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Corporate Governance and Sustainability Performance: Analysis of Triple Bottom Line Performance

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Abstract The study empirically investigates the relationship between corporate governance and the triple bottom line sustainability performance through the lens of agency theory and stakeholder theory. We claim, in fact, that no single theory fully accounts for all the hypothesised relationships. We measure sustainability performance through manual content analysis on sustainability reports of the US-based companies. The study extends the existing literature by investigating the impact of selected corporate governance mechanisms on each dimension of sustainability performance, as defined by the GRI framework. Our approach allows to identify which governance mechanisms foster triple bottom line performance, also revealing that some mechanisms fit only specific dimension(s) of sustainability. The fact-based findings provide support for a new beginning in the theorising process in which the theories must try not only to provide rationale for the impact of corporate governance on sustainability, but also to explain which dimension of sustainability might be more affected. The most important implication for practitioners is the support for sustainability practices, which may be gained through implementation of particular corporate governance mechanisms. The findings contribute also to the improvement of the ongoing standard setting process, in particular as it concerns the in-depth revision of the economic dimension of sustainability carried out under the new GRI framework.

Keywords Corporate Governance · Board independence · Sustainability performance · Agency theory · Stakeholder theory

Introduction

The debate on corporate scandals suggests the need for consideration of social goals along with profit maximisation (Margolis and Walsh 2003). Such discussion raises the questions of how effectively firms are governed and how different internal and external governance mechanisms determine corporate social behaviour. Since the UN Conference on the Human Environment, held in Stockholm in 1972, and following the great resonance of the Bruntland report issuance in 1987, corporate social responsibility (CSR) has climbed the ranking of governance priorities. Despite the acknowledgment of its importance; however, CSR is still a voluntary act for firms in most parts of the world (Cheng and Courtenay 2006).

The contemporary approach towards CSR focuses on triple bottom line functioning of the firm (Elkington 1997). This approach gives equal weight to economic, environmental, and social dimensions. The basic premise of the triple bottom line performance is its voluntary nature which pays off in the form of competitive advantage for the sustainable firms (Porter 1991). Keeping in view the voluntary nature of sustainability initiatives, in this study we investigate the relationship between internal corporate

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governance (CG) and triple bottom line performance of the US-based firms.

Despite the progress made towards understanding the impact of CG characteristics on corporate sustainability, there is still room to investigate this relation more thoroughly (Walls et al. 2012). Complete understanding requires more detailed exploration of the relationship between governance characteristics and sustainability dimensions. Several attempts have been made to comprehend this relationship, but none of the empirical contributions consider all three dimensions of sustainability performance (SP hereafter) in this given nexus.

Recently, Walls et al. (2012) note that firms with more independent boards and higher gender diversity exhibit higher environmental performance; their study covers the environmental dimension only. Likewise, many others such as Brammer and Pavelin (2006) and Rodrigue et al. (2013) link CG and environmental disclosure, whereas Mallin et al. (2013) add social disclosure. Similarly, there is also quite some literature investigating the relationship between CG, social disclosure (Haniffa and Cooke 2005), and performance (see e.g. Wang and Coffey 1992, Williams 2003, and Johnson and Greening 1999).

However, as the existing literature does not encompass the impact of CG on all the three dimensions of corporate sustainability, we perform such thorough analysis. To do so, we apply the framework provided by Global Reporting Initiative (GRI) for SP reporting. The GRI framework is widely accepted and considered as the best SP reporting framework (Morhardt et al. 2002; Fonseca et al. 2014). It challenges firms to disclose positive and negative performance on economic, environmental, and social dimensions under the assumption that each dimension is equally important for sustainable development (GRI 2006).

By quantifying the different dimensions of sustainability separately, this study uncovers many aspects in the governance–sustainability nexus. This treatment adds new evidence to the existing body of knowledge concerning the relationships between a firm's characteristics and sustainability dimensions, corroborating the arguments about the inter-linkages between different sustainability dimensions and their relative importance (Lozano 2008; Lozano and Huisingh 2011).

The analysis of manually quantified sustainability performance information reveals that a more independent board has a noteworthy role in fostering SP (defined as Hypothesis 2). It strengthens the idea of role separation and discourages the role of CEO as chairperson of the governing board in order to attain better environmental sustainability (Hypothesis 3). The results also show that the existence of more female directors enhances the social performance of a firm (Hypothesis 4). The frequency of board meetings improves social sustainability (Hypothesis 5), and the sustainability committee plays a substantial positive role in enhancing environmental and social performance of firms (Hypothesis 6). Our results imply that effective internal governance mechanisms help firms meet sustainable development goals. All the results remain stable across all industries under study.

Theoretically, our study contributes to two dominant paradigms of governance research, i.e. agency and stakeholder theory. We highlight the complementarities of both frameworks and take partly the agency and partly the stakeholder theory perspective in hypotheses development because no single theory can fully explain the hypothesised relationships (Walls et al. 2012). Our claims regarding board size (Hypothesis 1), board independence (Hypothesis 2), CEO duality (Hypothesis 3), and board meetings (Hypothesis 5) are based mainly, but not exclusively, on agency theory. On the other hand, the claims concerning women on the board (Hypothesis 4) and CSR committees (Hypothesis 6) are developed mainly through stakeholder theory.

Some scholars rely on other theoretical frameworks such as the resource-based view (Amran et al. 2014), the resource dependence theory and the slack resources theory (Fodio and Oba 2012), the neo-institutional theory (Ntim and Soobaroyen 2013), and the stewardship theory (Sharif and Rashid 2014). But again any theory independently falls short in explaining the relationship completely (see for example Haniffa and Cooke 2002; Prado-Lorenzo and Garcia-Sanchez 2010; Mallin et al. 2013).

Our study acknowledges the lacuna of a single theoretical framework and provides support for adopting different theories to study different dimensions of corporate governance. Our results may also guide future studies: showing that the predicted effect is often limited to one dimension of sustainability (either social or environmental), it calls for the necessity to assess simultaneously the triple bottom line performance of the CG aspect under examination.

The remainder of the paper is organised as follows: in the next section, we discuss the theoretical underpinnings of CG–SP nexus and develop our research hypotheses. Subsequent to the hypothesis development, we present the research method, empirical model, and estimation technique. In "Empirical results" section, we discuss the empirical results. In "Discussion and Conclusions and Limitations and Future Research" sections, we present our conclusion, implications, and directions for future research.

Theoretical Background and Review of Literature

Review of existing literature reveals that agency theory (Jensen and Meckling 1976) and stakeholder theory (Freeman 1984) are the two dominant perspectives used to

explain the relationship between governance and SP (see Table 1). Agency theory explains the conflicting relationship between managers and stakeholders assuming the presence of information asymmetry, opportunistic behaviour of agents, and conflicts of interests between principal (shareholder) and agent (manager). Therefore, it is desirable to monitor the agents closely in order to align the principal–agent goals, reduce conflicts, and maximise the wealth of stockholders (Halme and Huse 1997).

Agency theory contends that effective CG improves firm's capability to deal with emerging challenges and reduce the agency conflicts (Haniffa and Cooke 2002). Additionally, it maintains that the internal governance mechanism must act effectively to hold the agents accountable for their actions (Li et al. 2008). The agency literature in this vein suggests that effective CG enhances a firm's legitimacy (Michelon and Parbonetti 2012) and improves financial performance (Jo and Harjoto 2011).

Keeping in view the stakeholders' demand for sustainable corporate development, Gul and Leung (2004) argue that the agency theory better explains the role of governance in stakeholders' management. Similarly, Haniffa and Cooke (2002) maintain that effective board performance is important in order to curb managers' opportunism. Other proponents of agency theory such as Kolk (2008), Ienciu et al. (2012), and Buniamin et al. (2011) argue that effective governance can reduce the agency problems by holding managers accountable to the wide variety of stakeholders.

Although researchers have used the agency theory framework to explain the CG–CSR link, this framework seems unable to cover all the aspects of this relationship. There are good reasons for the quest for a logical premise that the majority of the literature seems to assume implicitly, with few exceptions: "The fact that companies increasingly use CSR committees does not explain why they do so and in which direction CSR governance structures might evolve" (Spitzeck 2009, p. 502). This shows that agency theory cannot fully explain the CG–CSR link. This limitation seeks theoretical aid to explain the CG–SP relationship.

Agency and stakeholder theories complement each other by advocating the alignment of stockholder, stakeholder, and management goals. Both frameworks discourage the opportunistic behaviour of management (Michelon and Parbonetti 2012). Walls et al. (2012) contend that one theory independent of the other is unable to explain why and/or how social targets should be included in corporate strategic goals. It is also evident from our literature review that many researchers use more than one theory to hypothesise about the relationships between CG and CSR dimensions (see e.g. Gul and Leung 2004; Fodio and Oba 2012; Mallin et al. 2013; Amran et al. 2014; Sharif and Rashid 2014; Arena et al. 2014; Post et al. 2014). This fact provides the rationale of combining both theories to explain the CG–SP link.

The findings of recent research show that companies all over the world are facing increased stakeholder pressure to be sustainable (see e.g. Chen and Wang 2011). The stakeholders' need for information about ongoing operations has increased remarkably in the last couple of decades (Haniffa and Cooke 2005; Fernandez-Feijoo et al. 2012). Stakeholders expect companies to disclose not only financial but also non-financial information (Fernandez-Feijoo et al. 2012). Jensen and Meckling (1979) and Hill and Jones (1992) argue that the board of directors is the supreme stakeholder of business firms and its duty is to align the goals of management with those of the wider variety of stakeholders.

Under stakeholder theory, Michelon and Parbonetti (2012) argue that good CG enhances firm–stakeholder relationships by fostering corporate sustainability. They consider good governance and sustainability as complementary mechanisms for better stakeholder management. They further note that stakeholder theory provides a link between governance mechanisms and sustainability initiatives for aligning long-term management–stakeholder goals. Barako and Brown (2008) divide stakeholder theory into two branches—managerial and ethical. Following Deegan (2000) and O'Dwyer (2002) who named managerial as a positive and ethical as a normative branch of stakeholder theory, Donaldson and Preston (1995, p. 6) argue that all the branches of stakeholder theory are 'mutually supportive' and advocate the conflict-free management–stakeholder relationship.

Following Jensen and Meckling (1979), in our theoretical framework we consider the governing board as a stakeholder group and use both agency and stakeholder theories for hypothesising on the underlying CG–SP relationships. Table 1 below provides an overview of empirical literature along with the use of agency and stakeholder theory in existing literature.

Hypothesis Development Framework

The literature on CG almost unanimously agrees on the fact that, the commitment to increase accountability and transparency in a company's activities, other than economic and financial ones, has grown rapidly among major companies and has become a relevant topic for corporate management. Several recent contributions have investigated the trustworthiness of the relationship between factors describing the governance structure and the various manifestations of SP through statistical analysis. Fewer contributions went further than exploring the actual managerial rationale for such a phenomenon and/or tried to frame it into a theoretical perspective.

Table 1 Theoretical background and review of prior research

Study	Governance variable(s) (Results in parenthesis)	Dependent variable(s)	Data source	Theory applied	Country
Wang and Coffey (1992)	Board independence (+), Director ownership (+), Women on board (0)	Corporate Philanthropy	Content analysis on annual reports	Agency Theory	US
Halme and Huse (1997)	Board size (+)	Environmental Disclosure	Content analysis on annual reports	Agency Theory	Scandinavian countries
Johnson and Greening (1999)	Board independence (+), Director ownership (+)	People and Product Dimensions of corporate social responsibility	Survey	Agency Theory	US
Babío Arcay and Muiño Vázquez (2005)	Board independence (+), director ownership (+), Board audit committee (+), CEO duality (0), board size (0)	Voluntary corporate disclosures	Content analysis on annual reports	Agency theory	Spain
Cheng and Courtenay (2006)	Board size (+), Board independence (+), Board composition (0), CEO duality (0)	Voluntary corporate disclosures	Content analysis on annual reports	Agency theory	Singapore
Mohd Ghazali and Weetman (2006)	Family members on board (0), board independence (0), board composition (0), director ownership (+)	CSR disclosure	Content analysis on annual reports	Agency theory	Malaysia
Barako *et al.* (2006)	Board composition (−), CEO duality (0), Board audit committee (+)	Voluntary corporate disclosures	Content analysis on annual reports	Agency theory	Kenya
Hossain and Reaz (2007)	Board composition (0)	CSR Disclosure	Content analysis on annual reports	Agency Theory	Bangladesh
Lim *et al.* (2007)	Board independence (+)	Voluntary disclosure including Social information	Content analysis on annual reports	Agency theory	Australia
Aras and Crowther (2008)	Corporate governance index (+)	Sustainability Disclosure	Content Analysis on annual reports	Stakeholder theory	UK
Akhtaruddin *et al.* (2009)	Board Size (+), Board Composition (+), Board audit committee (0)	Voluntary disclosure	Content analysis on annual reports	Agency theory	Malaysia
Arussi *et al.* (2009)	CEO duality (−)	Environmental disclosure	Content analysis on annual reports	Agency and stakeholder theory	Malaysia
Dunn and Sainty (2009)	Board Independence (+)	Corporate social performance score	Canadian Social Investment Database	Agency theory	Canada
Said *et al.* (2009)	Board Size (+), Board independence (0), CEO duality (0), Board audit committee (+)	CSR disclosure index	Content analysis on annual reports and website	Agency theory	Malaysia
Al-Shammari and Al-Sultan (2010)	Board composition (0), Family members on Board (0), CEO duality (0), Board Audit committee (+)	Voluntary Disclosure Index	Content Analysis on annual reports	Agency Theory	Kuwait
Jo and Harjoto (2011)	Governance index (+), CEO duality (+), CEO chair of nomination committee (0), Board size (0), Board Independence (+)	CSR combined score	KLD	Agency theory	US

Table 1 continued

Study	Governance variable(s) (Results in parenthesis)	Dependent variable(s)	Data source	Theory applied	Country
Post *et al.* (2011)	Board independence (+), Women on Board (0), Board Competence (0)	Disclosed environmental performance indicators	KLD	Agency theory	US
Galbreath (2011)	Board Independence (+), Board Size (0), Women on board (+)	Environmental quality and social responsiveness information	Content analysis on annual reports	Agency theory	Australia
Ienciu *et al.* (2012)	Board size (0), CSR committee (+), Board composition(+)	Environmental Reporting	Content analysis on Archival data	Agency theory	worldwide largest petroleum companies
Htay *et al.* (2012)	CEO duality (0), Board Independence (+), Board Size (+), Director Ownership (0), Institutional Ownership(0)	Social and environmental disclosure	Content analysis on annual reports	Agency theory	Malaysia
Rao *et al.* (2012)	Board Independence (+), Institutional Ownership (+), Board Size (+), Women on board (+)	Environmental Disclosure	OSIRIS database	Agency theory	Australia
Walls *et al.* (2012)	Board Size (-), Board Independence (−), Women on board (+), CSR Committee (+)	Environmental strengths and concerns	KLD	Agency and stakeholder theory	US
Allegrini and Greco (2013)	Board independence (0), Board Size (+), CEO duality (−), Board Meetings (+), Board audit committee (+)	Adoption of best practices for voluntary disclosure	Content analysis on annual reports	Agency theory	Italy
Ho and Taylor (2013)	Corporate Governance Index based on content analysis of financial reports (+)	Corporate social responsibility disclosure	Content analysis on annual reports	Agency theory	Malaysia
Saha and Akter (2013)	Board Size (0), Board Independence (0), Board audit committee (−), Director Ownership (−)	Voluntary disclosure	Content analysis on annual reports	Agency theory	Bangladesh
Garcia-Sanchez *et al.* (2014)	Board size (0), Foreign directors (0), Women on board (+), Director Ownership (+), Board Meetings (0), Board Composition (+)	CSR disclosure	Thomson Reuters database	Agency theory	Spain
Giannarakis (2014a)	CEO duality (0), Women on board (0), Board Competence (0), Board Meetings (0), Board size (0), Board composition (0), CSR Committee (+)	CSR disclosure	Bloomberg data source	Stakeholder theory	US
Giannarakis (2014b)	CEO duality (−), Women on board (0), Board Competence (0), Board Meetings (0), Board size (+)	ESG disclosure score	Bloomberg data source	Stakeholder theory	US
Giannarakis *et al.* (2014)	CEO duality (−), women on board (+)	Sustainability disclosure	Bloomberg data source	Stakeholder theory	US
Jizi *et al.* (2014)	CEO duality (+), Board Size (+), Board Independence (+), Board meetings (+)	CSR reporting	Thomson One banker database	Agency theory	US
Janggu *et al.* (2014)	Board size (+), Director Ownership (0), Board Competence (+), Board Independence (0), CEO duality (+), Foreign directors (0)	Sustainability disclosure	Content analysis on annual reports	Agency theory	Malaysia

+, Positive; 0, insignificant; −, negative

Source Authors

The variables most frequently used in the literature to describe the structure of CG are as follows: board independence and board composition, defined through parameters such as the total number of directors on the board; percentage of independent directors; CEO duality; percentage of non-executive directors; directors' ownership; and women on the board. The presence of a CSR committee and/or a CSR director is also often considered as affecting the CSR performance.

Differently from the existing contributions, we consider a widely accepted GRI framework and link the selected governance variables to the triple bottom line SP of a firm. The economic bottom of SP is composed of three sub-dimensions, namely direct economic value generated, market presence, and indirect economic impacts. The environmental and social bottoms also have sub-categories. The environmental bottom deals with the aspects of material, energy, water, biodiversity, emission and waste, products and services, compliance with environmental regulations, transportation of products, and overall environmental protection measures taken by a firm. The social bottom deals with labour laws, human rights, society, and product responsibility aspects. As for CG, we identify the most widely studied characteristics, as found in prior literature (see Table 1). These are board size, board independence, CEO duality, women on the board, number of board meetings per year, and existence of a sustainability committee or CSR director. In the sub-sections below, we develop hypotheses for CG characteristics.

Board Size and SP

Board size is taken into consideration mainly from the perspective of agency theory as a feature that induces less optimal monitoring in firm governance as the size increases (De Andres et al. 2005). The empirical studies show fragmented results for the relationship between board size and sustainability practices. Similarly, group dynamics and collective decision-making along with agency perspective advocate smaller governance board size (Ahmed et al. 2006; Amran et al. 2014). Prado-Lorenzo and Garcia-Sanchez (2010) argue that larger board size is detrimental to governance efficiency.

There is no clear consensus in the existing literature regarding the relationship between board size and SP. It is commonly argued that the larger the board size, the less effective the monitoring, controlling, communication, and decision-making it results. Ahmed et al. (2006) and Dey (2008) are of the view that a smaller board size makes communication more efficient, resulting in increased accountability and commitment. On the other hand, Guest (2009) highlights the drawback by arguing that smaller boards have less diversified expertise as compared to larger boards, which may affect the quality of advice given. According to John and Senbet (1998), a smaller board represents a higher workload for each board member, which may reduce their ability to monitor and control effectively. Likewise, Arena et al. (2014) reveal a positive association between board size and environmental rating. Many others note an insignificant relationship between size of the board and voluntary CSR initiatives (see e.g. Amran et al. 2014; Ienciu et al. 2012; Michelon and Parbonetti 2012; Babío Arcay and Muiño Vázquez 2005).

Keeping in view the voluntary nature of the sustainability initiative, we give ultimate importance to group dynamics and collective decision-making, and follow the arguments of De Andres et al. (2005) and Prado-Lorenzo and Garcia-Sanchez (2010), who argue that larger board size is detrimental to governance efficiency.

Taking this perspective of agency theory, we hypothesise the following relationship:

Hypothesis 1 Board size negatively impacts sustainability performance of a firm.

H1a Board size negatively impacts economic sustainability performance.

H1b Board size negatively impacts environmental sustainability performance.

H1c Board size negatively impacts social sustainability performance.

Board Independence and SP

Agency theory suggests that an independent governing board can control and monitor the agents' actions effectively. Furthermore, independent directors symbolise higher transparency which leads towards long-term value enhancement (Jizi et al. 2014). In the stakeholder theory framework, the independence of the board is expected to be positively associated with a higher level of SP since external directors are realistically less subjected than internal ones to pressure from shareholders and managers. Moreover, being external to the organisation they are invested with a responsibility towards a wider audience and have higher reputational costs (Lim et al. 2007; Prado-Lorenzo and Garcia-Sanchez 2010).

Prior empirical literature provides competing results on the association between board independence and SP. Eng and Mak (2003) note a negative impact of higher board independence on social disclosure. Allegrini and Greco (2013), Cormier et al. (2011), Huafang and Jianguo (2007), McKendall et al. (1999), and Michelon and Parbonetti (2012) are among those who report an insignificant relationship between the number of independent directors on a board and sustainability initiatives. This theoretical competition and empirical fragmentation of results clearly calls for further investigation into the underlying relationship, therefore we *hypothesise* that:

Hypothesis 2 Board independence positively impacts the sustainability performance.

H2a Board independence positively impacts the economic dimension of SP.

H2b Board independence positively impacts the environmental dimension of SP.

H2c Board independence positively impacts the social dimension of SP.

CEO Duality and SP

Agency theory posits a vigilant monitoring of agents' decisions in order to protect shareholders' rights (Jensen and Meckling 1976). CEO duality means that the chief executive officer also holds the position of the board's chairperson. When the two roles are assigned to a single person, it may result in weak monitoring (Rechner and Dalton 1991). The presence of the CEO as chair of the CG board reduces the independence of the board, which in turn decreases accountability and transparency of the firm (Michelon and Parbonetti 2012). In the stakeholder theory framework, the independence of the board is expected to be positively associated with a higher level of disclosure, since external directors are realistically less subjected to pressure from shareholders and managers than internal ones. Moreover, being external to the organisation, they are invested with a responsibility towards a wider audience and have higher reputational costs in comparison to internal directors (Lim et al. 2007; Prado-Lorenzo and Garcia-Sanchez 2010). When the two roles of CEO and chair of the CG board are combined, the boundary line between management and control becomes blurred (Fama and Jensen 1983).

Review of empirical literature reveals mixed findings on the relationship between CEO duality and SP of a firm. Arena et al. (2014) find a positive association between the CEO's dual role and environmental performance. Jizi et al. (2014) and Mallin et al. (2013) report a positive relationship between CEO duality and voluntary reporting practices. On the other hand, Haniffa and Cooke (2002), Barako et al. (2006), Buniamin et al. (2011), Michelon and Parbonetti (2012), and Liao et al. (2014) find no significant link between CEO duality and sustainability performance reporting. Clearly, the negative relationship is in line with the theoretical as well as managerial rationale which suggests that the separation of the two roles is advisable. Hence we *hypothesise* the following relationships:

Hypothesis 3 CEO duality negatively impacts sustainability performance.

H3a CEO duality negatively impacts economic sustainability performance.

H3b CEO duality negatively impacts environmental sustainability performance.

H3c CEO duality negatively impacts social sustainability performance.

Women on the Board and SP

Board composition has been interpreted in several ways that usually relate to size and diversity between the components in terms of gender and percentage of insiders versus outsiders. Diversity in the board is also correlated to a broader set of objectives pursued by the reporting: Liao et al. (2014) specifically refer to a divergent perspective between members of the board as a characteristic that enhances the representativeness of the governance.

The presence of women on the board as a measure of diversity has been positively associated with an increased orientation towards social responsiveness (Wang and Coffey 1992; Williams 2003). Interpretations of this correlation are connected to differences in their prevailing background (e.g. law, humanities, education) that push women to be more sensitive towards giving, towards philanthropic initiatives, and towards CSR in general (Williams 2003), and to differences in behaviours induced by sex inequalities in the job environment (Galbreath 2011).

On the basis of stakeholder theory, Orij (2010) notes that women are more orientated towards social issues than men. More women on the board may push the board members to develop effective stakeholder management by meeting a wider range of customers' expectations (Daily and Dalton 2003). This enables firms to take CSR initiatives and enhances socially responsible behaviour of the firms (Webb et al. 2008). Similarly, the literature focusing on CG and economic performance reveal that diversity in board composition leads to better corporate decision-making and economic performance (see for example Erhardt et al. 2003; Campbell and Mínguez-Vera 2008). Based on the above discussion and rationale provided by stakeholder theory, we hypothesise the following relationships:

Hypothesis 4 Higher percentage of women on the board positively impacts the SP.

H4a More female directors on the board positively impacts economic sustainability dimension of SP.

H4b More female directors on the board positively impacts environmental sustainability dimension of SP.

H4c More female directors on the board positively impacts social sustainability dimension of SP.

Board Meetings and SP

Like the opposing positions and results of other governance variables in relation to CSR, board activity is no exception.

Board meetings are often used as proxy for the level of board activity and board diligence (Laksmana 2008). There are two positions regarding the prospective impact of board activity on non-financial performance. Some scholars are of the view that more frequent meetings symbolise the inefficacy of directors which consequently limit their performance (Vafeas 1999), while others contend that it represents board effectiveness, which facilitates better supervision of a company's operations and motivates firms to increase transparency (Lipton and Lorsch 1992).

The former view finds support in a few studies such as Frias-Aceituno et al. (2013) and Prado-Lorenzo and Garcia-Sanchez (2010), who report a negative relationship between board meetings per year and environmental transparency. Other studies, such as Karamanou and Vafeas (2005) regarding transparency, and (Giannarakis 2014a) regarding SP disclosure of firms, find no relationship between the number of board meetings and SP.

The latter view is supported by recent empirical contributions. Allegrini and Greco (2013) study Italian firms and find a positive relation between the number of board meetings and organisational transparency. Likewise, Adawi and Rwegasira (2011) and Jizi et al. (2014) show a positive relationship between board activity and SP disclosure. Additionally, Ricart et al. (2005) find that higher number of board meetings represent the board activity regarding strategic planning of the firms; their interpretation of board meeting is the process of decision-making and accountability and distribution of resources. They note that in most of the board meetings, sustainability issues are discussed. Their study reveals a positive impact of board meetings on sustainability performance. Even though it may be reasonable to assume that more frequent board meetings are an indication of a firm's financial distress, researches developed under agency theory assumptions show that when the directors care more about shareholders' interests than those of debt-holders, their work incentive falls as the firm becomes more financially distressed. In fact, greater financial distress implies a greater probability of insolvency and/or a smaller firm value relative to debt. Consequently, the shareholders and the directors alike obtain less reward from the directors' hard work (Vafeas 1999). In this study, we adopt an agency theory perspective, consider the number of board meetings as a sign of board diligence, and propose a positive relationship between board meeting frequency and SP.

Hypothesis 5 Number of board meetings has a positive impact on the SP of firms.

H5a Number of board meetings has a positive impact on economic sustainability performance of a firm.

H5b Number of board meetings has a positive impact on environmental sustainability performance of a firm.

H5c Number of board meetings has a positive impact on social sustainability performance of a firm.

Sustainability Committee and SP

Another element of board structure used in recent studies is the existence of a sustainability/CSR committee on the governing board. The existence of a CSR committee symbolises the board's orientation and commitment towards sustainable development. Scholars like Ricart et al. (2005) carry out an exhaustive analysis of business cases and argue that the existence of a CSR committee is a sign of a firm's commitment towards sustainability. They interpret it as an allocation of productive resources for better stakeholder management by fostering sustainability practices in the firm's strategic planning.

The theoretical underpinning combined with common sense supports a positive link between a CSR committee and SP (Ricart et al. 2005). However, there is no clear consensus among different empirical findings. The literature reveals insignificant as well as positive relationships between a sustainability committee and SP. McKendall et al. (1999) and Rodrigue et al. (2013) report an insignificant relationship between a CSR Committee and environmental violations and performance, respectively. Michelon and Parbonetti (2012) conduct a study on the US and European companies, finding an insignificant relationship between the existence of a sustainability committee and SP disclosure. Similarly, Rupley et al. (2012) find an insignificant impact of a CSR Committee on quality of environmental disclosure.

However, Spitzeck (2009), based on a study of British firms, confirms a positive and significant impact of the presence of a CSR committee on CSR practices. Liao et al. (2014) study the UK-based firms and report a positive link between a CSR committee and carbon disclosure projects. Likewise, Ienciu et al. (2012), Walls et al. (2012), Arena et al. (2014), and Amran et al. (2014) are among others who find a positive relationship between a CSR committee and certain aspects of SP. Based on these results and the arguments of our baseline theories, we expect to find a positive relationship between the existence of a sustainability committee and SP.

Hypothesis 6 Existence of sustainability committee has a positive and significant impact on the SP of firms.

H6a Existence of sustainability committee positively impacts economic sustainability performance of a firm.

H6b Existence of sustainability committee positively impacts environmental sustainability performance of a firm.

H6c Existence of sustainability committee positively impacts social sustainability performance of a firm.

Methodology

Sample Design and Data Collection

Our study sample included 100 US companies from the high-performance Global Fortune 2013 list. Based on the GRI's list of reporting firms, our final sample comprises 152 reports issued by selected firms during the study period—a span of 5 years from 2007 to 2011. The reason for selecting this period is straightforward; this is the longest period of sustainability reporting guidelines (G3 guidelines) without any updates or modifications. We examine the reports which meet the following criteria: (1) the report is prepared using the GRI G3 guidelines; (2) the reports are prepared in the English language; and (3) the reports are published in the period from 2007 to 2011. Table 2 below presents sector-wise distribution of sample reports over the study period.

We collected sustainability reports from the corporateregister.com website. Following the methodology of Jones et al. (2007), Villiers et al. (2009), and Plumlee et al. (2015), we apply a two-stage manual content analysis technique to measure the SP.

Measurement of Variables

Following GRI information structure, we measure the disclosure level and the quality indices for each sustainability dimension (economic, social, and environmental) from each sustainability report. In line with the previous research methodology of Jones et al. (2007) and Michelon and Parbonetti (2012), we measure the disclosure level on a binary scale which takes value 1 if an item is disclosed and 0 otherwise. Then, we calculate the cumulative score of each dimension using the following formulation:

$$\text{Disclosure Index}_i = \text{No. of items disclosed on an indicator} / \text{Total item on an indicator.}$$

In the above formula, i represents each sustainability dimension. The value of the disclosure index of each dimension depends on a specific number of items given in G3 guidelines. There are 9 items for economic indicator, 30 for environmental, and 40 for social. To measure the performance of sustainability dimensions, we categorise the information in positive and negative type following the definitions provided by Patten and Crampton (2004, p. 40). This approach is consistent with Plumlee et al. (2015). Previously, Cox et al. (2004), Dunn and Sainty (2009), Graves and Waddock (1994), and Johnson and Greening (1999) applied a similar measurement for CSR performance on KLD data.

The bifurcation of information as positive and negative allows us to calculate a quality index using a normalisation algorithm previously used by Hillman and Keim (2001) and Jo and Harjoto (2014):

$$\text{Quality Index}_i = \frac{\text{Real Value} - \text{Minimum}}{\text{Maximum} - \text{Minimum}}.$$

In the formula, i represents the individual sustainability indicator. *Real Value* is obtained by subtracting the negative score of an indicator from its positive score. *Minimum* is the total number of items in an indicator with negative sign and *Maximum* is the total number of items with positive sign. Thus, for instance, the total number of items on

Table 2 Distribution of Sample Sustainability Reports over Time

Sector	2007	2008	2009	2010	2011	Total
Technology & Equipment	6	7	7	8	9	37
Oil & Gas Producers	4	5	4	5	5	23
Chemicals & Pharmaceuticals	7	4	6	6	7	30
Food & Beverages	3	2	3	2	2	12
Banks & Financial Services	3	1	3	3	6	16
Automobiles	0	1	2	2	2	7
Retailer	1	0	1	2	3	7
Household Goods	1	1	1	1	1	5
Industrial Transportation	1	1	1	1	1	5
Telecom	0	1	1	1	1	4
Airlines	0	0	1	1	1	4
Media	0	1	0	1	0	2
Total	26	24	30	33	38	152

economic indicator items is 9. In this case, the *Minimum* represents the worst case (-9) when all items give negative information. *Maximum* means (9) when there is full disclosure with positive information. The same formula is used for environmental and social indicators where the count of items is 30 and 40, respectively.

Finally, we calculate the performance of each dimension by multiplying the disclosure index by its respective quality index. As our argument is based on transparency and accountability, this interaction enables us to capture performance and transparency jointly.

All the data of manual content analysis are coded by two coders. Keeping in view the limitations of research methodology based on manual content analysis, we calculate "Krippendorff Alpha" as the reliability measure for our extracted data using http://dfreelon.org/utils/recalfront/recal2/online utility. Initially, 25 % of the total collected reports were coded by both the coders. We use these data for inter-coder reliability measurement. The value of alpha should be greater than 0.67 for useful conclusions (Krippendorff 2004, p. 241). We calculate the alpha value for our disclosure indices as well as for the quality indices. This results in six alpha values. The values of alpha for economic, environmental, and social disclosure indices are 0.807, 0.740, and 0.711 respectively. Similarly, the values for quality indices are 0.785, 0.739, and 0.740, respectively. All the observed values are well above the acceptable threshold value. Table 3 below summarises dependent, independent, and control variables.

Empirical Model and Estimation Technique

Our aim in this study is to test the relationship between CG characteristics and SP over a time span of five years for a given set of firms. Therefore, we apply a regression model suitable for panel data, estimating the following equation:

$$\text{Sustainability Performance}_{it} = \alpha + \beta \text{CG}_{it} + \gamma \text{Control}_{it} + u_{it},$$

where i represents the firm dimension and t the time dimension. The dependent variable considers alternatively the three dimensions, namely economic, environmental, and social, of sustainability performance. As for the independent variables, CG_{it} is a vector of CG board characteristics featuring research hypotheses 1–6, that is to say board size, board independence, CEO duality, percentage of women on board, board activity, and existence of a sustainability committee. They represent our main variables of interest. $Control_{it}$ is a vector of control variables, selected after a careful review of empirical literature, among industry and firm-specific features. For the industry, we use a dummy variable which takes value 1 if the firm belongs to environmentally sensitive industries (i.e. oil and gas producers, chemicals and pharmaceuticals) and 0 otherwise. There is no clear consensus in the literature about the definition of environmentally sensitive industries (Xu 1999). We follow Mani and Wheeler (1998) and consider oil and gas producers and chemical and pharmaceutical industries as environmentally sensitive. The review of empirical literature shows that firms belonging to these industries face more public pressure to be sustainable environmentally and socially (Xu 1999). We use firm size, profitability, capital structure, sales growth, research and development intensity, and capital intensity as control variables. The detailed measurement of each variable is given in Table 3. Following the GRI framework of SP in this study, we measure SP for all the three dimensions separately. The dependent variables in this study are randomly distributed between 0 and 1.

Our panel data structure allows the modelling of firm heterogeneity that cannot be observed, overcoming the endogeneity and omitted variable issues. To select the appropriate estimation model, either a fixed or a random effect model, we apply a (Hausman 1978) specification test and find that the fixed effect model fits better the economic and environmental performance, whereas the random effect model is more appropriate for the social dimension. The main difference between a fixed effect and a random effect model lies in the relationship between the unobserved time invariant individual characteristics of the firms and the regressors. Contrary to the fixed effect model, the random effect model assumes that there is not a correlation among them (Greene 2008, p. 183).

Empirical Results

Descriptive Statistics and Pairwise Correlation

We present the results of Pearson correlation in Table 4. In columns 2 and 3, we present the descriptive statistics (mean and standard deviation) which are followed by Pearson correlation results. We find a significant positive correlation between the three SP dimensions. The correlation coefficient between economic and environmental variables is 33.9 %, and 28.4 % between economic and social variables. Both coefficients are significant at 1 % significance level. Similarly, the environmental and social dimensions are positivity correlated with $r = 0.746$. Again the significance is at 1 %. This means that the firms which perform better (or worse) on one sustainability dimension also perform better (or worse) on other sustainability dimensions.

In the above table, we note a negative correlation of *BSIZE* with environmental and social performance at 10 and 5 % significance levels, respectively. Board

Table 3 Measurement of dependent, independent, and control variables

Name of Variable	Mnemonics	Role	Measurement
Economic Sustainability Performance	EC_SUST	Dependent	Product of economic Disclosure Index and Economic Sustainability Index
Environmental Sustainability Performance	EN_SUST	Dependent	Product of Environmental Disclosure Index and Environmental Sustainability Index
Social Sustainability Performance	SO_SUST	Dependent	Product of Social Disclosure Index and Social Sustainability Index
Board Size	BSIZE	Independent	Total number of directors on governance board
Board Independence	BINDP	Independent	Percentage of Independent directors to total directors
CEO Duality	CEOD	Independent	Binary variable which takes value 1 if the CEO of the company is also the chairperson of the governance board and 0 otherwise
Women on Board	WOB	Independent	Percentage of female directors in relation to the board size
Board Activity	BMTNG	Independent	Number of board meetings per year
Sustainability Committee	CSRCOM	Independent	Binary variable which takes value 1 if there exists a sustainability committee and 0 otherwise
Industry Belonging	ENV_SENS	Control	Dummy variable which takes value 1 if reporting firm belongs to environmentally sensitive sector and 0 otherwise.
Profitability	ROA	Control	Calculated as ratio of operating income and total assets
Firm Size	SIZE	Control	Log of total assets of the firm
Capital Structure	D/E	Control	Ratio between total debts to shareholders' equity.
Sales Growth	SGROW	Control	Percentage change in total sales with respect to previous year.
R&D Intensity	RDINT	Control	Ratio of total R&D expenditure to total sales
Capital Intensity	CAPINT	Control	Ratio of capital expenditure and total sales.

independence is found to be positively correlated with environmental and social performance, but we are unable to find any significant correlation of board size and board independence with economic dimension of SP. The governance variable for gender diversity *WOB* is found to be positively correlated with all the sustainability dimensions. We also note a positive correlation between *WOB* and *BINDP*. Board activity, which is measured by the number of board meetings per year, is found to be negatively associated with all the sustainability dimensions. The level of significance is 10 % for economic and 5 % for environmental and social dimensions. We further note that bigger boards with more independence meet more frequently as we find a positive correlation between board meeting and size and independence.

Estimation Results

CG and Economic Sustainability Performance

In this section, we present regression results of CG and corporate sustainability. Table 5 below contains stepwise fixed effect regression models. The first dependent variable is economic SP. We applied stepwise regression to avoid multicollinearity problems. In model 1, we report regression of *EC_SUST* on governance variables and controls. In the second model, we analyse the impact of an interaction variable of board independence and CEO duality along with other governance variables. Based on the premise that CEO duality can undermine the independence of a board, we use this interaction variable and report the results. In the third fixed effect regression model, we regress the dependent variable with only control variables. Models 4 to 9 are restricted models with individual governance variables and controls.

The results show that no variable is found to be significantly related with economic SP. Although these results are at odds with our expectations, they direct the thinking process towards improvements in the reporting framework. As we will discuss more in depth later, this is consistent with the process that led to GRI 4, where the economic dimension has been the most widely revised.

CG and Environmental Sustainability Performance

The second dependent variable is *EN_SUST*. This represents the environmental dimension of SP. The results of CG and environmental performance are presented below in Table 6.

Table 4 Descriptive statistics and Pearson correlation

Var.	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. EC_SUST	0.412	0.223	1												
2. EN_SUST	0.453	0.177	0.339***	1											
3. SO_SUST	0.468	0.173	0.284***	0.746***	1										
4. BSIZE	12.427	2.150	−0.0688	−0.1044*	−0.18**										
5. BINDP	85.095	8.209	−0.0419	0.325***	0.21***	0.0273	1								
6. WOB	18.682	8.283	0.1881**	0.24***	0.29***	0.0734	0.117*	1							
7. BMTNG	9.200	4.475	−0.0958*	−0.153**	−0.16**	0.30***	0.11*	−0.027	1						
8. ROA	7.437	6.055	0.223***	0.63***	0.64***	−0.155*	0.037	0.042	−0.29***	1					
9. SIZE	11.319	1.267	0.0004	−0.0216	−0.13*	0.494***	0.17**	0.18**	0.60***	−0.14*	1				
10. D/E	88.295	448.47	−0.185**	−0.28***	−0.30***	0.11*	−0.023	−0.12*	0.17**	−0.27***	0.09*	1			
11. SGROW	8.322	17.725	0.0628	0.11*	0.028	−0.06	0.031	−0.08	−0.18**	0.30***	−0.10*	0.0253	1		
12. RDINT	0.040	0.056	0.0155	0.232**	0.33***	0.125*	0.15*	0.09*	−0.0232	0.25***	−0.0026	−0.14*	0.068	1	
13. CAPINT	−0.137	0.995	0.103*	0.11*	0.133*	0.082	−0.14*	0.11*	0.0042	−0.0004	0.29***	0.0135	−0.05	0.061	1

Presents the correlation results of pairwise correlation between dependent, independent, and control variables. The level of significance is represented by asterisks. First three variables *EC_SUST*, *EN_SUST*, and *SO_SUST* represent the three sustainability dimensions, i.e. economic, environmental, and social, respectively. The correlation results of sustainability variables are followed by the results of governance variables. Governance variables include board size, board independence, gender diversity, and board meetings per year. Governance variables are followed by the results of control variables. Based on the extensive literature review, we included profitability (*ROA*), firm size (*SIZE*), debt-to-equity ratio (*D/E*), sales growth (*SGROW*), R&D intensity (*RDINT*), and capital intensity (*CAPINT*) as control variables along with others

Table 5 Regression results of CG characteristics and economic sustainability performance

VAR.	Exp. Sign	(1) EC_SUST	(2) EC_SUST	(3) EC_SUST	(4) EC_SUST	(5) EC_SUST	(6) EC_SUST	(7) EC_SUST	(8) EC_SUST	(9) EC_SUST
BSIZE	(−)	−0.00748	−0.00703		−0.00557					
		(0.604)	(0.627)		(0.686)					
BINDP	(+)	0.00220				0.00175				
		(0.300)				(0.387)				
CEOD	(−)	−0.0305					−0.0234			
		(0.412)					(0.512)			
INDCEO	(−)		−0.000272							
			(0.508)							
WOB	(+)	−0.00154	−0.00134					−0.000797		
		(0.593)	(0.643)					(0.771)		
BMTNG	(+)	−0.00319	−0.00280						−0.00192	
		(0.447)	(0.504)						(0.630)	
CSRCOM	(+)	−0.00699	0.000378							5.25e−05
		(0.861)	(0.992)							(0.999)
ENV_SENS	(+)	0.0330	0.0446	0.0720	0.0693	0.0684	0.0492	0.0725	0.0710	0.0720
		(0.864)	(0.817)	(0.697)	(0.709)	(0.712)	(0.794)	(0.697)	(0.702)	(0.699)
ROA	(+)	−0.00106	−0.00203	−0.00207	−0.00189	−0.00138	−0.00216	−0.00210	−0.00208	−0.00207
		(0.802)	(0.624)	(0.605)	(0.639)	(0.735)	(0.590)	(0.601)	(0.603)	(0.610)
SIZE	(+)	0.0406	0.0448	0.0230	0.0337	0.0193	0.0300	0.0220	0.0243	0.0230
		(0.598)	(0.560)	(0.739)	(0.650)	(0.781)	(0.669)	(0.751)	(0.726)	(0.742)
D/E	(−)	−5.87e-06	−8.92e-06	−1.11e-05	−1.07e-05	−9.02e-06	−1.20e-05	−1.13e-05	−9.07e-06	−1.11e-05
		(0.904)	(0.855)	(0.815)	(0.822)	(0.850)	(0.801)	(0.813)	(0.850)	(0.816)
SGROW	(+)	0.000960	0.000953	0.00106	0.00106	0.00107	0.00103	0.00105	0.00103	0.00106
		(0.321)	(0.325)	(0.259)	(0.263)	(0.254)	(0.275)	(0.268)	(0.277)	(0.262)
RDINT	(+)	−1.078	−1.228	−1.408	−1.381	−1.355	−1.234	−1.382	−1.461	−1.409
		(0.630)	(0.583)	(0.516)	(0.526)	(0.532)	(0.573)	(0.526)	(0.502)	(0.519)
CAPINT	(+)	−0.669	−0.526	−0.569	−0.507	−0.671	−0.620	−0.539	−0.598	−0.569
		(0.509)	(0.600)	(0.553)	(0.603)	(0.488)	(0.520)	(0.578)	(0.535)	(0.555)
Constant		−0.0681	0.0675	0.156	0.106	0.0370	0.0922	0.183	0.160	0.156
		(0.936)	(0.936)	(0.845)	(0.896)	(0.964)	(0.909)	(0.821)	(0.842)	(0.847)

Table 5 continued

VAR.	Exp. Sign	(1) EC_SUST	(2) EC_SUST	(3) EC_SUST	(4) EC_SUST	(5) EC_SUST	(6) EC_SUST	(7) EC_SUST	(8) EC_SUST	(9) EC_SUST
R^2 (within)		0.052	0.041	0.029	0.031	0.037	0.034	0.030	0.032	0.029

The table comprises the fixed effect regression results of CG mechanisms and economic bottom of sustainability. We present the stepwise regression results in different models. The first model contains results of economic performance and all variables. This is the complete unrestricted model. In our analysis, the independent variables are board size (*BSIZE*), board independence (*BINDP*), CEO duality (*CEOD*), women on board (*WOB*), board meetings (*BMTNG*), and presence of sustainability committee (*CSRCOM*). We include industry belonging (*ENV_SENS*), profitability (*ROA*), firm size (*SIZE*), debt-to-equity ratio (*D/E*), sales growth (*SGROW*), R&D intensity (*RD_INT*), and capital intensity (*CAP_INT*) as control variables. In the second model, we include an interaction variable (*INDCEO*) of board independence and CEO duality along with other governance variables. The third model contains the regression results of control variables only. We measure the dependent variable as a product of disclosure index and its respective quality index. The data for governance variables and controls have been obtained from *Bloomberg* data sources. Bloomberg calculates *BSIZE* as the number of directors on governance board. The *BINDP* is a percentage of independent directors to total directors. Similarly, *WOB* is a ratio of female directors to board size. *CEOD* and *CSRCOM* are binary variables and *BMTNG* is the number of meeting of board in one reporting year. To avoid confounding results, we split our main regression model in restricted models and used our variables of interest individually. This technique is used to avoid multicollinearity problems among explanatory variables. Data for control variables have been obtained from Bloomberg which calculates *ROA* as the ratio of operating income and total assets. The *SIZE* is our second control variable which is log of firm's total assets. *D/E* is the ratio of debt and equity of the firm. We calculate sales growth as percentage change in the sales with respect to previous year's sale. R&D intensity is calculated as the ratio of R&D and sales. Similarly, *CAPINT* is a measure of capital expenditure divided by sales

P value in parentheses

*** $P < 0.01$, ** $P < 0.05$, * $P < 0.1$

Following the pattern of *EC_SUST* analysis, we present fixed effect regression results in different models. As for the previous analysis, we resort to a stepwise procedure with restricted models to avoid multicollinearity. In the results of our main model, we reveal that *BINDP* is positively related to *EN_SUST*. The significance is at 1 % level. The result remains consistent while using only *BINDP* with control variables in model (5). The second governance variable found relevant is *CEOD*. The impact is negative and at 1 % significance level. This result also remains significant in model (6). Another variable found relevant is the sustainability committee (*CSRCOM*). The variable is positively related to a dependent variable at 1 % significance level. In both models (1 and 9), the variable remained significant with *P* value less than 0.01.

Based on the assumption that CEO duality can impact on board independence, we include an interaction variable (*INDCEO*) and analyse its impact on the dependent variable. The coefficient is negative and significant, confirming that a dual CEO more than offsets the efforts to increase board independence. However, the coefficient is two orders of magnitude (−0.0007 vs. −0.0689) less than that of CEOD. This means that board independence reduces the negative impact of a dual CEO. We are unable to find any relevance of *BSIZE*, *WOB*, and *BMTNG* with the environmental dimension of SP. Among controls, we only find profitability as a relevant control variable for environmental sustainability performance. It is remarkable that belonging to environmentally sensitive industries (*ENV_SENS*) does not affect the environmental sustainability performance.

CG and Social Sustainability Performance

The third dimension we used for SP measurement is social SP. The social performance is a measure of performance in labour, human rights, society, and product responsibility dimensions. The results of social sustainability analysis are presented below in Table 7.

Based on the Hausman specification test, we apply the random effect regression model for analysing the impact of CG variables on social sustainability performance. Keeping in view the same group of predictors, we follow the previous presentation pattern. Our random effect model results reveal that board independence (*BINDP)*, women on board (*WOB)*, board activity (*BMTNG)*, and presence of sustainability committee (*CSRCOM)* are positively related to social performance. We find no significant relationship between board size (*BSIZE*), CEO duality (*CEOD*), and social SP.

Consistent with the model concerning environmental sustainability, we find that a dual CEO has a detrimental influence on board independence. In fact, while *BINDP* has

Table 6 Regression results of CG characteristics and environmental sustainability performance

VAR	Exp. Sign	(1) EN_SUST	(2) EN_SUST	(3) EN_SUST	(4) EN_SUST	(5) EN_SUST	(6) EN_SUST	(7) EN_SUST	(8) EN_SUST	(9) EN_SUST
BSIZE	(−)	−0.00550	−0.00471		−0.00808					
		(0.490)	(0.589)		(0.421)					
BINDP	(+)	0.00464***				0.0051***				
		(0.000139)				(0.00033)				
CEOD	(−)	−0.0858***					−0.0689***			
		(6.23e−05)					(0.00707)			
INDCEO	(−)		−0.0007***							
			(0.0037)							
WOB	(+)	0.000946	0.00139					0.00156		
		(0.552)	(0.423)					(0.433)		
BMTNG	(+)	0.000156	0.00107						0.000804	
		(0.946)	(0.673)						(0.782)	
CSRCOM	(+)	0.125***	0.140***							0.134***
		(1.54e−07)	(5.52e−08)							(3.27e−07)
ENV_SENS	(+)	−0.132	−0.100	−0.0476	−0.0514	−0.0582	−0.115	−0.0487	−0.0472	−0.0349
		(0.217)	(0.388)	(0.724)	(0.704)	(0.646)	(0.389)	(0.719)	(0.728)	(0.768)
ROA	(+)	0.0109***	0.0089***	0.0111***	0.0114***	0.0131***	0.0108***	0.0112***	0.0111***	0.0090***
		(9.85e−06)	(0.000562)	(0.000227)	(0.000186)	(7.84e-06)	(0.000204)	(0.000219)	(0.000242)	(0.000613)
SIZE	(+)	0.0179	0.0254	−0.0366	−0.0210	−0.0475	−0.0161	−0.0347	−0.0371	−0.00744
		(0.674)	(0.584)	(0.468)	(0.697)	(0.317)	(0.744)	(0.493)	(0.464)	(0.867)
D/E	(−)	4.66e−06	−1.59e−06	4.85e−06	5.41e−06	1.11e−05	2.23e−06	5.21e−06	3.99e−06	1.65e−06
		(0.863)	(0.957)	(0.889)	(0.876)	(0.734)	(0.947)	(0.881)	(0.909)	(0.957)
SGROW	(+)	−0.000773	−0.000779	−0.000572	−0.000577	−0.000535	−0.000662	−0.000545	−0.000559	−0.000722
		(0.149)	(0.183)	(0.403)	(0.400)	(0.406)	(0.319)	(0.428)	(0.418)	(0.230)
RDINT	(+)	2.000	1.636	1.850	1.890	2.006	2.362	1.798	1.872	1.175
		(0.108)	(0.227)	(0.243)	(0.234)	(0.178)	(0.127)	(0.257)	(0.240)	(0.398)
CAPINT	(+)	−0.100	0.224	0.362	0.452	0.0628	0.212	0.303	0.374	0.328
		(0.857)	(0.711)	(0.604)	(0.524)	(0.924)	(0.755)	(0.667)	(0.595)	(0.592)

Table 6 continued

VAR	Exp. Sign	(1) EN_SUST	(2) EN_SUST	(3) EN_SUST	(4) EN_SUST	(5) EN_SUST	(6) EN_SUST	(7) EN_SUST	(8) EN_SUST	(9) EN_SUST
Constant		−0.214	0.0849	0.750	0.678	0.401	0.562	0.698	0.749	0.393
		(0.648)	(0.867)	(0.198)	(0.251)	(0.469)	(0.322)	(0.235)	(0.201)	(0.443)
R^2 (within)		0.528	0.429	0.157	0.162	0.264	0.219	0.162	0.157	0.360

In the table, we present the fixed effect regression results of CG and environmental sustainability performance. We present results of stepwise regression for environmental dimension in eight models. Model (1) contains fixed effect regression results of all variables. The independent variables are governance characteristics. Similar to the previous presentation of economic dimension, model 2 contains results of interaction variable and other governance variables along with control variables. In equation 2, the dependent variable is *EN_SUST* which is a measure of environmental SP of sample firms. We measure the dependent variable as the product of disclosure index and its respective quality index. Both these indices are measured from the manual content analysis quantification of sustainability information disclosed in sustainability reports by sample companies. The disclosure index is a ratio of disclosed item and the total items on an indicator. To calculate the quality index, we trifurcated the disclosed information into good, neutral, and bad information. For this trifurcation, we follow Patten and Crampton (2003) who provided bases for defining information as positive and negative. We use the same control variables (*ENV_SENS, ROA, SIZE, D/E, SGROW, RDINT*, and *CAPINT*) for all the three dimensions of SP

P value in parentheses

*** $P < 0.01$, ** $P < 0.05$, * $P < 0.1$

a positive and significant effect, the interaction with CEO duality (*INDCEO*) is insignificant. This means that a dual CEO cancels out the positive impact of board independence: compared to the environmental dimension, however, the effect of a dual CEO is weaker, simply offsetting the positive influence of board independence.

The other variable found relevant in explaining changes in the dependent variable is board activity measured by the number of meetings per year. We note that this variable is positively related to the response variable. This implies that a higher number of board meetings increase the firm's focus on social responsibility. The last variable we find positively related to social performance is the existence of a sustainability committee. This result shows that a board with a dedicated committee for sustainability issues enhances social performance. We observe that more profitable firms perform better on social issues, while larger firms focus less on social issues. Sales growth is also found to be negatively related, whereas *RDINT* and *CAPINT* are found to be positively related to social performance. As before, the fact of belonging to environmentally sensitive industries (*ENV_SENS*) is not significant. Table 8 below summarises the overall hypotheses testing results.

Discussion and Conclusions

In this study, we investigate how CG is related to SP, more specifically, whether particular CG characteristics are related to SP dimension(s). In contrast to the existing literature, we measure the SP on three dimensions separately, following the (GRI) framework for measurement of our dependent variables—economic, environmental, and social dimensions. The GRI framework challenges firms to report positive as well as negative information regarding their operations (Hahn and Lülfs 2014) and facilitates them in the improvement of their CSR management (Vigneau et al. 2014).

Our analysis yields interesting results regarding the relationship between CG characteristics and SP dimensions. We find support for most of our hypothesised relationships with agency and stakeholder theory and conduct fact-based empirical analysis. Contrary to our expectations, we are unable to find any significant relationship between the economic bottom of sustainability performance and CG characteristics. The possible reason for this finding lies in the very nature of economic indicators. The underlying GRI framework describes the nature of the economic dimension in following manner:

> An organization's economic performance is fundamental to understanding the organization and its basis for sustainability. However, this information is

Table 7 Regression results of CG characteristics and social sustainability performance

VAR.	Exp. Sign	(1) SO_SUST	(2) SO_SUST	(3) SO_SUST	(4) SO_SUST	(5) SO_SUST	(6) SO_SUST	(7) SO_SUST	(8) SO_SUST	(9) SO_SUST
BSIZE	(−)	−0.00199	−0.00125		−0.00572					
		(0.721)	(0.907)		(0.383)					
BINDP	(+)	0.00383***				0.00529***				
		(0.00123)				(7.51e−06)				
CEOD	(−)	0.00578					0.0225			
		(0.777)					(0.312)			
INDCEO	(−)		−3.53e−06							
			(0.991)							
WOB	(+)	0.00459***	0.00460**					0.00468***		
		(0.000262)	(0.0327)					(0.000714)		
BMTNG	(+)	0.00650***	0.00712**						0.00483*	
		(0.00910)	(0.0230)						(0.0787)	
CSRCOM	(+)	0.0621***	0.0649**							0.0887***
		(0.00475)	(0.0277)							(9.27e−05)
ENV_SENS	(+)	−0.0416	−0.0639	-0.0698	−0.0508	−0.0596**	−0.0549*	−0.0284	−0.0535*	−0.0598**
		(0.107)	(0.653)	(0.632)	(0.103)	(0.0367)	(0.0655)	(0.326)	(0.0866)	(0.0232)
ROA	(+)	0.0150***	0.0133***	0.0140***	0.0160***	0.0167***	0.0165***	0.0164***	0.0163***	0.0131***
		(0)	(3.33e−05)	(2.06e−05)	(0)	(0)	(0)	(0)	(0)	(4.76e−10)
SIZE	(+)	−0.0445***	−0.000318	−0.0177	−0.0173	−0.0283***	−0.0232**	−0.0266***	−0.0315**	−0.0250***
		(0.000128)	(0.996)	(0.746)	(0.166)	(0.00638)	(0.0320)	(0.00978)	(0.0114)	(0.00978)
D/E	(−)	−2.97e−05	−1.13e−05	−3.19e−06	−3.55e−05	−3.52e−05	−3.49e−05	−2.76e−05	−4.14e−05*	−3.89e−05*
		(0.159)	(0.755)	(0.932)	(0.142)	(0.117)	(0.146)	(0.232)	(0.0854)	(0.0804)
SGROW	(+)	−0.00134**	−0.00135*	−0.00148**	−0.00167***	−0.00167***	−0.00168***	−0.00156***	−0.00154**	−0.00166***
		(0.0137)	(0.0604)	(0.0474)	(0.00610)	(0.00340)	(0.00615)	(0.00879)	(0.0109)	(0.00495)
RDINT	(+)	0.507**	1.121	1.398	0.711***	0.577**	0.665***	0.553**	0.676**	0.707***
		(0.0210)	(0.498)	(0.413)	(0.00865)	(0.0192)	(0.00914)	(0.0235)	(0.0121)	(0.00176)
CAPINT	(+)	0.181**	−0.228	−0.157	0.221**	0.188*	0.207**	0.190*	0.241**	0.187**
		(0.0404)	(0.759)	(0.835)	(0.0333)	(0.0507)	(0.0421)	(0.0506)	(0.0209)	(0.0466)
Constant		0.399***	0.183	0.535	0.632***	0.238	0.611***	0.572***	0.679***	0.630***
		(0.00483)	(0.768)	(0.394)	(1.78e−06)	(0.105)	(1.21e−06)	(2.02e−06)	(6.00e−07)	(2.42e−08)
R^2 (Overall)		0.528	0.429	0.152	0.152	0.264	0.219	0.162	0.157	0.360

The table is built with the random effect regression results of social sustainability performance analysis. Following the analysis and presentation pattern of previous equation, we analyse the impact of governance and control variables on social SP. *SO_SUST* is the measure of social performance which is computed from sustainability disclosure index and quality index. The social performance is a measure of performance on labour, human rights, society, and product responsibility dimensions. The GRI framework challenges companies to report on all aspects of firm's social impacts. The guidelines provide the definition of overall indicators as well as individual items comprised by each indicator. The independent and control variables are the same for all the sustainability variables. We report the overall *R-Squared* in the bottom of table

P value in parentheses

*** $P < 0.01$, ** $P < 0.05$, * $P < 0.1$

Table 8 Summary of hypotheses testing

Hypotheses	Studied relationship	Result
Hypothesis 1		
H1a	BSIZE→EC_SUST	Rejected
H1b	BSIZE→EN_SUST	Rejected
H1c	BSIZE→SO_SUST	Rejected
Hypothesis 2		
H2a	BINDP→EC_SUST	Rejected
H2b	BINDP→EN_SUST	Accepted
H2c	BINDP→SO_SUST	Accepted
Hypothesis 3		
H3a	CEOD→EC_SUST	Rejected
H3b	CEOD→EN_SUST	Accepted
H3c	CEOD→SO_SUST	Rejected
Hypothesis 4		
H4a	WOB→EC_SUST	Rejected
H4b	WOB→EN_SUST	Rejected
H4c	WOB→SO_SUST	Accepted
Hypothesis 5		
H5a	BMTNG→EC_SUST	Rejected
H5b	BMTNG→EN_SUST	Rejected
H5c	BMTNG→SO_SUST	Accepted
Hypothesis 6		
H6a	CSRCOM→EC_SUST	Rejected
H6b	CSRCOM→EN_SUST	Accepted
H6c	CSRCOM→SO_SUST	Accepted

> already well reported … in annual financial accounts and reports. Financial statements provide information about the financial position, performance, and changes in the financial position of an entity (GRI 2006, p. 25).

The observed finding of non-relevance of the economic dimension provides support to the existing argument of Lozano and Huisingh (2011) regarding the weak inter-linkage between different sustainability dimensions of stand-alone reporting frameworks. The revealed results are also in line with recent modifications in reporting guidelines. In the new version of reporting guidelines (G4 guidelines), GRI has changed 78 % of the items on the economic indicator.

Alternatively, our empirical evidence can be interpreted as support for the choice of integrated reporting. An integrated reporting framework provides a holistic view on a firm's financial and non-financial performance avenues. Building inter-linkages between financial and non-financial performance through integrated reporting will provide better performance analysis prospects (Lozano and Huisingh 2011).

Empirical results show that most of the CG characteristics play an important role in enhancing a firm's environmental and social SP, across all industries. We note that a board with a higher proportion of independent directors positively impacts environmental and social performance (H2b and H2c). These results are in line with the agency and stakeholder theory argument that external directors have responsibility for a wider variety of stakeholders (Galbreath 2011; Jo and Harjoto 2011). These results provide support for conventional wisdom that a more sovereign board is the superior governance structure (Coles et al. 2008; Linck et al. 2008).

Results of H3 are consistent with agency theory and existing empirical literature (see e.g. Arussi et al. 2009; Allegrini and Greco 2013; Giannarakis et al. 2014; Giannarakis 2014b). These results support the role separation of CEO and chairperson of the board. Our results support the agency theory argument that the governing board should monitor the agents' decisions. If the CEO is chair of the board, this monitoring process cannot be effective (Allegrini and Greco 2013). The confirmation of H3 is limited to H3b—CEO duality linked to environmental performance.

In line with the arguments of stakeholder theory and the findings of Ibrahim and Angelidis (2011) and Ntim and Soobaroyen (2013), we find that board diversity enhances the social dimension of sustainability, (H4c) but differently from Walls et al. (2012), we find that diversity does not have any significant impact on environmental performance. Therefore, our results do not find support for H4b—women on a board being linked to environmental performance. Keeping in view the importance of social performance in enhancing financial performance (Dhaliwal et al. 2011) and the importance of diversity in effective decision-making (Post et al. 2011), our results support increased board diversity.

Consistent with agency theory, we consider board meetings as an indicator of board diligence and assume that through more frequent meetings the board can pay more attention to other stakeholders' needs. This is the basic premise of our Hypothesis 5. We find significant support for H5c, which suggests the relationship between the social bottom line and board meeting frequency. These results also confirm the recent findings of Jizi et al. (2014).

The existence of a CSR committee signals the effort to invest in better stakeholder management. This argument, coming mainly from stakeholder theory and its related hypotheses H6b and H6c, finds clear support in our findings where both environmental and social performance are fostered by the CSR committee.

Altogether, our results largely support the complementary theoretical assertions of agency theory and stakeholder theory regarding the role of the board in enhancing SP. We observe that the more independent board, with more women on the board, and a designated CSR committee which meets more frequently, is better able to monitor management decisions regarding environmental and/or social issues. Our results provide support for the use of GRI as a reporting tool, consistent with internal CG structures. Our results also imply that effective internal governance mechanisms help firms to meet sustainability goals and attain legitimacy. Therefore, it is socially desirable to have superior governance mechanisms for monitoring corporate behaviour and fostering corporate sustainability.

Limitations and Future Research Directions

We investigate in depth the relationship between CG characteristics and SP, but our results are limited to large companies which have more resources to invest in sustainability initiatives and can have more vigilant governance mechanisms than smaller firms. The analysis of smaller and medium-sized firms may yield different results. Additionally, we use the general GRI framework for our measurement and reporting of SP, which inherently possesses some limitations regarding its applicability for some sectors. The use of the sector-specific framework may provide better insight regarding the CG and SP relationship.

The study of underlying relationships using other research methods, for example case study and survey methods, can also provide in-depth insight. The suggested methods can better capture the demographic characteristics of board members and firms. Based on the review of extant literature, we also conclude that there is a clear fragmentation in the CG and SP research streams. There can be many possible reasons for this fragmentation, including methodological issues, sample size, country and industry effect, and time period. To the best of our knowledge, no meta-analytical review has so far been presented in the existing literature. Having said this, we invite future researchers to fill this gap by identifying the possible reasons for this existing fragmentation.

Further suggestions for future research could be the use of other CG elements. The role of board audit and nomination committees could be an interesting research question. We note interesting results concerning the role of board meeting frequency and social performance; it would add value to these results by studying the average attendance of each meeting in relation to social as well as other performance dimensions of sustainability. The inclusion of management variables such as the presence of a finance director on the board and the backgrounds of top management may also uncover interesting facts. Finally, a more external CG perspective may add to our knowledge of the broader research field of CG.

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