities involved, contributing to a more coherent and integrated approach to NRRP implementation.

AI is an innovative solution to address the challenges of the NRRP, facilitating simplification, increasing efficiency and better responding to the needs of administrations and territories (Gallo, 2024).

5. CONCLUSION

The study highlighted the significant role AI can play in in improving government efficiency and transparency. By using AI for automated data processing and advanced analysis, studies in the literature have observed greater accuracy in monitoring and reporting, helping to reduce human error and potential bias. The regulatory framework provided by the AI Act ensures that these technologies are implemented while respecting individual rights and maintaining public trust.

Despite the considerable benefits of AI, its implementation in the public sector is not without challenges. These include: 1) the need to ensure data integrity, 2) protection against bias in decision-making processes, and 3) maintaining transparency in automated operations. It is essential that public entities take proactive measures by establishing clear guidelines and implementing continuous monitoring to ensure responsible and effective use of AI tools.

Looking ahead, it is crucial that public administrations continue to explore the application of AI in various operational aspects. As technologies evolve, AI integration strategies must also adapt to meet changes in regulatory frameworks and ethical standards. Collaboration between technology experts, regulators and public stakeholders will be crucial in shaping an innovative and responsible public sector enabled by AI.

Moreover, progress in digitisation and the use of AI offers opportunities to develop more robust ethical and regulatory frameworks, integrate AI into decision-making at more complex levels, and customise public services to better meet citizen needs. These technologies can also enhance civic participation through platforms that increase government transparency.

Finally, it is recommended that public administrations engage in ongoing training and capacity building of their staff to enable them to effectively manage and use AI technologies. It is also crucial to increase public awareness of the role and implications of AI in public governance, to stimulate informed and sustainable public debate, and to promote a more responsible and transparent approach to the management of public funds and policies.

Despite its considerable benefits, the present study has some limitations that deserve attention. First, the speed of technological evolution may make some of our findings less relevant over time as new AI capabilities and applications emerge. Second, the dynamics of AI implementation may vary significantly between different administrative contexts, thus limiting the generalisability of our findings. Third, our study may not capture all the challenges and implications of AI adoption, particularly those related to rapid regulatory changes that may affect the implementation of the technologies in question. Finally, the reliance on secondary data and the interpretation of pre-existing studies may introduce a degree of interpretive bias that needs to be considered when evaluating the results.

These considerations underline the importance of continuing research in this field, with a particular focus on longitudinal studies that can trace the evolution of the impact of AI over time and across different geographies and sectors of public administration.

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BOARD OF DIRECTORS' PERFORMANCE AND THE EXTENT OF CORPORATE SOCIAL RESPONSIBILITY REPORTING

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Abstract

This study examined the impact of board size, presence of an audit committee, and chief executive officer (CEO) duality on the level of corporate social responsibility (CSR) reporting in Jordan. The population of the research included all non-financial companies in the industrial and service sectors listed on the Amman Stock Exchange (ASE) for the period 2006–2015. The study covered the impact before and after the issuance of the Jordanian Corporate Governance Code (JCGC) (Jordan Securities Commission [JSC], 2009). The study results suggest that the level of CSR reporting has significantly improved among Jordanian public listed companies since issuing the corporate governance code in 2009. This finding suggests that these companies may have adopted CSR reporting as a legitimation strategy to influence the external perception of their performance and convince the public of their legitimacy.

Keywords: Corporate Governance, CSR, Reporting, Board of Directors, Performance

Authors' individual contribution: The Author is responsible for all the contributions to the paper according to CRediT (Contributor Roles Taxonomy) standards.

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1. INTRODUCTION

The internal and external aspects of the corporate social responsibility (CSR) framework are based on "ethics", that companies can adopt to create a positive perception in the community, legitimise their activities and attract new investors (Alrousan et al., 2015). A wider range of stakeholder groups have the right to be informed about a company's activities in community engagement, the workplace, the environment, the market, and even society at large (Abu-Baker & Naser, 2000). Corporate social reporting is one of the strategies that companies can use to communicate with stakeholder groups and the public affected by their operations. This provision of information in the annual reports is generally categorised as voluntary disclosure (Jizi et al., 2014; Liao et al., 2016).

Companies with an effective and active board of directors (BoD) should disclose more information about their CSR activities to meet the expectations of a group of stakeholders including the society at large (Isa & Muhammad, 2016). An active corporate BoD can act as a representative of stakeholders in implementing effective corporate governance mechanisms to enhance accountability, monitoring and transparency in companies. Therefore, the effectiveness of corporate governance practices depends on the activity of the BoD in companies (Esa & Zahari, 2016). The corporate board also dominates the disclosure policies to ensure the effective control mechanism of reporting in the companies. Hence, corporate board characteristics are important internal control mechanisms that influence effective corporate governance practices and CSR reporting level (Said et al., 2009; Khan et al., 2013; Barakat et al., 2015; Majeed et al., 2015; Isa & Muhammad, 2016; Fuente et al., 2017).

Previous studies have mainly focused on developed countries such as the USA, the UK, Canada, Australia, and Western Europe (Sparkes & Cowton, 2004; Li et al., 2008; Jo & Harjoto, 2012; Paek et al., 2013; Zhang et al., 2013; Fernandez-Feijoo et al., 2014; Ducassy & Montandrau, 2015;

Oh et al., 2016; Rao & Tilt, 2016b; Galbreath, 2017). The existing literature suggests that there is a significant gap in such research in developing countries and further research is needed (Velte, 2017; Abu Qa'dan & Suwaidan, 2019). This is because political, social, and economic environments have different impacts on board composition and CSR reporting levels (Khan et al., 2013; Habbash, 2016; Velte, 2017). Jordan provides a rich setting for this study for several reasons. First, Jordan is a developing country and the Jordanian culture, economic, and business environment are different from developed countries (Barakat et al., 2015; Ibrahim & Hanefah, 2016). Second, the legal context in Jordan is well organized with a stable political situation compared to the surrounding Arab countries in the Middle East (Naser et al., 2002; Ismail & Ibrahim, 2008; Barakat et al., 2015). The Jordanian Corporate Governance Code (JCGC) was implemented in January 2009 for public companies listed on the Amman Stock Exchange (ASE) (Shanikat & Abbadi, 2011; Jordan Securities Commission [JSC], 2009). This code is predicted to provide an indication of the relationship between corporate governance practices and the level of CSR reporting in the context of developing countries (Rashid & Lodh, 2008; Habbash, 2016).

Previous studies have not provided conclusive evidence regarding the level of influence of corporate governance practices on CSR reporting in developing countries. A diverse range of results were obtained, at least in part due to differences in theoretical perspectives, sample size, period, and research methodologies, which provide a rationale for further research (Jain & Jamali, 2016; Rao & Tilt, 2016a; Abu Qa'dan & Suwaidan, 2019). This study used longitudinal data (panel data) to provide a clearer explanation of the influence of corporate governance on CSR reporting over a long period of time (Berg & Lune, 2017). This paper analyzed balanced panel data of all non-financial companies using a quantitative method to test hypotheses within the framework of legitimacy theory to explain the relationship between corporate governance practices and the level of CSR reporting.

The remainder of the paper is structured as follows. Section 2 provides an overview of the relevant literature. Section 3 describes the methodology models and data. Section 4 presents the analysis and discussions, and finally, Section 5 presents the conclusions, limitations, and suggestions for future research.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Theoretical background

The BoD is one of the most important corporate governance mechanisms that monitor the actions of the management and the reporting process in companies. A large number of directors sitting on the board can increase the level of disclosures in the company's annual reports (Sartawi et al., 2014). A large number of directors on the board can improve the transparency of the information in the companies to satisfy stakeholder group demands for more CSR reporting (Barakat et al., 2015). Some of the previous studies in developing countries have found that the large board size affects the increase in the level of CSR reporting (Esa & Mohd Ghazali, 2012; Ahmed Haji, 2013; Majeed et al., 2015; Isa & Muhammad, 2016; Ahmad et al., 2017c). Ahmed Haji (2013), using the case of Malaysia, shows that after the revision of the corporate governance code, a positive and significant relationship emerged between the size of the BoD and the level and quality of CSR disclosure. Ahmad et al. (2017c) suggest that companies with large boards tend to improve involvement in CSR activities and increase reporting.

The presence of an audit committee is considered as one of the important corporate governance mechanisms to improve the reporting and disclosure process. This committee increases monitoring and control of the managers' decisions in the interest of all stakeholder groups (Khan et al., 2013). Hence, an effective audit committee can improve the quality of disclosures including CSR reporting (Khan et al., 2013). Some of the previous studies suggest that there is a positive relationship between the presence of an audit committee and the level of CSR reporting (Said et al., 2009; Khan et al., 2013). In contrast, other studies found an insignificant negative relationship between the presence of an audit committee and the level of CSR reporting in developing countries (Habbash, 2016).

The leadership structure is an important corporate governance mechanism that controls and monitors company operations. The duality of the chief executive officer (CEO) and chairman roles increases management power and may impair the power of monitoring in the companies including reporting policies and decreases investment in CSR activities and reporting (Habbash, 2016; Oh et al., 2016; Ahmad et al., 2017c). Some of the prior studies have examined the relationship between CEO duality and CSR reporting (Said et al., 2009; Khan et al., 2013; Muttakin & Subramaniam, 2015; Habbash, 2016; Ahmad et al., 2017c). These limited previous studies have shown mixed results in the context of developing countries. The impact of CEO duality has been found to be significantly negative (Muttakin & Subramaniam, 2015; Abu Qa'dan & Suwaidan, 2019), insignificant positive (Said et al., 2009; Khan et al., 2013; Habbash, 2016) and insignificant negative on the level of CSR reporting (Ahmad et al., 2017c).

In the context of Jordan, the impact of board size and audit committee presence on the level of CSR reporting has been understudied (Barakat et al., 2015; Abu Qa'dan & Suwaidan, 2019). The study conducted by Barakat et al. (2015) used a small sample size (55 companies) of Jordanian service, industrial, and financial companies in one year (2011). This study found that there is a positive and significant association between board size, audit committee presence, and CSR reporting level.

Abu Qa'dan and Suwaidan (2019) suggest that there is a significant negative relationship between CEO duality and the level of CSR reporting. This study examined companies in the industrial sectors during the period 2013–2015 and ignored the service sector. Therefore, this study does not include the years before JCGC 2009 nor all the years after JCGC 2009. Overall, there is a significant gap in the literature of such studies and there is no consensus in the findings (mixed results) of previous studies in developing countries.

2.2. Corporate board practices and CSR reporting in Jordan: A legislative framework

Chapter 2 of the JCGC explains that the members of the BoD must be qualified, experienced and elected by a cumulative voting system at a general meeting to represent all stakeholders (JSC, 2009, pp. 7–11). The number of these board members must be no less than five and no more than thirteen for a maximum term of four years. The board meeting must be held once every two months, requested by at least the chairman or a quarter of the board members. This board should ensure adequate experience and qualifications held by the executive management members. In addition, the role of duality is not accepted and board members in the company are not allowed to hold the same position or represent other companies with the same business activities (JSC, 2009).

According to the JCGC, the audit committee should be elected from the BoD of at least three non-executive members two of them independent. All members of the audit committee must have experience in finance and accounting, and at least one of them must have an academic qualification or professional certificate in this field. This committee must meet at least four times a year and once with the external auditor without the presence of the executive management members. The audit committee must also monitor the company's activities in accordance with applicable rules and laws. In addition, the audit committee has the power to require the presence of the external auditor, make a recommendation to the BoD on the appointment of the external auditor for election by the general meeting, and appoint an internal auditor for the company (JSC, 2009).

CSR activities and reporting have received a great deal of attention from the Jordanian government through the enactment of legislation and regulations:

1. The Environmental Protection Code (Law No. 12 of 1995) and the Securities Commission Law of 1998 were enacted to ensure the compliance of companies with its environmental control standards and to mandate companies to disclose information about social and environmental issues in their annual reports (Al-Khadash, 2004; Suwaidan et al., 2004).
2. In 2004, the JSC issued instructions and guides for preparing annual reports, issuing the company's disclosures, accounting, and auditing standards (JSC, 2004, n.d.). These guidelines and instructions require companies to report all services that companies provide to the local community and to disclose the company's role in protecting the environment. Companies that do not contribute to the community should state that clearly in their annual report (Ibrahim & Hanefah, 2016).
3. In 2006, the Jordanian government amended the environmental protection law by enacting Law No. 52 of 2006 on Protection of the Environment to improve the compliance of companies to protect the environment from their activities and comply with applicable regulations (Haddad et al., 2017).
4. In 2009, the JCGC was issued and required ASE-listed companies to disclose information on the local community and the environment in their annual reports. This was clearly stated in Chapter 5 (Disclosure and Transparency) as follows: "The company shall disclose its policy regarding the local community and the environment" (JSC, 2009, p. 15).

The above-mentioned government regulations oblige companies to disclose social and environmental information in their annual reports. This is designed to ensure the quality and reliability of the annual report and to attract local and foreign investment (Ibrahim & Hanefah, 2016). In fact, the approach of either "comply or explain" is adapted to achieve full compliance gradually. Despite this, the JCGC does not provide guidelines for disclosing the structure of CSR activities in annual reports. Therefore, CSR reporting is not fully regulated and is still a voluntary action in Jordan.

2.3. Empirical review and research hypotheses

A stakeholder group is defined as a group that supports the decisions and actions of companies so that they exist, continue and survive. This group can be comprised of shareholders, creditors, customers, employees, and society. Companies without the support of this type of group may cease to exist (Freeman & Reed, 1983). Hence, companies should build and maintain good and trusting relationships with various stakeholder groups that may affect or be affected by their activities (Freeman, 1984; Stovall et al., 2004). In this regard, Roberts (1992) pointed out that companies can use CSR activities and reporting as a strategy to respond to stakeholder demands and expectations.

Legitimacy theory tends to provide an additional perspective and in-depth understanding of the influence of corporate governance factors on the level of CSR reporting. Legitimacy theory promotes a focus on the expectations of society in general (Deegan et al., 2002). According to Suchman (1995), the definition of legitimacy is "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" (p. 574). Therefore, companies seeking legitimacy may adopt a strategy to influence external perceptions of their operations and increase public acceptance of their legitimacy (Lindblom, 1994). CSR reporting can be seen as one of the strategies that companies can adopt to create a positive image of their operations (Gray et al., 1996; Deegan et al., 2002).

Corporate board members play an important role in the companies through controlling or monitoring management actions (Barakat et al., 2015). These board members are expected to improve controlling mechanisms and reporting policies in the companies to protect the interest of the stakeholder group (Jizi et al., 2014). A high proportion of directors (a large number of directors) on the board may also help improve the company's disclosure policies and increase transparency (Sartawi et al., 2014). A board with a high proportion of directors can act as a representative of different stakeholder groups, including society. This type of board can emphasize its CSR strategy and report additional information to reduce the legitimacy gap. This discussion leads to the following hypothesis:

H1: A high proportion of directors (board size) on the board of directors is positively associated with the level of corporate social responsibility reporting.

The audit committee plays an important role in enhancing the level of disclosure by overseeing the reporting process in companies (Said et al., 2009). Existing literature suggests that the effectiveness of the audit committee depends on the number of independent members on the board, the number of experts on the board, and the frequency of meetings (Xie et al., 2003; Madawaki & Amran, 2013; Soliman & Ragab, 2014). An effective audit committee has an impact on increasing the quantity and quality of reporting by controlling and monitoring the decision-making of companies (Said et al., 2009; Khan et al., 2013). Companies with an audit committee on their BoD appear to report more CSR information to inform public opinion about their legitimacy. This discussion leads to the following hypothesis:

H2: The presence of an audit committee on the board is positively associated with the level of corporate social responsibility reporting.

The duality of the roles of the CEO and the chairman should be separated from the corporate board (Cadbury Committee, 1992; JSC, 2009). This duality of director roles may decrease corporate mechanism control and the efficiency of corporate disclosure policy (Abdel-Fattah, 2008) because the power is dominated by a CEO who also acts as chairman of the board. This authority may disregard investing in social activities and hide some information at a board meeting to achieve their personal interest (Jizi et al., 2014; Liao et al., 2016). Liao et al. (2016) suggest that the segregation of the roles of CEO and chairman on the board is positively associated with CSR assurance decisions, quality of CSR information, and stakeholder confidence in the company. This powerful management may interpret CSR reporting as a harmful activity that may reduce their wealth and benefit the company (Jizi et al., 2014).

According to legitimacy theory, companies may attempt to repair the perceived loss of legitimacy if a legitimacy gap occurs. However, companies with the role of CEO and chairman on the BoD may devote less attention to reporting information than mandatory requirements because the perceived threat is minimal. Therefore, these companies are likely to make lower levels of voluntary CSR disclosures. This discussion leads to the following hypothesis:

H3: The presence of chief executive officer duality on the board is negatively associated with the level of corporate social responsibility reporting.

3. RESEARCH METHODOLOGY

3.1. Data

This study adopted a quantitative method with a deductive exploratory approach to explain the relationship between corporate governance practices and the level of CSR reporting in Jordan. The study population included all non-financial publicly listed companies in the ASE industrial and service sectors for the period from 2006 to 2015. Table 1 shows a total of 80 companies, resulting in a balanced panel data of 800 observations as of December 31, 2015.

Table 1. Companies of non-financial sectors summary

Sectors	*Number of companies*	*Observation*	
		Per period	*Percentage (%)*
Services	35	350	43.75
Industrial	45	450	56.25
Total	**80**	**800**	**100.00**

Financial companies include different types of industries such as insurance, banks, diversified financial services, and real estate. This study excluded these companies due to significant differences in the application of accounting policies as well as a different set of instructions and rules of disclosure requirements compared to non-financial companies (Haniffa & Cooke, 2005; Goodwin-Stewart & Kent, 2006; Mohd Ghazali, 2007; Abed et al., 2012; Ahmed Haji, 2013; Ho & Taylor, 2013; Esa & Zahari, 2016; Habbash, 2016). Unlisted and suspended companies on the total period of the study were also omitted from the list. Companies that did not have available annual reports were excluded. The following table identifies and shows the total number of 80 companies.

Table 2. Study dataset

Study population summary	*No. of ASE-listed companies*
Total number of ASE-listed companies as of December 31, 2015	228
Less: Financial companies	111
Less: Companies that were not listed during the entire survey period	23
Less: Companies with the unavailability of annual reports	11
Less: Suspended companies during the study period	3
Total number of non-financial companies in this study	80

The data source for the study is annual reports of public companies listed on the ASE for the period 2006–2015. This study started in 2006 because of the unavailability of annual reports prior to 2006 on the ASE website and ended in 2015 because it is the most recent year for which data are available.

3.2. Variables

3.2.1. Dependent variable

The CSR reporting index (*CSRRI*) is the dependent variable in this study. Different areas of disclosures in the annual reports of companies such as community involvement information, workplace information, marketplace information, and environmental information are observed to build the CSR reporting index. Other types of disclosure made in the company have not been considered. Accordingly, the use of content analysis to analyze the annual reports is empirically appropriate in the areas of CSR reporting (Guthrie & Parker, 1990). The content analysis method is used to codify the selected contents of the annual reports into different categories (Guthrie & Abeysekera, 2006). Based on the methodology of previous studies (Rashid & Lodh, 2008; Barakat et al., 2015; Rashid, 2015; Isa & Muhammad, 2016; Omar et al., 2016), this study uses an index that considers selected aspects of information that companies disclose CSR in their reports.

The checklist has 48 items based on previous studies (Mohd Ghazali, 2007; Rashid & Lodh, 2008; Rouf, 2011; Barakat et al., 2015; Rashid, 2015). In this study, a pilot test was conducted on 35 companies to test the validity of the proposed checklist. Hence, the study modified the items in the checklist to confirm its relevance to Jordanian non-financial sectors (see Appendix). In addition, to ensure reliability, two independent research fellows were asked to perform the coding procedure according to Khan (2010). The CSR score is constructed based on an unweighted method which indicates that all information, regardless of its importance or relevance to any particular user group, is of equal value (Mohd Ghazali, 2007; Omar & Simon, 2011; Ahmed Haji, 2013; Barakat et al., 2015). A value of "1" was assigned if the item in the checklist was disclosed by the company, otherwise a value of "0" was assigned. In this study, the total score of the binary variables awarded to each company for the maximum number of checklist items is calculated to obtain the CSR reporting index ratio used by Sharif and Rashid (2014) as shown below:

$$CSRRI = \sum d_i^{48}/n_j \qquad (1)$$

where, *CSRRI* = CSR reporting index; n_j = total number of items for j^{th} companies, $n_j \leq 48$; d_i = equals 1, if items are included in the checklist, and 0 if otherwise.

3.2.2. Independent variables

The independent variables in this study are board size (*BDSIZE*), the presence of an audit committee on the BoD (*AC*), and CEO duality (*CEOD*). According to previous studies, board size is determined by the total number of board members (Ahmed Haji, 2013; Barakat et al., 2015). The presence of an audit committee is a dichotomous variable equal to "1" if an audit committee exists (Khan et al., 2013; Barakat et al., 2015). According to Khan et al. (2013), Habbash (2016), and Liao et al. (2016), CEO duality is a dummy variable equal to "1" if there is CEO duality and "0" otherwise.

This study examines company characteristics as control variables that may affect the level of CSR disclosure, such as company size, company age, and liquidity. This is consistent with previous studies on corporate governance and CSR reporting (Rashid & Lodh, 2008; Oh et al., 2011; Ahmed Haji, 2013; Barakat et al., 2015; Rashid, 2015; Habbash, 2016; Ibrahim & Hanefah, 2016). According to Khan et al. (2013), Barakat et al. (2015), and Habbash (2016), company size is measured as the natural logarithm of total assets. Larger companies are more in the public eye than smaller companies. Such companies seek to satisfy stakeholder interests by disclosing more CSR information (Khan et al., 2013; Barakat et al., 2015).

Companies that have been in business for a long time may disclose more CSR reports to maintain the trust and confidence of stakeholder groups and the general public than new companies (Habbash, 2016). The age of a company is measured by the total number of years since its establishment (Rashid & Lodh, 2008; Oh et al., 2011). Companies with high liquidity have a fund to invest in CSR activities and disclose more information in annual reports to respond to stakeholder demands and expectations (Rashid, 2015). This study measures liquidity as the ratio of current assets to current liabilities of a company (Rashid, 2015).

3.2.3. Model

We use longitudinal (panel) data to examine the impact of corporate governance factors on the level of CSR reporting. This study used a multiple regression model as part of the analysis.

$$CSRRI = \beta_0 + \beta_1 BDSIZE + \beta_2 AC + \beta_3 CEOD + \beta_4 SIZE + \beta_5 AGE + \beta_6 LIQ + \varepsilon \qquad (2)$$

where, *CSRRI* is a CSR reporting index; *BDSIZE* is a board size; *AC* is an audit committee presence; *CEOD* is a CEO duality; *SIZE* is a company size; *AGE* is a company age; *LIQ* is company liquidity; β is a beta coefficient; ε is an error term.

Special attention was paid to the compliance of the given regression equation with the criteria (assumptions) of statistical analysis such as normality, linearity, and homoscedasticity (Khan et al., 2013; Rashid, 2015; Habbash, 2016; Rao & Tilt, 2016b). The normality assumption means that the observational data in the study should be normally distributed. Pallant (2007) argued that if the study has large observations and more than 30, this assumption is relatively irrelevant. However, in this study, the residuals/histogram normality test was used to check the "bell shape" of the data. The result indicates that a bell-shaped curve shape meets the assumption of normality.

To test the correlation coefficients between sets of variables, correlation statistical analysis such as the variance inflation factor (VIF) test was performed to diagnose the problem of multicollinearity (Weisberg, 2005). When a significant correlation is found between the independent variables, it indicates a multicollinearity problem. If the VIF value is greater than 10, it indicates a multicollinearity problem (Gujarati, 2003). Therefore, highly correlated variables should be removed from the analysis. However, in this study, the highest VIF value of the independent variables is 1.45. Thus, this result confirms that multicollinearity is not a problem and is consistent with the assumption of no collinearity.

Scatter plots of residuals versus predicted value, chi-square, Breusch-Pagan and corresponding *p*-values were used to test the heteroscedasticity assumption. The heteroscedasticity assumption means that the error term represents the variance between the independent variable values. The results indicate that heteroscedasticity is present in the data. The standard error of White's (1980) method was used to correct for the heteroscedasticity problem and, therefore, met the homoscedasticity assumption.

4. RESULTS AND DISCUSSION

4.1. Descriptive statistics

Table 3 shows descriptive statistics The level of CSR reporting in Jordanian public companies is 39.1% on average. This result indicates that the level of CSR reporting has increased compared to previous studies of Jordanian companies (Suwaidan et al., 2004; Ismail & Ibrahim, 2008; Al-Hamadeen & Badran, 2014; Ibrahim & Hanefah, 2016).

The findings revealed that the minimum and maximum number of directors on the BoD ranged from 3 to 13 members, and the average was 8.4%. This suggests that the number of members on the board is in the range of corporate governance requirements. This study finds that 34.2% of the companies do not have an audit committee on the BoD. The presence of an audit committee among non-financial Jordanian public listed companies is a reasonable average of 65.8%. This average indicates good compliance with the corporate governance practices in these companies.

The role of CEO duality on the BoD in Jordanian public listed companies is found with an average of 21.1%. This average generally is low as compared to the previous studies such as 24% in Bangladesh (Khan et al., 2013) and 80% in Saudi Arabia (Habbash, 2016). This finding may indicate awareness of the Jordanian companies toward corporate governance requirements. In general, company size, company age, and company liquidity are found with an average of 16.9%, 22.3%, and 3.85%, respectively.

Table 3. Descriptive statistics

Variables	*N*	*Mean*	*Median*	*Std. deviation*	*Minimum*	*Maximum*
Independent variable						
CSRRI	800	0.391	0.396	0.177	0.875	1.000
Dependent variables						
BDSIZE	800	8.430	9.000	2.245	3.000	13.000
AC	800	0.658	1.000	0.475	0.000	1.000
CEOD	800	0.211	0.000	0.408	0.000	1.000
Control variables						
SIZE	800	16.970	17.000	1.298	13.000	21.000
AGE	800	22.325	18.000	14.770	1.000	64.000
LIQ	800	3.854	1.625	35.072	0.000	990.120

4.2. Correlation analysis

Table 4 reports the correlations between the independent variables used in the study. The result suggests that there are no significant problems of collinearity in the data as mentioned earlier. In addition, the correlation coefficients between the independent variables range from -0.04 to 0.392. In this respect, the correlation does not exceed 0.80 and is still below the level normally deemed excessive (Gujarati, 2003).

Table 4. Correlation matrix

	Variables	*1*	*2*	*3*	*4*	*5*	*6*	*VIF*
1	*BDSIZE*	1.00						1.06
2	*AC*	0.03	1.00					1.34
3	*CEOD*	0.04	-0.078*	1.00				1.11
4	*SIZE*	0.392**	0.06	0.02	1.00			1.45
5	*AGE*	0.099**	0.01	-0.090*	0.162**	1.00		1.03
6	*LIQ*	-0.02	0.02	-0.089*	-0.135**	-0.04	1.00	1.04

*Note: ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).*

4.3. Additional descriptive test on pre- and post-2009 data

The study data is divided into two groups, such as before and after the issuance of JCGC in 2009, to assess the impact of the code practice on the level of CSR reporting. JCGC was introduced in 2009 and required companies to report social and environmental information in their annual reports according to the "comply or explain" approach.

The average CSR reporting index before and after 2009 is shown in Table 5. The CSR reporting rate among Jordanian public-listed companies averages 37% before 2009. This percentage improved to 40% after 2009. The t-test of the mean differences between before and after 2009 is also shown in Table 5. The t-test result shows that the mean differences of *CSRRI* are statistically significant. This finding may suggest that ASE-listed companies tend to satisfy society and stakeholder group expectations to legitimatize their action. These companies may have adopted CSR reporting as a legitimation strategy to influence the external perception of their operations and to reassure the public of their legitimacy.

Table 5. Means differences between the before and after 2009 data

Dependent variable	*Pre-2009 mean*	*Post-2009 mean*	*t-test for equality of means*		
			t	*Mean difference*	*Std. error difference*
CSRRI	0.370	0.400	2.299**	0.03	0.013
Observations	240	560			

*Note: The t-test is presented in the parentheses. ** $p < 0.05$.*

4.4. Model analysis

The regression coefficient of the relationship between board independence and CSR reporting is shown in Table 6 of Model 1. The adjusted R-squared value shows that 31% of the variation in the level of CSR reporting can be explained by the corporate governance variables.

The regression coefficient indicates that the board size is significantly positively related to the level of CSR reporting. This suggests that companies with a large board tend to reduce the legitimacy gap and balance the interest of stakeholder groups, including the public at large. This finding is consistent with the results of previous studies on CSR reporting and supports the research hypothesis *H1* (Ahmed Haji, 2013; Barakat et al., 2015; Majeed et al., 2015).

The presence of an audit committee on the BoD has a significant positive effect on the level of CSR reporting. This result indicates that Jordanian companies are aware of the need to communicate their legitimacy to the public. This finding is consistent with the results of previous studies on CSR reporting and supports the research hypothesis *H2* (Said et al., 2009; Khan et al., 2013; Barakat et al., 2015). CEO duality was found to be negatively related to the level of CSR reporting with CEO duality on the board not paying much attention to the level of CSR reporting and stakeholder group expectations (Said et al., 2009; Khan et al., 2013). This type of directors can also easily access information and hence are less concerned about providing more CSR information since the perceived threat is minimal. However, this relationship is not significant, so hypothesis *H3* is not supported. This finding is consistent with the results of Said et al. (2009), Khan et al. (2013), and Ahmad et al. (2017c), who did not find a significant association.

Examining the control variables, the study notes that company size, age, and company liquidity are significantly positive with a level of CSR reporting. In general, larger companies tend to align the interests of stakeholder groups and disclose more CSR information than smaller companies (Dissanayake et al., 2019). This finding is consistent with Oh et al. (2011), Ahmed Haji (2013), Barakat et al. (2015), and Habbash (2016). Companies that have been in business for a long time disclose more CSR reporting. This type of company tends to balance the interests of the stakeholder group and satisfy their expectation more than less established companies (Habbash, 2016). Companies with high liquidity tend to satisfy stakeholder groups in general (Rashid, 2015).

Table 6. Regression analysis

Variables	*OLS Model 1 (Before controlling for industry type)*	*OLS Model 2 (After controlling for industry type)*	*2SLS Model 3 (After controlling for industry type)*
Intercept	-0.425 (-6.688)***	-0.479 (-7.700)***	-0.498 (-8.139)***
Independent variables			
BDSIZE	0.011 (4.575)***	0.012 (4.970)***	0.011 (4.750)***
AC	0.066 (6.275)***	0.064 (6.019)***	0.051 (4.764)***
CEOD	-0.018 (-1.481)	-0.011 (-0.923)	-0.016 (-1.363)
Control variables			
SIZE	0.034 (8.051)***	0.040 (9.111)***	0.043 (9.946)***
AGE	0.004 (11.677)***	0.003 (8.173)***	0.003 (8.024)***
LIQ	0.000 (0.630)	0.000 (0.688)	0.000 (0.452)
Industry dummy	No	Yes	Yes
F-statistic	61.78	67.59	64.09
Adjusted R-squared	0.313	0.368	0.356
Observations	800	800	720

*Note: The t-test is presented in the parentheses. *** $p < 0.001$.*

4.5. Robustness tests

Ahmad et al. (2017a) argue that industrial types may have different impacts on the level of CSR reporting. Block and Wagner (2014) also argue that CSR reporting is an industrial-specific variable. Therefore, the study included an industry-type dummy variable equal to "1" for service sectors and "0" for manufacturing sectors as a control variable. The result reveals that there is no significant change as shown in Table 6 of Model 2.

The results of the study are robust in the sense that balanced panel data is used, hence there is no unobserved heterogeneity. However, this study used a lagged structure to test the endogeneity issue. This was done by lagging the independent variables as instrumental variables for one year in a two-stage least square (2SLS) model. The results in Table 6 of Model 3 indicate that there is no endogenous relationship between the level of CSR reporting and the independent variables, hence supporting the findings of Model 1.

4.6. Regression analysis on pre- and post-2009 data

This study has regressed the model equation again by using pre-2009 (2006–2008) and post-2009 (2009–2015) data as shown in Table 7. The results indicate that the effect of board size on CSR reporting level was marginally positive before 2009, and this relationship became significant and positive after 2009. The effect of the audit committee on CSR reporting level changed from significant at 5% before 2009 to significant at 1% after 2009. This finding suggests that board members' effectiveness, roles, and awareness on the board have improved CSR reporting to enhance company legitimacy since 2009. Another possible explanation is that these board members, by seeking to motivate and encourage management to promote more CSR information, effectively seek to legitimise their role and effectiveness as board members. The results of the study also indicate that there is no significant change in the relationship between CEO duality and CSR reporting, which confirms the result of Model 1.

Table 7. Regression analysis of pre- and post-2009

Variables	*OLS Model 4 (Pre-2009)*	*OLS Model 5 (Post-2009)*
Intercept	-0.261 (-2.256)**	-0.557 (-7.806) ***
Independent variables		
BDSIZE	0.004 (1.063)	0.015 (5.384)***
AC	0.041 (2.107)**	0.080 (6.244)***
CEOD	0.017 (0.829)	-0.021 (-1.394)
Control variables		
SIZE	0.031 (3.828)***	0.043 (8.283)***
AGE	0.002 (3.908)***	0.003 (7.017)***
LIQ	0.003 (1.465)	-0.000 (-0.440)
Industry dummy	Yes	Yes
F-statistic	13.527	56.87
Adjusted R-squared	0.268	0.411
Observations	240	560

*Note: The t-test is presented in the parentheses. ** $p < 0.05$, *** $p < 0.001$.*

5. CONCLUSION

This study examined the impact of board size, audit committee presence, and CEO duality on the level of CSR reporting in Jordan. In general, large boards may increase the board's power to encourage management to report on CSR to enhance the legitimacy of the company. The presence of an audit committee on the board influences decision-making by monitoring and tracking the disclosure process in companies (Khan et al., 2013). The role of CEO duality has less attention to CSR reporting levels. This suggests that the chairman and CEO may consider investing in CSR activities that reduce their personal interest (Khan et al., 2013; Liao et al., 2016). Therefore, due to the concentration of power of this duality, they can easily access the information and then be less concerned about additional CSR reporting beyond the mandatory requirements (Ahmad et al., 2017c).

In addition, the study has captured the effect before and after the issuance of the corporate governance code in 2009. The study results suggest that the level of CSR reporting has significantly improved among Jordanian public companies since issuing the corporate governance code in 2009. This finding suggests that these companies may have adopted CSR reporting as a legitimation strategy to influence the external perception of their operations and to reassure the public of their legitimacy.

This study makes several important contributions to the existing literature on corporate governance and CSR reporting in several ways:

- First, the results indicate that board size and the presence of an audit committee are important corporate governance factors that influence the level of CSR reporting.
- Second, this study has provided an evaluation of the JCGC from a CSR reporting perspective.
- Third, the study findings contribute to the literature on CSR governance and reporting in the Middle East and developing countries by using a legitimacy theory approach.
- Fourth, this study can be considered as one of the few empirical studies that assessed the level of CSR reporting before and after the issuance of a corporate governance code in developing countries.
- Fifth, this study provides significant information for policymakers to continue to improve corporate governance best practices in the companies and develop greater awareness of companies CSR reporting biases associated with CEO duality.

Finally, establishing guidelines for a CSR reporting framework to be disclosed in the annual reports or other channels of reporting may help companies legitimise their action and attract new investors.

This study has limitations and provides suggestions for new research on corporate governance and CSR reporting. First, this study examined limited factors that affect the level of CSR reporting. Corporate governance has many elements such as ownership structure, board independence and board diversity that may affect the level of CSR reporting and further studies may try to explore this. Second, CSR data were measured in this study based on the disclosures in the company's annual reports. Further studies may seek other channels of reporting such as stand-alone reports, company websites, or any publicly available information. Finally, this study examined the corporate governance factors of non-financial sectors. Further research may explore the corporate governance factors of financial companies that may have a different impact on the level of CSR reporting.

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APPENDIX. CSR DISCLOSURES CHECKLIST

Community involvement reporting
Information on charitable donations for the public
Information on support for public education
Information on support for public health
Information on support for the culture
Information on sponsoring recreational activities
Information on donations to the public for making gardens
Information on support to the local population
Information on the establishment of educational institutions
Information on support for the social welfare system
Information on the establishment of the medical centre
Information on supporting or conducting educational conferences
Environmental reporting
Information on environmental controlling system
Information on the company's policies for the environment
Information on the protection of natural resources
Information on the effluent treatment system
Information on preventing waste
Information on the water discharge of the company's operations
Information on the air emission control of the company's operations
Information on observation of pollution in the process of business operations
Information on solid waste disposal of the company's operations
ISO/26000/9001/22000/14001
Information on anti-litter campaign
Information on making the country green (e.g. planting of trees)
Information on initiatives to reduce carbon or green gas emissions
Providing environmental management services to other company's projects
Support the public or private action designed to protect the environment
Participation in environmental institutions (e.g. industry committees)
Marketplace reporting
Information on the quality of the product
Information on the safety of the product
Information on the development of the product
Information on research plans to develop its product
Information on disclosing safety practices to consumer
Information on customer service improvement
Information on complaints and consumer satisfaction
Workplace reporting
Information on the number of employees
Information on health care for employees
Information on employee training
Information on employees' welfare
Information on employees' salary
Information on employee appreciation such as the pensions programme
Information on the relationship between employee management and employee satisfaction
Information on hazards in the work environment
Information on compliance with safety and health standards in the workplace
Information on the percentage or number of minorities in the workforce such as female directors
Information on employee morale
Information on sponsoring educational conferences
Information on the company's future
Information on job opportunities

Note: Adopted from Haniffa and Cooke (2005), Mohd Ghazali (2007), Rashid and Lodh (2008), Rouf (2011), Bayoud et al. (2012), Rashid (2015), Barakat et al. (2015), Ibrahim and Hanefah (2016), and Ahmad et al. (2017a).

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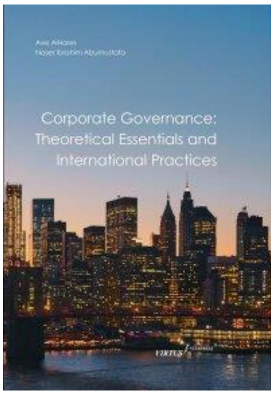

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Synopsis: The textbook "Corporate Governance: Theoretical Essentials and International Practices" includes a number of contemporary illustrations and case studies and provides students with questions for reflection and discussion at the end of each chapter. It is designed specifically to accompany a one-semester module in corporate governance and is oriented toward undergraduates studying accounting and finance, business and management, as well as toward MBA (Master of Business Administration) and other postgraduate students taking modules with a corporate governance component. This textbook will be a useful guide for trustees on the many training courses that are being developed for them around the country, as well as for other professionals in the institutional investment community who require a reference text on corporate governance issues.

Innovation in Financial Restructuring: Focus on Signals. Processes and Tools

ISBN: 978-6-177309-10-8
Authors: Marco Tutino. Valerio Ranciaro

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Synopsis: The book “Innovation in Financial Restructuring: Focus on Signals. Processes and Tools” describes the financial restructuring activities. focusing on all the operational actions related to the process. It’s substantially divided into two parts. each containing two chapters. The first section refers to the explanation of the financial structure and arrives to define the signals and the costs of the financial distress. This part continues with an emphasis on the financial debt and. specifically. the financial documentation. the financial covenants and the inception of the NPL are discussed. The second part of the book deals with the financial restructuring process. identifying the different choices. the issues and the alternatives possible to go-ahead to do a restructuration. The last chapter is dedicated to an analysis of a restructuring process case study. that enables readers to better understand the reality of this difficult process but. if it is well managed. could be a successful process.

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