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Exploring the relationship between board characteristics and environmental disclosure: Empirical evidence for European firms

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Abstract

Research Question: Does the effect of selected board characteristics is contingent on the level of environmental disclosure by European firms.

Motivation: Sustainable development is based on a vision where the protection of the environment, social progress and economic efficiency are indispensable.

Idea: This research aims to investigate the effect of selected board characteristics on the level of environmental disclosure by European firms.

Data: This study used a sample of 220 European companies under the context of a new dataset, namely, DataStream ASSET database. Corporate environmental disclosure index (CEDI) is developed to measure the level of environmental information.

Tools: This index is calculated based on the CEDI-related items provided by DataStream ASSET4.

Findings: The multiple linear regression analyses were used to verify the effect of the board of directors' characteristics on the level of environmental disclosure. The results indicate that the board size and board independence have a statistically significant and positive impact on the level of environmental disclosure.

Contribution: The findings have important implications for different policymakers; It helps inform regulatory regulators of the importance of good corporate governance to lay the foundation for comprehensive environmental disclosure by establishing valuable relationships with different stakeholders.

Keywords: Environmental disclosure, board of directors, corporate governance, European companies.

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1. Introduction

Sustainable development is based on a vision where the protection of the environment, social progress and economic efficiency are indispensable. In the current context, all companies seek to achieve three ultimate objectives: economic prosperity, social equity and environmental sustainability. In this way, companies are no longer regarded as production and marketing units intended to achieve financial profiles, but rather as entities serving social progress as well as the welfare of all (Saida, 2009). Additionally, societal reporting is gradually becoming a tool used by companies to align themselves with the objectives of sustainable development. Thus, to improve the relationship between the company and the environment, several regulators have been established such as the New Economic Regulations (NRE) in France, the American Institute of Certified Public Accountants (AICPA) and the Canadian Institute of Chartered Accountants (CICA). Despite the existence of these organizations, some companies still do not fully disclose such information, and the quality of environmental disclosure varies greatly between companies in the same country or between companies in different countries.

In addition, the financial crisis, accounting and auditing scandals, have led to a growing demand for transparency about societal and environmental activities of firms. In this regard, environmental disclosure has become a tool that enables firms to communicate their environmental practices and activities for their stakeholders (Cormier *et al,* 2014). According to the European Commission (2011), the number of social reporting in the European Union has increased from 0 in 1992 to 4000 in 2010. Indeed, there has been a significant increase in research on corporate environmental disclosure practices in recent years. The relationship between corporate governance and firm performance is well established in several studies (Prabowo & Simpson, 2011; Coleman & Wu, 2020; Al-Matari, 2019), while there have been relatively few attempts to investigate the relationship between board composition and environmental disclosure in emerging market companies. While, little research has been done on continental European countries (Lakhal, 2005; Patelli & Prencipe, 2007). It is often argued that good corporate governance is associated with increased transparency and credible disclosure (Ajinkya *et al.,* 2005; Cormier *et al.,* 2010; Dunstan, 2008). This research focuses mainly on the determinants of environmental disclosure. Board characteristics is one of these key determinants. Although there has been an interest in the relationship between board composition and corporate social responsibility, less is known about how board composition affects corporate environmental disclosures (Ibrahim *et al.,* 2003).

The transparency decision-making and environmental disclosure has attracted increasing academic interest. Corporate environmental disclosure is the latest

novelty in the corporate reporting field. Integrated reporting is an extension to traditional annual reports. It is a tool capable of better representing the capacity of companies to create value over time.

Therefore, the current study focuses on the effect of corporate governance on the level of environmental disclosure. Specially, this paper empirically analyzed the effect of selected characteristics of the board of directors (board size, board independence, duality of the CEO and audit committee independence) on the level of environmental disclosure of selected most polluting sector of European countries. To achieve this objective, the study considered a total of 220 European companies under the context of a DataStream ASSET4 database for the year 2015.

The findings suggest that firms with larger boards are likely to disclosure more environmental information than firms with smaller boards. The results indicate that the board size and board independence have a statistically significant and positive impact on the level of environmental disclosure. On the other hand, for the rest of independent variables (duality and audit committee independence), the results indicate that these board characteristics are unrelated to the level of environmental disclosure.

The current study may contribute to two streams of literature, the disclosure literature and corporate governance literature. This study contributes to the existing literature by providing insights from countries with a developed economy and providing updated documentary and empirical evidence concerning the association between board characteristics and the level of environmental disclosure by European companies.

The paper is divided into five sections. After this introduction, Section 2 provides an overview of the previous related literature and introduces the hypotheses of the study. Section 3 outlines the data and methodology. Section 4 presents the empirical findings of the study. Finally, Section 5 discusses the conclusion, limitations and future research opportunities.

2. Literature review and hypotheses development

This study aims to investigate the relationship between selected board characteristics and the level of environmental disclosure of European companies.

2.1 Theoretical approach

To present the main reasons and usefulness of the environmental disclosure and corporate governance, we will appeal to the agency theory, the legitimacy theory and stakeholder theory. Agency theory provides a framework linking corporate

governance and sustainability disclosure (Driver & Thompson, 2002; Huse, 2003). Additionally, managers have more information about all company's activities and business compared to investors who depend on periodic reports (Hamza & Jarboui, 2017). Shareholders of the company most often answer about their agents because they do not have thorough financial knowledge (Ezhilarasi & Kabra, 2017). Thus, Watts and Zimmerman (1986) argue that transparency is one of the solutions to agency problems.

Environmental disclosure is an appropriate tool that reduces conflicts between shareholders and managers. Thus, environmental disclosure tends to reduce information asymmetries by providing credible communication to stakeholders. In this regard, communications policies related to environmental behavior can reduce these political costs while increasing the company's value in the financial market. Therefore, by disseminating social information, the company reduces the possibility of the public requesting greater control of its activities, and on the other hand, it also raises the argument to the government that it does not choose legislation.

Another important theory that explains the motivation of companies to disclose environmental information is legitimacy theory. This theory underlines that companies must respond in accordance with society's expectations. According to Deegan (2002), the theory of legitimacy has been used as the theoretical basis for environmental and social relationships, and this theory provides a foundation for understanding how managers could use information disclosure to benefit an organization. Additionally, firms trying to gain or keep their legitimacy are encouraged to use communication strategies to influence social perceptions (Cho & Patten, 2007). Furthermore, these authors suggest that organizations tend to use environmental reporting practice as a tool of legitimization. Social and environmental research are particularly inclined to use legitimacy theory to explain the behaviour of corporate management towards certain actions, such as disclosing certain social and environmental information as part of its business strategy (De Silva Lokuwaduge & Heenetigala, 2017).

Companies with major environmental issues often make high-level environmental disclosures in financial reports and in companies with high political visibility. These companies use disclosure as a legal tool when facing public pressure from the political environment. In this regard, the company will not release environmental information under the pressure of the legal environment, but release environmental information under the pressure of its cultural and political environment (Béatrice Boyer-Allirol, 2015).

For stakeholder theory, stakeholders expect that firms will inform them on their activities covering environment and product responsibility (Javaid *et al.*, 2016). Social disclosure is therefore seen as part of the dialogue between the company and its stakeholders (Gray *et al.,* 1995). Social disclosure is viewed as the result of a

strategy for dealing with stakeholder demands (Ullmann, 1985). This theory underlines that corporate social and environmental disclosure is viewed as a means by which stakeholders are managed to get support and approval for the organization's continued existence (Gray *et al.*, 1995). Stakeholder theory recognizes that there is a broad range of stakeholders who are interested in the environmental behaviour of companies and, consequently, demand information regarding the impact of their activities on the environment (Moneva & Llena, 2000).

2.2 Environmental disclosure and corporate governance

Prior studies in recent years have provided insights into the number of companies disclosing environment-related information. This section presents the relevant literature of the relationship between corporate governance and the level of environmental disclosure of developing countries.

Ienciu (2012) examined the relationship between the characteristics of corporate governance and the existence of environmental reporting for a sample of 64 companies listed on the Bucharest Stock Exchange using content analysis. The study analyzed four major corporate governance characteristics: board size, structure of the board, existence of the board committees and the practice of separation between Chief Executive Officer and Chairman of the board. The author founded that board independence and board size are factors that explain the level of environmental reporting within Romanian companies. The author founded also that the level of environmental reporting doesn't influence CEDI by the practice of separation between the Chief Executive Officer and the Chairman of the Board and the existence of board committees does not influence the level of environmental information reported by the companies. In the same vein, Michelon and Parbonetti (2012) investigated the impact of different characteristics of the board (board composition, structure, and CEO duality) on sustainability disclosure among US and European companies.

Results also revealed a weak evidence of the relationship between the presence of a CSR committee and the extent of sustainability disclosure. Other characteristics of the board (independent directors and CEO duality) were not associated with the extent of sustainability disclosures. Rao *et al.* (2012) investigated the relationship between environmental reporting and corporate governance attributes of Australian companies for 2008. They examined the annual reports of 100 Australian firms listed on the Australian Stock Exchange. The findings showed that there is a positive relationship between environmental reporting and proportion of independent and female directors on the board. Results also showed a positive relationship between the extent of environmental reporting and institutional investors and board size.

The relationship between corporate governance mechanisms and environmental reporting practices was tested by Yusoff *et al.* (2015) within Malaysian public-listed

companies. A content analysis has been conducted to gather relevant information from the annual reports of the 100 leading Malaysian public-listed companies covering a three-year period, from 2009 to 2011. The authors proved the presence of a positive association between board size and environmental reporting. Other corporate governance mechanisms, including (board independence, ownership concentration and female directorship) were not associated with the environmental reporting practices of companies. Akbas (2016) employs content analysis of annual reports to analyze the relationship between selected board characteristics and the extent of environmental disclosure in annual reports of 62 non-financial Turkish firms listed on the BIST-100 index at the end of 2011.The results indicated that firms with larger boards disclose more environmental information than firms with smaller boards. But board independence, board gender diversity and audit committee independence found to be unrelated to the extent of environmental disclosure.

Trireksani and Djajadikerta (2016) showed that there is a significant positive relationship between the board of director's size and the extent of environmental disclosure. The proportion of female directors on the board and the proportion of independent directors on the board were found to have no relationships with the extent of environmental disclosure made by listed mining companies in Indonesia.

Ezhilarasi and Kabra (2017) using content analysis, investigated the impact of corporate governance attributes (board size, chief executive officer duality, domestic institutional ownership and foreign institutional ownership) on the level of environmental disclosure of annual reports for a sample of 177 most polluting companies in India for a period of 6 years. Findings showed that foreign institutional ownership is positively and statistically related to the level of environmental disclosure. But board size, chief executive officer duality and domestic institutional ownership found to be unrelated to the level of environmental disclosure. Furthermore, Husted *et al.* (2018) examined the effect of board structure on Environmental, Social and Governance (ESG) disclosure in Latin America using a four-year panel collected for 2011, 2012, 2013, and 2014, the final sample consisted of 176 firms located in four countries from four Latin American countries (Brazil, Mexico, Colombia and Chile).

The following variables have been analyzed by the study: board size, women on the board, CEO duality, and independent directors. Empirically, the study used the Bloomberg ESG and Capital IQ databases to test hypotheses. The results indicated that board size and independent directors' impact ESG disclosure positively, but women on the board and CEO duality impact ESG disclosure negatively. In other words, Fernandes *et al.* (2018) analyzed the influence of the characteristics of boards of directors on the level of environmental information voluntarily disclosed by Brazilian companies for 2016. Findings showed that the number of independent board members is positively and statistically related to the level of environmental disclosure. Nevertheless, Findings also revealed no association between the level of

environmental disclosure and the size of the board, the presence of women on the board, educational level of board members, age of board members, and duality of the CEO.

Masud *et al.* (2018) investigated the effect of corporate governance elements on environmental sustainability reporting performance in South Asian countries. Used an ordinary least squares regression analysis, the authors founded that environmental sustainability reporting performance has a positive association with foreign and institutional ownership, board independence, and board size. Therefore, director share ownership significantly relates with environmental sustainability reporting performance. In contrast, results also revealed no association between environmental sustainability reporting performance and family ownership, female directorship, and CSR and environmental committees.

Shahab & Ye (2018) analyzed the impact of ownership structure and board characteristics on the ‘‘CSR disclosure score’’ for a longitudinal data of 1166 non-financial firms. Empirical results showed that state ownership and block ownership are negative predictors of the CSR disclosure, while institutional ownership, board size and board composition positively affect CSR disclosure. Results also revealed no association between CEO duality and CSR disclosure.

2.3 Board characteristics

2.3.1 Size of directors' board

The board size is an important mechanism of corporate governance; it may influence the level of corporate environmental disclosure (Ntim *et al.,* 2013). According to the agency's theory, a large number of directors can contribute to the effectiveness of their supervision, since large boards offer diversity in terms of expertise and more managerial oversight capacity (Larmou & Vafeas, 2010; Uwuigbe *et al.,* 2011). As a result, they are more likely to reduce managerial opportunism while valuing social and environmental responsibilities (Sun *et al.* 2010).

In addition, Elzahar and Hussainey (2012) argued that an increased directors' board size could lead to an improvement in the collective control and decision-making quality by using the diversity of knowledge and expertise provided by the board, which could have a positive influence on the level of corporate environmental disclosure. Similarly, Cormier *et al.* (2010) document that board size is negatively related to information asymmetry and, therefore, is positively related to voluntary disclosure. Additionally, Said *et al.* (2009) highlight that a positive relationship persists between board size and the corporate social responsibility index. Ghabayen *et al.* (2016), states that large boards can provide better advice to the CEO, so companies with larger boards are more likely to disclose more environmental

information. In this framework, Akbas (2016) found that firms with larger boards disclose more environmental information than firms with smaller boards. Buniamin *et al.* (2008) found that the more the number of board members, the lower the level of corporate environmental disclosure.

Nevertheless, Jensen (1993) found that larger Directors' board may lead to increased communication and coordination problems. Furthermore, Said *et al.* (2009) predict that ineffective coordination in communication and decision making will lead to poor quality of financial disclosure as the Board of Directors are unable to do their role efficiently. Consistent with these arguments, Raheja (2003) concludes that smaller boards will reduce agency conflict between managers and shareholders. Small-size boards are more effective in monitoring management actions (Lakhal, 2005). Some of the empirical studies found a non-significant relationship between board size of the board and the level of environmental information such as Fernandes *et al.* (2018); Ezhilarasi & Kabra (2017); Giannarakis (2014).

So, we have developed the following hypothesis:
H1: There is a relationship between the board size and the level of the environmental disclosure.

2.3.2 Independence of directors' board

Board independence is the most debated corporate governance issues discussed by corporations (Kathy Rao *et al.,* 2012). Therefore, the presence of independent directors in the board enhances the role of the board as a shareholder s' agent (Ghabayen *et al.,* 2016). Tamimi and Sebastianelli (2017) consider that a higher percentage of independent of Directors' board members improves the company's performance and therefore increases the level of disclosure of environmental information. Furthermore, it is expected that boards with more independent directors are more likely to ensure that a company discharges its social responsibility, including environmental responsibility (Kathy Rao *et al.,* 2012).

In this way, Ienciu (2012) states that a sufficient number of independent directors solve potential conflicts of interests between management of the company and stakeholders. Therefore, according to De Villiers *et al.* (2009), boards with more independent directors force managers to take decisions in favor of environmental activity. In this regard, the agency the theory and legitimacy theory indicates that independent directors are crucial for improving governance and decision making (Ghabayen *et al.,* 2016). Moreover, Fernandes *et al.* (2018) suggest that board independence can improve control of the administration and can ensure greater environmental disclosure. Consistent with these arguments, a higher proportion of independent board members should increase the effectiveness of the board in supervising and controlling management (John & Senbet, 1998; Cheng & Courtenay, 2006). Empirically, a large number of several studies on the level of environmental

disclosure found a positive association between independent directors and the level of environmental disclosures (Kathy Rao *et al.,* 2014; Habbash, 2016; Rupley, 2012; Ienciu, 2012; Javaid *et al.,* 2016; Fernandes *et al.,* 2018; Uwuigbe *et al.,* 2011).

On the other hand, Akba (2016), Trireksani and Djajadikerta (2016), Michelon and Parbonetti (2012), Yusoff *et al.* (2015), Buniamin *et al.* (2008) found no relationship between the number of independent board members and the level of environmental disclosure. Therefore, a positive relationship can be expected between board independence and the level of environmental disclosure. So, we propose to test the following hypothesis:
H2: There is a positive relationship between the proportion of independent directors on the board and the level of environmental disclosure.

2.3.3 Duality of the CEO

The duality of the CEO occurs when the same person is the CEO and the chairman of the board (Bear *et al.* 2010). According to the theory of agency, the two roles of CEO and chairman of the board should be separated in order to ensure the necessary checks and balances over management's performance (Fama & Jensen, 1983). The presence of a dual Chairman and CEO may constrain board independence (Michelon & Parbonetti, 2012) and affect its effectiveness as a governance mechanism (Adams *et al.* 2005). In this contest, having CEO duality could impact the effectiveness of board monitoring (Bear *et al.* 2010). So, the CEO will be able to control board meetings and select agendas and board members (Haniffa & Cooke, 2002). Indeed, the separation of the functions of the CEO and the chairman of the board ensures a high level of transparency, so reduce the asymmetry of information between management and stakeholders (Gul & Leung, 2004; Rupley *et al.,* 2011). In addition, Forker (1992) argues that the duality of the two functions can negatively affect the quality of disclosure.

In this way, the separation of the functions of the CEO and the chairman of the board could ensure a more objective monitoring, favoring the disclosure of certain information to the disadvantage of the company's management, such as environmental performance information (Ienciu, 2012). Nevertheless, companies with the CEO duality offer a strong power to a person, which may enable him to make decisions (Tsui & Gul, 2000) that, do not maximize the shareholder's wealth (Haniffa & Cooke, 2005) and will contribute to improving monitoring quality and reducing which could improve the quality of reporting (Said *et al.* 2009).

Forker (1992) and Gul & Leung (2004) found a negative relationship between CEO duality and the level of voluntary reporting. However, Fernandes *et al.* (2018); Shahab & Ye (2018); Buniamin (2018); Jizi (2017); Ezhilarasi & Kabra (2017) found a non-significant relationship between duality of the CEO and the level of environmental disclosure.

It is expected that the CEO duality negatively relates with the level of environmental disclosure and it is hypothesized that:
H3: There is a negative relationship between CEO duality and the level of environmental disclosure.

2.3.4 Audit committee independence

The composition of audit committees is an important factor that can affect the level of disclosure (Akhtaruddin *et al.,* 2009). In addition, audit committees can enhance the quality of information flow between managers and shareholders (Barako *et al.,* 2006). Audit committees are therefore expected to improve the credibility of the information disclosed (McMullen, 1996). Forker (1992) considered the audit committee as an effective monitoring mechanism to improve disclosure and reduce agency costs. In this regard, the agency's theory suggests that the establishment of an audit committee reduces information asymmetry, managerial opportunism and improves the quality of disclosure (Chung *et al.*, 2004). Therefore, the majority of the audit committee members must be non-executive directors (Akhtaruddin *et al.,* 2009). In this way, independence of audit committee chairman can influence the overall functioning of the audit committee (Ashfaq & Rui, 2019).

Consistent with this suggestion, the existence of an audit committee was significantly and positively related to the extent of voluntary disclosure (Ho & Wong, 2001; Akhtaruddin *et al.,* 2009). Similarly, Nelson *et al.* (2010) found that audit committee independence helps to improved disclosures by Australian listed companies.

In this framework, Said *et al.* (2009) found a positive relationship between the proportion of independent non-executive directors sit on the audit committee and the level of corporate social disclosure in Malaysian public listed companies. Moreover, in the context of Bangladesh, Khan *et al.,* (2013) and Rouf *et al.* (2011) found a positive association between presence of audit committees and the level of CSR disclosures.

Therefore, we propose to test the following hypothesis:
H4: There is a positive relationship between the proportion of independent directors on the audit committee and the level of environmental disclosure.

3. Research design

3.1 Sample selection and data collection

This study aims to investigate the effect of selected board characteristics on the level of environmental disclosure by European firms. The sample consists of all European industrial companies available on the DataStream ASSET4 database of the year 2015.

We have chosen the year 2015 because the accounting data under analysis could have been considered definitively reliable, considering the time that sometimes is necessary to validate all the accounting information, most of all from social and environmental points of view.

We selected industrial companies due to their high impact on the environment. Furthermore, the company belonged to an industrial sector has a clear interrelation with the environment (Moneva & Llena, 2000). We selected European companies because it is classified as a global region with a high degree of sustainability.

On the other hand, we eliminated all non-industrial companies because of their limited effect on the environment. We also exclude firms with missing data. After these eliminations, the final simple consists of 220 European companies. An international industry classification benchmark (ICB) founded by Dow Jones and FTSE in 2005, seems to be the most appropriate classification for European companies. Similarly, the sample firms' distribution by activity sector along with the observations' percentage, distribution are shown on (Table 1) below.

Governance data, environmental indicators and control variables are collected from the DataStream ASSET4 dataset, by Thomson Reuters, DataStream ASSET4 is the world's leading provider of ESG (environmental, social, governance) information. It started collecting environmental, social and governance information in 2002, and provides objective, relevant and systematic information from 3200 global firms.

Table 1: Breakdown of companies by country and industry

Panel A. Sample distribution by country

Country	Number of firms	Country	Number of firms
United Kingdom	52	Australia	7
Switzerland	21	Belgium	7
Germany	19	Netherlands	6
France	17	Greece	5
Sweden	15	Norway	5
Spain	14	Portugal	4
Finland	12	Turkey	4
Italy	10	Hungary	2
Poland	9	Ireland	2
Denmark	8	Czech Republic	1
Total: 220			

Panel B. Sample distribution by sector

Code ICB	Industry activity	Number of firms	Percentage of the sample
0500/0530	Oil & Gas Producers	35	14%
1700/1750	Industrial Metals & Mining	15	7%

2300/2350	Construction & Materials	45
2700/2720	General Industrials	13
2700/2730	Electronic & Electrical Equipment	17
2700/2750	Industrial Engineering	39
4500/4570	Pharmaceuticals & Biotechnology	36
7000/7530	Electricity	23
Total		**220**

Notes: Panel A provides the distributional properties of the full sample by country, and Panel B presents sample distribution by industry

3.2 Measures of the variables

3.2.1 Dependent variable

The level of European firms' environmental disclosure constitutes the dependent variable of the study. For the measure of the dependent variable, we calculate a corporate environmental disclosure index (CEDI), this index is calculated based on the CEDI -related items provided by the DataStream ASSET4 database. There is a total of 70 items regrouped into three dimensions; emission reduction (28 items), resource reduction (17 items), and product innovation (25 items). The CEDI is measured by dividing the sum of all CED items by total maximum possible number of CED items (Total 70 items). The CEDI has been adapted from the study by (Tan *et al.*, 2017a). The description and measurements of this index are represented in table 2.

Table 2: Description of Variables

Variables	Description and Measures
CEDI	(sum of all three dimension items for firm i) / (total maximum possible number of three dimension items) *(source: DataStream ASSET4, total 70 items)*
CED items*	
Emission reduction (ER)	(sum of all emission reduction items for firm i)/ (total maximum possible number of emission reduction items) *(source: DataStream ASSET4, total 28 items)*
Resource reduction (RR)	(sum of all resource reduction items for firm i at year t)/ (total maximum possible number of resource reduction items) *(source: DataStream ASSET4, total 17 items)*
Product innovation (PI)	(sum of all product innovation items for firm i)/ (total maximum possible number of product innovation items) (*source: DataStream ASSET4, total 25 items)*

*Items used for the measures of CEDI are directly adopted from study of Tan *et al.* (2017b)

3.2.2 Independent variables

The characteristics of the board of directors used were: size of board, independence of directors' board, the duality of the CEO and independence of audit committee. The data about these characteristics were collected from the DataStream database ASSET4. Table 3 represents the measurement of the independent variables of this study. The size of the board (BDSIZE) is measured by the number of effective board members. Board independence (BDINDEP) is measured by the percentage of the independent directors to the total number of directors on the board. The duality of the CEO (DUAL) is measured by a dummy variable (0,1) with 0 for companies that have duality of the CEO. Audit committee independence (COMIND) is measured by the percentage of independent directors of the total number of directors on the audit committee of companies.

Table 3: Description of Independent and control variables

Variables	Symbols	Measurement
Independent variables		
Board Size	BDSIZE	The number of effective board members.
Board Independence	BDINDEP	The percentage of the independent directors to the total number of directors on the board.
Duality of the CEO	DUAL	Dummy variable (0,1) with 0 for companies that have duality of the CEO.
Audit Committee independence	COMIND	The percentage of independent directors of the total number of directors on the audit committee of a companies.
Control variables		
Company Size	LOGSIZE	The natural logarithm of total assets of the company.
Profitability	PROF	The ratio of net profit after tax to total assets.
Executive Compensation	EXCOM	Dummy variable (0,1) with 1 if the company subdivide the remuneration of executives according to fixed salaries, bonuses and stock option plans.

Notes: This table reports the definitions of the variables used in our study.

3.2.3 Control variables

Previous literature arguments that company characteristics may affect the level of environmental disclosures (Ho & Taylor, 2007; Liu & Anbumozhi, 2009). In this study, three corporate characteristics are examined as control variables such as

company size, profitability and executive compensation. Company size (LOGSIZE) is measured as the natural logarithm of total assets of the company. Profitability (PROF) is measured as the ratio of net profit after tax to total assets. For executive compensation (EXCOM), Beatty & Zajac (1990), use a dichotomous measure of executive compensation (0,1) to indicate whether the stock option was used to compensate the manager. In this study, we employed total compensation, consisting of salary, bonus and stock option. Executive compensation is a dummy variable that take 1 if the company subdivide the remuneration of executives according to fixed salaries, bonuses and stock option plans and 0 otherwise.

3.3 Regression model

The below model is set to estimate relationships and examine the hypotheses.

$$CEDI_i = \beta_0 + \beta_1 BDSIZE_i + \beta_2 BDINDEP_i + \beta_3 DUAL_i + \beta_4 COMINP_i + \beta_5 LOGSIZE_i + \beta_6 PROF_i + \beta_7 EXCOM_i + \varepsilon_i$$

All the variables are defined previously in Table 3. ε is the error term, and the indices i represent the companies.

4. Empirical results

4.1 Description Statistics

Table 4 reports the descriptive statistics. The mean, median, standard deviation, minimum and maximum values. The mean value of the dependent variable of the study, the level of environmental disclosure index (CEDI) is 0.579. The maximum value of the dependent variable is 0.821, while the minimum of this variable is 0.306, indicating a small variation in the level of environmental disclosure practices among the sample companies. As far as the independent variables, Table 4 shows that the mean value of board size is about 11 members. In this way, the average number of the board of directors in Europe is about 12 (Albert-Roulhac & Breen, 2005), which is very good in terms of board efficiency.

On the other hand, we can see from Table 4 that only 36.6% of director's members are independent, this finding indicate that, over than 50% of firms don't have independent members on their boards. The average independence of the audit committee is 68%, which indicates that the majority of the members of directors on the audit committee are independent. Table 4 shows that most of the sampled firms (79 %) don't use the practice of separation between the Chairman of the Board and the CEO.

With regard to the control variables, table 4 shows that the mean value of company size is 15.667, so we can conclude that the sample consists of relatively large companies. Additionally, companies in the sample have an average PROF of 3.3%, with a range from -1.221 to 68.4%. Finally, the average of executive compensation is 57%, which indicates that sampled firms subdivided the remuneration of executives according to fixed salaries, bonuses and stock option plans.

Table 4: Description Statistics

Variable	Obs.	Mean	Std.Dev.	Min.	Max.	Skew.	Kurt.
CEDI	120	0.579	0.125	0.306	0.821	0.866	0.899
BDSIZE	120	10.61	3.66	3	25	0.273	-1.121
BDINDEP	120	0.366	0.286	0.023	0.944	-0.827	-0.784
DUAL	120	0.791	0.408	0	1	-1.441	0.076
COMIND	120	0.680	0.376	0	1	-0.561	3.872
LOGSIZE	120	15.667	2.039	4.71	22.06	-3.212	36.208
PROF	120	0.033	0.135	-1.221	0.684	-0.315	-1.918
EXCOM	120	0.577	0.495	0	1	-0.463	-0.672

Notes: This table reports descriptive statistics. Variables definitions are provided in Table 2.

4.2 Correlation matrix

Table 5 presents the Pearson correlation matrix among variables. Corporate environmental disclosure index (CEDI) is positively correlated with board size (BDSIZE) (p = 0.461) and board independence (BDINDEP) (p = 0.191). CEO duality is negatively correlated with CEDI (p= -0.165). On the other hand, Audit committee independence **(**COMIND) is insignificantly correlated with CEDI. For the control variables, CEDI is positively correlated with firm size (LOGSIZE) (p = 0.587) and profitability (PROF) (p = 0.143). However, executive compensation (EXCOM) is positive, but insignificantly correlated with CEDI.

In order to test whether relevant multicollinearity is affecting the results, we tested the Tolerance and the Variance Inflator Factor (VIF) and the Pearson correlation tests for the dependent and independent variables. Table 6 reveals that the tolerance level for all independent variables is more than 0.1 and the variance inflation factors (VIF) is less than 5. In our case, the lowest tolerance level scored 0.586 and the highest VIF was 1.707, so multicollinearity among the predictor variables is not a problem. Additionally, we used the correlation matrix to detect multicollinearity problems. Table 5 shows that the correlation coefficient between explanatory variables is below 0.8. In addition, the Pearson correlations between explanatory

variables range from 0.015 to 0.631; so, multicollinearity is not a problem for interpreting the regression results.

Table 5: Correlation matrix and VIF

Variables	CEDI	CEDI	BDINDEP	DUAL	COMIND	LOGSIZE	PROF	EXCOM
CEDI	1							
BDSIZE	0.461**	1						
BDINDEP	0.191**	-0.171*	1					
DUAL	-0.165*	-0.187*	-0.681	1				
COMIND	0.126	-0.167*	0.631*	-0.300	1			
LOGSIZE	0.587**	0.473**	-0.18	0.128	-0.410	1		
PROF	0.143*	0.550	0.129	-0.150	0.076	0.132*	1	
EXCOM	0.015	-0.119	0.078	0.126	0.100	-0.068	0.096	1
VIF	1.325	1.382	1.707	1.061	1.677	1.314	1.047	1.045

4.3 Regression results

Table 7 shows that the F-statistic is 25.366 (p=0.000) and this result supports that the estimated model is statistically significant, with an adjusted R2 measure 0.438, implying that the independent and control variables explain 43.8% of the variability of the level of environmental disclosure. As hypothesized, board size has a significant positive relationship (p=0.000) with the level of environmental disclosure. This indicates that the larger the number of board members, the higher the tendency for companies to report on the environment in the annual report. This result confirms the studies of (Rao *et al.,* 2012; Yusoff *et al.,* 2015; Akbas, 2016; Trireksani & Djajadikerta, 2016; Husted *et al.,* 2018; Masud *et al.,* 2018; Shahab & Ye, 2018; Buniamin *et al.,* 2008).

The variable board independence is found to be positively significant to support a positive association as predicted in H2. The results are consistent with the results of the studies conducted by Rao *et al.* (2014), Habbash (2016), Rupley (2012), Ienciu (2012), Javaid *et al.* (2016), Fernandes *et al.* (2018), Uwuigbe *et al.* (2011), Masud *et al.* (2018), Shahab and Ye (2018). Role duality displayed no significant association with the level of environmental disclosure. This result is consistent with the findings of Michelon and Parbonetti (2012), Buniamin (2008), Fernandes *et al.* (2018), Ezhilarasi and Kabra (2017), Khan *et al.* (2013), Ienciu (2012), who identify that there is no relationship between CEO duality and the level of environmental disclosure. The presence of independent directors on the audit committee is unrelated to the level of environmental disclosures of the sampled companies. These findings are in line with the results of the studies conducted by Bouaziz (2014).

For the control variables, we found positive and significant relationships between the level of environmental disclosure and company size (p=0.000). The results indicate that large companies produce a higher volume of environmental information. Indeed, the cost of producing information is lower for large than small companies (Fernandes *et al.* 2018). This result is consistent with the findings of Akbas (2016), Buniamin (2008), Fernandes *et al.* (2018), Ezhilarasi and Kabra (2017), Michelon and Parbonetti (2012) and Said *et al.* (2009). One the other hand, we found that there is no association between environmental disclosures and profitability of the company. The results are consistent with Ezhilarasi and Kabra (2017), Fernandes *et al.* (2018), Sun *et al.* (2010), Clarkson *et al.* (2011), Akbas (2016), Zeng *et al.* (2012). We found also that is no relationship between environmental disclosures and executive compensation. Previous research is in line with this result and suggests that executive compensation is not in line with a socially responsible philosophy (Miles & Miles, 2013).

Table 7: Regression results

Variables	Coefficient	t-Statistic	Probability
Intercept	-0.032	-0.009	0.993
BDSIZE	0.288***	4.838	0.000
BDINDEP	0.202***	3.056	0.003
DUAL	0.055	0.837	0.404
COMIND	-0.047	-0.892	0.373
LOGSIZE	0.451***	7.761	0.000
PROF	0.031	0.590	0.556
EXCOM	0.061	1.186	0.237
Statistics model	$R^2 = 0.456$ Adjusted $R^2 = 0.438$ F = 25.366 (Sig.= 0.000)		

Notes: This table presents results from linear regressions in our model. t-Statistics estimator are reported in parentheses. The asterisks *** and ** indicate significance at the 5% and 1% levels, respectively.

4.4 Further analysis

One source of bias is that sectors of the economy do not have the same environmental requirements and, therefore, this could influence the behavior of companies in terms of environmental transparency. To account for this source of bias, it is essential to re-estimate the initial model for each sector separately.

In this direction, regression results are presented after the division of the sample into sub-samples representing the different industries because the role of environmental disclosure may also vary by the environmental sensitivity of the industry. In three of the six industries, the p-value below 0.1 in terms of the relationship between board size and the level of environmental disclosure. The other three industries "Industrial Metals & Mining", "Pharmaceuticals & Biotechnology" and "Construction & Materials", p-value exceeded 0.1 between thesis variables.

Independence of board and the level of environmental disclosure is positive and significant in only Pharmaceuticals & Biotechnology industry. The same result is obtained for CEO duality, which is significant and negative for the firms operating in environmentally non-sensitive industries (companies belonging to polluting sectors).

The relationship between the presence of independent directors on the audit committee and the level of environmental disclosure is positive and significant in only two industries (p=0.06) in Electricity industry and (p=0.03) in Industrial Goods and Services industry. We found that there is no association between environmental disclosures and profitability of the company in tree industry and we found also that is no relationship between environmental disclosures and executive compensation in the majority of industry. In addition, these findings are in line with the results of regression results in table 7 and environmental disclosure remains positive and significant for environmentally sensitive industries more than non-sensitive-industries.

Table 8: regression analysis by sector

Variables	**ICB 7530** Electricity	**ICB 2700** Industrial Goods & Services	**ICB 0500** Oil & Gas	**ICB 1750** Industrial Metals & Mining	**ICB 4570** Pharmaceuticals & Biotechnology	**ICB 2350** Construction & Materials
Intercept						
Coefficient	-0.078	0.095	-0.127	0.098	-0.133	0.136
t-Statistic	-0.35	1.30	-0.91	0.18	-1.05	0.62
P-Value	0.730	0.198	0.373	0.866	0.979	0.539
BDSIZE						
Coefficient	0.007**	0.010***	0.014**	0.002	-0.0002	0.006
t-Statistic	2.36	2.84	2.42	0.19	-0.03	1.21
P-Value	0.032	0.006	0.024	0.855	0.979	0.234
BDINDEP						
Coefficient	0.070	0.055	0.088	0.165	0.2406***	0.064
t-Statistic	1.03	1.25	1.21	1.57	3.02	0.87

Variables	**ICB 7530** Electricity	**ICB 2700** Industrial Goods & Services	**ICB 0500** Oil & Gas	**ICB 1750** Industrial Metals & Mining	**ICB 4570** Pharmaceuticals & Biotechnology	**ICB 2350** Construction & Materials
P-Value	0.318	0.216	0.237	0.160	0.005	0.390
DUAL						
Coefficient	0.006	-0.016	0.03	-0.121	-0.0981***	-0.027
t-Statistic	0.20	-0.72	0.71	-0.86	-2.38	-0.70
P-Value	0.848	0.477	0.484	0.418	0.025	0.487
COMIND						
Coefficient	0.112**	0.076**	0.010	-0.092	-0.094	-0.016
t-Statistic	2.03	2.22	0.15	-0.82	-1.55	-0.33
P-Value	0.060	0.030	0.884	0.440	0.132	0.741
LOGSIZE						
Coefficient	0.0290***	0.021***	0.030***	0.036	0.041***	0.026*
t-Statistic	2.47	3.99	4.03	1.67	4.11	2.01
P-Value	0.026	0.000	0.001	0.139	0.000	0.052
PROF						
Coefficient	0.625**	-0.0756	0.419*	0.0581	-0.128*	-0.098
t-Statistic	2.04	-0.85	2.64	0.14	-1.75	-0.37
P-Value	0.060	0.398	0.015	0.896	0.092	0.713
EXCOM						
Coefficient	-0.027	0.012	0.013	0.006	0.073*	0.023
t-Statistic	-0.88	0.59	0.34	0.11	2.16	0.83
P-Value	0.394	0.55	0.738	0.919	0.039	0.410
Observations	23	69	31	15	36	46
R2	0.7874	0.5123	0.7329	0.5817	0.712	0.3879
Adjusted R2	0.6881	0.4563	0.652	0.1634	0.64	0.2752
Statistics F	7.93	9.15	9.02	1.39	9.90	3.44
Prob> F	0.000	0.000	0.000	0.337	0.000	0.006

*, **, *** denote significance at the 10, 5 and 1 percent levels, respectively

5. Conclusion

The objective of this article is to examine the link between board characteristics and environmental disclosure of a sample of companies from twenty European countries. The originality of this study lies mainly in the interaction between two fields of

research to explain the quality of financial information by the approach of the ethical behavior of companies. In this perspective, we proposed to mobilize models of legitimacy and theories of stakeholders and agency theories in the explanation of board characteristics in terms of environmental disclosure. Indeed, this study contributes to the existing literature on environmental disclosure by providing empirical results on the relationship between board characteristics, which is an important corporate governance mechanism, and the extent of environmental disclosure from a European country.

The results show that environmental disclosure is a common practice in most companies and is positively related to certain characteristics of the board. The results also support the argument that board characteristics play an important role in determining how companies alleviate agency problems and meet the needs and interests of various stakeholder groups.

The findings have important implications for different policymakers; It helps inform regulatory regulators of the importance of good corporate governance to lay the foundation for comprehensive environmental disclosure by establishing valuable relationships with different stakeholders. This study also provides valuable information to managers who wish to improve the effectiveness of the environmental message they send to different stakeholders, to investors who seek to promote the long-term financial value of their investments, to researchers who wish to participate constructively in research on disclosure. Companies' environmental information to identify underlying relationships, and environmentalists seeking innovative solutions to maintain sustainability and long-term well-being by integrating green concepts into other disciplines, including accounting.

The results of this study may be interpreted depending on several limitations. Firstly, this study considered data only for a one-year period of analysis. Thus, future research could use longitudinal data to investigate the impacts of board characteristics on the quality of environmental disclosure of European companies. Secondly, the second limitation relates to the fact that the manager’s profile is not taken into account in our research models.

It is interesting to recall that the manager occupies a central position in the financial and accounting policy of the company, especially in a context where the environmental, social, and governance (ESG) dimensions are the rules of the game. However, the failure to take into account the variables relating to the characteristics of the manager represents a major limitation of this work. Future research could henceforth be based on comparative studies between the Mediterranean countries and examine the impact of the governance structures of their companies on financial transparency in the context of companies belonging to the ESG index.

References

Ajinkya, B., Bhojraj, S. & Sengupta, P. (2005) "The association between outside directors, institutional investors, and the properties of management earnings forecasts", *Journal of Accounting Research*, vol. 3: 343-376.

Akbas, H. E. (2016) "The relationship between board characteristics and environmental disclosure: Evidence from Turkish listed companies", *South East European Journal of Economics and Business*, vol. 11, no. 2: 7-19.

Akhtaruddin, M., Hossain, M. A., Hossain, M. and Yao, L. (2009) "Corporate governance and voluntary disclosure in corporate annual reports of Malaysian listed firms", *Journal of Applied Management Accounting Research.* vol. 7, no. 1: 1-19.

Albert-Roulhac, C. & Breen, P. (2005) "Corporate governance in Europe: current status and future trends", *Journal of Business Strategy*, vol. 28, no. 6: 19-29

Barako, D.G., Hancock, P. and Izan, H.Y. (2006) "Factors influencing voluntary corporate disclosure by Kenyan companies", *Corporate Governance*, vol. 14, no. 2: 107125.

Bear, S., Rahman, N., & Post, C. (2010) "The impact of board diversity and gender composition on corporate social responsibility and firm reputation", Jo*urnal of Business Ethics*, vol. 97, no. 2), 207-221.

Beatty, R. P., & Zajac, E. J. (1990) "Top management incentives, monitoring, an risk-bearing: a study of executive compensation, ownership, and board structure in initial public offerings", *In Academy of Management Proceedings,* vol. 1990, no. 1: 7-11.

Bouaziz, M. Z. (2014) "Corporate governance and voluntary financial disclosure by Canadian listed firms", *Management Review: An International Journal,* vol. 9, no. 1: 44-69.

Buniamin, S., Alrazi, B., Johari, N. H., & Rahman, N. R. A. (2008) "An investigation of the association between corporate governance and environmental reporting in Malaysia", *Asian Journal of Business and Accounting*, vol. 1, no. 2: 65-99.

Cheng, E. C. & Courtenay, S. M. (2006) "Board composition, regulatory regime and voluntary disclosure", *The International Journal of Accounting,* vol. 41, no. 3: 262-289.

Cho, C. H., & Patten, D. M. (2007) "The role of environmental disclosures as tools of legitimacy: A research note", *Accounting, organizations and society*, vol. 32, no. 7-8), 639-647.

Chung, R., Ho, S. and Kim, J.-B. (2004) "Ownership structure and the pricing of discretionary accruals in Japan", *Journal of International Accounting, Auditing and Taxation,* vol. 13: pp. 13-20.

Clarkson, P. M., Overell, M. B. and Chapple, L. (2011) "Environmental reporting and its relation to corporate environmental performance", *Abacus*, vol. 4, no. 1: 27-60.

Miles, P. C., & Miles, G. (2013) "Corporate social responsibility and executive compensation: Exploring the link. *Social Responsibility Journal*, vol. 9: 76-90.

Cormier, D., Lapointe-Antunes, P. & Magnan, M. (2014) "Does corporate governance enhance the appreciation of mandatory environmental disclosure by financial markets?", *Journal of Management & Governance,* vol. 19, no. 4: 897-925.

Cormier, D., Ledoux, M. J., Magnan, M., & Aerts, W. (2010) "Corporate governance and information asymmetry between managers and investors", *Corporate Governance: The international journal of business in society*, vol. 10, no. 5), 574-589.

Deegan C. (2002) "Introduction: the legitimising effect of social and environmental disclosures – a theoretical foundation", *Accounting, Auditing and Accountability Journal,* vol. 15, no. 3: 282-311.

Deegan C. (2014) "An overview of legitimacy theory as applied within the social and environmental accounting literature", In Sustainability Accounting and Accountability, Bebbington J, Unerman J, O'Dwyer B (eds). *Routledge: New York, United States*; 248-272.

Driver, C., and G. Thompson, (2002) "Corporate governance and democracy: the stakeholder debate revisited", *Journal of Management and Governance*, vol. 6(2), 111-130.

Dunstan, K. L. (2008) "The case for the use of international reporting standards in New Zealand: A briefing paper prepared on behalf of the New Zealand securities commission", *Available at SSRN* 1281656.

Elzahar, H. and Hussainey, K. (2012) "Determinants of narrative risk disclosures in UK interim reports", *The Journal of Risk Finance,* vol. 13, no. 2: 133-147.

Ezhilarasi, G., & Kabra, K. C. (2017) "The Impact of Corporate Governance Attributes on Environmental Disclosures: Evidence from India", *Indian Journal of Corporate Governance,* 10, no. 2), 24-43.

Fama, E.F. and Jensen, M.C. (1983) "Separation of ownership and control", *Journal of Law and Economics,* vol. 26, no. 2: 301-325.

Fernandes, S. M., Bornia, A. C., & Nakamura, L. R. (2018) "The influence of boards of directors on environmental disclosure", *Management Decision*.

Forker, J.J. (1992) "Corporate governance and disclosure quality", *Accounting and Business Research,* vol. 22, no. 21, pp. 111-124.

Ghabayen, M.A., Mohamad, N.R. and Ahmad, N. (2016) "Board characteristics and corporate social responsibility disclosure in the Jordanian banks", *Corporate Board: Role, Duties and Composition,* vol. 12, no. 1, pp. 84-99.

Giannarakis, G. (2014) "Corporate governance and financial characteristic effects on the extent of corporate social responsibility disclosure", *Social Responsibility Journal,* vol. 10, no. 4), 569-590.

Gisbert, A., & Navallas, B. (2013) "The association between voluntary disclosure and corporate governance in the presence of severe agency conflicts", *Advances in Accounting,* vol. 29, no. 2), 286-298.

Gray R, Kouhy R, Lavers S. (1995) "Corporate social and environmental reporting a review of the literature and a longitudinal study of UK disclosure", *Accounting, Auditing and Accountability Journal,* vol. 8, no. 2: 47-77.

Gray, R. (2000) "Current developments and trends in social and environmental auditing, reporting and attestation: a review and comment", *International Journal of Auditing*, vol. 4, no. 3: 247-268.

Gul, F.A. and Leung, S. (2004) "Board leadership, outside directors' expertise and voluntary corporate disclosures", *Journal of Accounting and Public Policy*, vol. 23, no. 5, pp. 351-379.

Hamza, S., & Jarboui, A. (2017) "Corporate social responsibility and earnings management within the managerial psychological context", *International Journal of Auditing Technology,* vol. 3, no. 4), 269-281.

Haniffa, R. M., & Cooke, T. E. (2005) "The impact of culture and governance on corporate social reporting", *Journal of Accounting and Public Policy,* 24, no. 5), 391-430.

Haniffa, R.M. and Cooke, T.E. (2002) "Culture, corporate governance and disclosure in Malaysian corporations", *Abacus*, vol. 38, no. 3: 317-348.

Ho, C.A. & Williams, S.M. (2003) "International comparative analysis of the association between board structure and the efficiency of value added by a firm from its physical capital and intellectual capital resources", *The International Journal of Accounting*, vol. 38, no. 4: 465-491

Ho, L. J. and Taylor, M.E. (2007) "An empirical analysis of triple bottom-line reporting and its determinants: Evidence from the United States and Japan", *Journal of International Financial Management and Accounting,* vol. 18, no. 2: 123-150.

Huse, M., (2003) "Renewing management and governance: new paradigms of governance?", *Journal of Management and Governance,* vol. 7, no. 3: 211-221.

Husted, B. W., & de Sousa-Filho, J. M. (2018) "Board structure and environmental, social, and governance disclosure in Latin America", *Journal of Business Research*.

Ienciu, I. A. (2012) "The relationship between environmental reporting and corporate governance characteristics of Romanian listed entities", J*ournal of Accounting and Management Information Systems*, vol. 11, no. 2: 267-294.

Javaid Lone, E., Ali, A., & Khan, I. (2016) "Corporate governance and corporate social responsibility disclosure: Evidence from Pakistan", *Corporate Governance: The international journal of business in society*, vol. 16, no. 5), 785-797.

Jensen, M. (1993) "The modern industrial revolution, exit, and the failure of internal control systems'', *Journal of Finance*, vol. 48, pp. 831-80.

Jizi, M. (2017) "The influence of board composition on sustainable development disclosure", *Business Strategy and the Environment*, vol. 26, no. 5), 640-655.

John, K. & Senbet, L. W. (1998) "Corporate governance and board effectiveness", *Journal of Banking & Finance,* vol. 22, no. 4: 371-403.

Joseph, G. (2007) "Implications of a stakeholder view on corporate reporting", *Accounting and the Public Interest*, vol. 7: 50-65.

Kathy Rao, K., Tilt, C. A., & Lester, L. H. (2012) "Corporate governance and environmental reporting: an Australian study", *Corporate Governance: The international journal of business in society,* vol. 12, no. 2: 143-163.

Khan, A., Muttakin, M. B., & Siddiqui, J. (2013) "Corporate governance and corporate social responsibility disclosures: Evidence from an emerging economy", *Journal of business ethics*, vol. 114, no. 2: 207-223.

Khurram Ashfaq, Zhang Rui, (2018) "Revisiting the relationship between corporate governance and corporate social and environmental disclosure practices in Pakistan", *Social Responsibility Journal*

Lakhal, F. (2005) "Voluntary earnings disclosures and corporate governance: Evidence from France", *Review of Accounting and Finance*, vol. 4, no. 3: 64-85.

Larmou, S. and Vafeas, N. (2010) "The relation between board size and firm performance in firms with a history of poor operating performance", *Journal of Management & Governance* vol. 14, no. 1: 61-85.

Lim, S., Matolcsy, Z. and Chow, D. (2007) "The association between board composition and different types of voluntary disclosure", *European Accounting Review*, vol. 16, no. 3: 555-583.

Liu, X. and Anbumozhi, V. (2009) "Determinant factors of corporate environmental information disclosure: an empirical study of Chinese listed companies", *Journal of Cleaner Production*. vol. 17, no. 6: 593-600.

Lokuwaduge, C. S. D. S., & Heenetigala, K. (2017) "Integrating environmental, social and governance (ESG) disclosure for a sustainable development: an Australian study", *Business Strategy and the Environment*, vol. 26, no. 4: 438-450.

Masud, M. A. K., Nurunnabi, M., & Bae, S. M. (2018) "The effects of corporate governance on environmental sustainability reporting: Empirical evidence from South Asian countries", *Asian Journal of Sustainability and Social Responsibility*, vol. 3, no. 1, 3.

McMullen, D. A., & Raghunandan, K. (1996) "Enhancing audit committee effectiveness", *Journal of Accountancy*, vol. 182, no. 2: 79.

Michelon G., Parbonetti A., (2012) "The effect of corporate governance on sustainability disclosure", *Journal of Management and Governance*, vol. 16, no. 3: pp. 477-509

Moneva, J. M., & Llena, F. (2000) "Environmental disclosures in the annual reports of large companies in Spain", *European Accounting Review*, vol. 9, no. 1: 7-29.

Nelson, J., Gallery, G. & Percy, M. (2010) "Role of corporate governance in mitigating the selective disclosure of executive stock option information", *Accounting and Finance,* vol. 50, no. 3: 685-717.

Ntim, C. G., Lindop, S. & Thomas, D. A. (2013) "Corporate governance and risk reporting in South Africa: A study of corporate risk disclosures in the pre-and post-2007/2008 global financial crisis periods", *International Review of Financial Analysis* vol. 30: 363-383.

Patelli, L. & Prencipe, A. (2007) "The relationship between voluntary disclosure and independent directors in the presence of a dominant shareholder", *European Accounting Review*, vol. 16, no. 1: 5-33.

Raheja, C. (2003) ''The interaction of insiders and outsiders in monitoring: a theory of corporate boards'', working paper, Vanderbilt University, available at: http://tkyd.org/../board structure and_agency_costs_ameziane_lesfer_2002.pdf (accessed May 2005).

Rupley, K. H., Brown, D. & Marshall, R. S. (2012) "Governance, media and the quality of environmental disclosure", *Journal of Accounting and Public Policy* vol. 31, no. 6: 610-640.

Said, R., Hj Zainuddin, Y. & Haron, H. (2009) "The relationship between corporate social responsibility disclosure and corporate governance characteristics in Malaysian public listed companies", *Social Responsibility Journal,* vol. 5, no. 2: 212-226.

Saida, D. (2009) "Contribution on the analysis of the environmental disclosure: a comparative study of American and European multinationals"; *Social Responsibility Journal*, vol. 5, no. 1: 83-93.

Shahab, Y., & Ye, C. (2018) "Corporate social responsibility disclosure and corporate governance: Empirical insights on neo-institutional framework from China", *International Journal of Disclosure and Governance,* vol. 15, 87-103.

Sun, N., Salama, A., Hussainey, K., & Habbash, M. (2010) "Corporate environmental disclosure, corporate governance and earnings management", *Managerial Auditing Journal,* vol. 25, no. 7: 679-700.

Tamimi, N. and Sebastianelli, R. (2017) "Transparency among S&P 500 companies: an analysis of ESG disclosure scores", *Management Decision,* vol. 55, no. 8: 1660-1680.

Tan, S. H., Habibullah, M. S., Tan, S. K., & Choon, S. W. (2017) "The impact of the dimensions of environmental performance on firm performance in travel and tourism industry", *Journal of environmental management*, vol. 203, 603-611.

Tan, S., Muzafar, S. H., & Tan, S. (2017) "Corporate governance and environmental responsibility", *Annals of Tourism Research*, vol. 63, 213-215.

Tilling MV. (2004) "Some thoughts on legitimacy theory in social and environmental accounting", *Social and Environmental Accountability Journal,* vol. 24, no. 2: 3-7.

Trireksani, T., & Djajadikerta, H. G. (2016) "Corporate Governance and Environmental Disclosure in the Indonesian Mining Industry", *Australasian Accounting, Business and Finance Journal,* vol. 10, no. 1: 18-28.

Tsui, J. & Gul, F.A. (2000) "Corporate governance and financial transparencies in the Hong Kong special administrative region of the People's Republic of China'', paper presented at the 2nd Asian Roundtable on Corporate Governance, Hong Kong, May 2000.

Ullmann, A. A. (1985) "Data in search of a theory: A critical examination of the relationships among social performance, social disclosure, and economic performance of US firms", *Academy of management review*, vol. 10, no. 3: 540-557.

Uwuigbe, U. N., Egbide, B. C. & Ayokunle, A. M. (2011) "The effect of board size and board composition on firms corporate environmental disclosure: a study of selected firms in Nigeria", *Acta Universitatis Danubius* vol. 7, no. 5: 164-176.

Yusoff, H., Darus, F. & Rahman, S.A.A. (2015) "Do corporate governance mechanisms influence environmental reporting practices? Evidence from an emerging country", *Int. J. Business Governance and Ethics*, vol. 10, no. 1: 76-96.

Zeng, S. X., Xu, X. D., Yin, H. T. & Tam, C. M. (2012) "Factors that drive Chinese listed companies in voluntary disclosure of environmental information", *Journal of Business Ethics,* vol. 109, no. 3: 309-321.