

# Unpacking sustainability reporting dimensions: the impact of board characteristics

Sustainability  
reporting  
dimensions

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## Abstract

**Purpose** – This paper aims to document international evidence of the impact of a board-level governance bundle [size, independence, CEO duality, gender diversity and sustainability committee (SC)] on sustainability reporting (SR) and, separately, on its three dimensions (economic, environmental and social).

**Design/methodology/approach** – The sample includes 370 listed firms from 50 countries. A GRI standards-based disclosure index was constructed to quantify SR across various reporting media.

**Findings** – The baseline findings show that SC positively affects SR and its three dimensions. Board size also has a significant and positive impact on SR and two of its dimensions (economic and social). Similarly, board independence and CEO duality have a significant but negative association with SR and the same two dimensions. Finally, board gender diversity has no significant impact on SR and all its three dimensions.

**Practical implications** – The findings that only SC significantly influences SR, and its three dimensions, have important implications for corporate governance reforms internationally to improve SR in countries where such committees are not yet part of the board of directors' sub-committees.

**Originality/value** – Overall, this study contributes to board characteristics–SR literature and holds significant theoretical and practical implications.

**Keywords** Board characteristics, Sustainability reporting, Triple bottom line reporting, Stakeholder agency theory, Sustainability committee

**Paper type** Research paper



## 1. Introduction

Recently, there has been increasing interest from business and academia in sustainability reporting (SR) (Dwekat *et al.*, 2022; Hasan *et al.*, 2022; Alshhadat, 2023; Benameur *et al.*, 2023;

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Kumar *et al.*, 2023; Nuhu and Alam, 2024). In this paper, we document international evidence of the impact of board characteristics on SR and, separately, on its three dimensions (economic, environmental and social). According to the literature (e.g. Ong and Djajadikerta, 2020; Nicolò *et al.*, 2022; Baatwah *et al.*, 2023; Yadav and Jain, 2023), prior studies have established that corporate governance (CG), and specifically board of directors (BoD), play an essential role in SR. We focus on BoD because it is the fundamental mechanism of firms and an important part of their governance structure (Jensen and Meckling, 1976). In fact, BoD represents the ultimate internal control mechanism for monitoring managers (Rupley *et al.*, 2012) and has a significant influence on firms' reporting procedures.

The investigation of how BoD affects SR is important because the latter is central to achieving the United Nations' sustainable development agenda. In this regard, the United Nations, in 2015, issued 17 Sustainable Development Goals (SDGs) with 169 associated targets and 232 indicators to ensure sustainable development. These SDGs "are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental" (United Nations, 2015). Specifically, target 12.6 encourages firms to adopt sustainable practices and integrate sustainability information into their reporting cycle.

Despite the progress made in investigating this relationship, prior studies largely neglect the importance of unpacking the SR dimensions (e.g. Ibrahim and Hanefah, 2016; Katmon *et al.*, 2019; Githaiga and Kosgei, 2023; Nguyen *et al.*, 2023). In this paper, we argue that the investigation of aggregate SR has led to an over-simplification of a rather multi-dimensional SR construct, hence obfuscating the potential influence on each dimension. Several studies (e.g. Walls *et al.*, 2012; Wang *et al.*, 2016; Xu and Ma, 2022) argue that drawing insightful conclusions about the association with different dimensions of sustainability can be challenging. This is due to the multi-dimensional construct of sustainability (Lozano, 2008). In fact, the literature that uses aggregate measures of SR may not adequately capture the construct's complexity and richness. For instance, a firm with high levels of social reporting but low levels of environmental reporting may have the same aggregate score as another firm with a low social reporting score but a high environmental reporting score, assuming that these firms have similar economic reporting scores. This may lead to "stakeholder mismatching" (Wood and Jones, 1995) and an imbalance of interests since different stakeholders have different interests in firms (Clarkson, 1995).

Moreover, the impact of board attributes on sustainability may differ by dimensions. For example, Endrikat *et al.* (2021) find that a particular aspect of corporate social responsibility (CSR) (i.e. social vs environmental dimension) moderates the board attributes–CSR nexus. Alazzani *et al.* (2017) argue that female directors are more concerned with the social dimension than the environmental one. Walls *et al.* (2012) restrict their study to the environmental dimension, arguing that environmental activities may have specific disclosure criteria. SR dimensions are not necessarily related to each other dimensions and may differ substantially. For instance, environmental matters are more technical and tend to influence operational functions, which often depend on internal mechanisms, while social issues include, to a greater degree, ethical and moral reasoning aspects, which usually rely on external stakeholders' actions (Endrikat *et al.*, 2021).

Therefore, because all three dimensions should be satisfied simultaneously and equitably to achieve sustainability (Lozano, 2008; Hussain *et al.*, 2018), the aggregate score of these dimensions may not accurately depict a company's engagement in SR and each dimension. A more charitable explanation of this is that there may not be an equivalent aggregate of CSR performance, either. Several studies question the construct validity of aggregate social responsibility performance scores and that scores do not say much about the performance

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(Wang *et al.*, 2016; Xu and Ma, 2022), making the comparability across companies depending on such scores less credible (Aguinis and Glavas, 2012).

We assert that SR should be treated as a multi-dimensional construct. However, the lack of empirical evidence across all three dimensions means a holistic and integrative understanding of this relationship remains a question of debate. In this paper, we bridge this gap by investigating the impact of a specific board-level governance bundle [1], i.e. size, independence, CEO duality, gender diversity and sustainability committee (SC) on aggregate SR dimensions, and separately, on each dimension. To do so, we use the stakeholder agency theory (Hill and Jones, 1992), use a sample of 370 international firms, and apply GRI standards to measure SR.

Our key findings indicate that SC is the only board characteristic with a positive and significant influence on total SR and its three dimensions. Board size is positively and significantly associated with total SR, economic reporting and social reporting but insignificantly related to environmental reporting. Moreover, board independence and CEO duality have a significant but negative impact on total SR, economic reporting and social reporting but an insignificant influence on environmental reporting. The results also show that gender diversity has neither an impact on total SR nor separately on its three dimensions.

Our study contributes to the existing literature in several ways. *First*, we contribute by documenting evidence of the impact of board characteristics on SR and its three dimensions. Such analysis is not only a response to the increasing calls to disentangle the dimensions of sustainability-related activities (Jain and Jamali, 2016; Wang *et al.*, 2016; Endrikat *et al.*, 2021; Xu and Ma, 2022) but may also uncover several aspects of this given nexus. Our findings show that the impact of some board mechanisms differs by dimension. Thus, we contribute by providing a possible explanation for the inconclusive results, adding new evidence to the literature and advancing the few studies that acknowledge the multidimensional nature of sustainability. By doing so, we keep research aligned with business practices and growing academic interests in SR. Unpacking the dimensions of SR could balance stakeholders' interests instead of focusing on some stakeholders and neglecting others and make the results more operationally meaningful for managerial practices. Hence, we provide firms and standard setters with significant implications.

*Second*, and theoretically, we contribute by providing evidence suggesting that stakeholder-agency theory may not fully explain the impact of all board characteristics on total SR and its three dimensions. Thus, our results contribute to theory development because our analysis is not only descriptive but also exploratory because, as far as we know, no theoretical perspective at present would explicitly explain why the impact of certain board characteristics differs by dimension.

The rest of the paper is structured as follows. Section 2 discusses the theoretical framework and develops the research hypotheses. The data and methodology are discussed in Section 3. Section 4 describes and discusses the empirical results. Finally, Section 5 provides the conclusion of the study and suggests areas for further research.

## 2. Literature review

### 2.1 Theoretical background

This study draws on the stakeholder-agency theory developed by Hill and Jones (1992). According to this theory, the company can be viewed as a link of numerous contracts between seekers and resource holders (Hill and Jones, 1992). As this paradigm portrays, managers in modern-day firms are considered having implicit contractual relationships with various stakeholders – beyond just shareholders, as suggested by the agency theory (Taurigana and Chithambo, 2015; Jain and Zaman, 2020). These stakeholders provide vital

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resources to the company and, in return, expect the company to meet their demands and interests (Kock *et al.*, 2012), including corporate disclosures (Tauringana and Chithambo, 2015). Consequently, managers are duty-bound to allocate critical resources and make decisions in the best interests of stakeholders (Hill and Jones, 1992; Kock *et al.*, 2012). Thus, they will be seen as the stakeholders' agents, and not only as the shareholders' agents (Hill and Jones, 1992).

However, as happens with the agency theory, the principal–agent relations may be filled with a conflict of interest concerning the way of allocating company resources (Kock *et al.*, 2012; Tauringana and Chithambo, 2015). This is due to management's self-interests (Jain and Zaman, 2020) and the complex nexuses of implicit and explicit contractual contracts between the company and its stakeholders (Kock *et al.*, 2012). According to Jain and Zaman (2020), the rationalization for deviant practices arises from the natural conflicts of stakeholders' interests (Hill and Jones, 1992), which lead to agency-like issues (Jensen and Meckling, 1976) in the existence of uncertainty, information asymmetry and power differences.

Accordingly, and in the SR context, the managers may not act according to what stakeholders seek or may satisfy the interests of one group of stakeholders at other stakeholders' expense. Thus, these circumstances require developing mechanisms to align managers' and stakeholders' conflicting interests to enhance SR. In this regard, monitoring and aligning these interests within the stakeholder-agency viewpoint can be achieved by putting in place CG mechanisms (Kock *et al.*, 2012; Tauringana and Chithambo, 2015), and specifically, boards, which have the required legitimacy and power (Hill and Jones, 1992).

## 2.2 Hypotheses development

*2.2.1 Board size.* According to the stakeholder-agency viewpoint, boards are an essential CG mechanism for monitoring management's activities and aligning them with stakeholders' interests (Hill and Jones, 1992). That is, board size may affect corporate outcomes (Yadav and Jain, 2023), such as reporting sustainability information, especially because boards are responsible for setting social responsibility agendas (Baatwah *et al.*, 2023). As stakeholder-agency theory argues, large boards are more likely to represent the interests of shareholders and various stakeholders (Jain and Zaman, 2020). Thus, they should be more effective in enhancing SR (Baatwah *et al.*, 2023). Indeed, large boards ensure that strategies and policies are executed and provide organizations with the necessary diversity to obtain vital resources and broadened networking (Mardawi *et al.*, 2023; Yadav and Jain, 2023).

Furthermore, large boards may positively affect disclosure activities because such boards consist of directors from various stakeholders (Tauringana and Chithambo, 2015). Moreover, small boards hold higher responsibilities and more workload, which may reduce their ability to practice their monitoring roles (Jizi, 2017). Guest (2009) argues that boards with a small number of directors affect the quality of advice and control offered because such boards have less diversified backgrounds and experience than larger boards. Therefore, large boards are presumed to affect SR more positively than smaller ones.

The empirical findings regarding board size are mostly limited to either significant and positive (e.g. Alotaibi and Hussainey, 2016; Biswas *et al.*, 2019) or insignificant impacts (e.g. Adel *et al.*, 2019; Nguyen *et al.*, 2023). Consistent with the stakeholder-agency theory and based on both the above discussion and empirical results, we argue that large boards can enhance the disclosure of sustainability information. Therefore, our first set of hypotheses is:

*H1.* Board size has a positive influence on sustainability reporting.

*H1a.* Board size has a positive influence on economic reporting.

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*H1b.* Board size has a positive influence on environmental reporting.

*H1c.* Board size has a positive influence on social reporting.

*2.2.2 Board independence.* Based on the stakeholder-agency theory, boards with more independent directors can better mitigate and monitor the management's opportunistic behavior that undermines stakeholders' interests (Hill and Jones, 1992; Tauringana and Chithambo, 2015), such as SR. Moreover, from this theoretical viewpoint, independent directors represent multiple stakeholders' interests (Hill and Jones, 1992; Jain and Zaman, 2020). Therefore, they may have incentives to influence the reporting of activities regarding sustainability. According to Ibrahim and Hanefah (2016), a board with more independent directors is expected to direct management toward engaging in and disclosing social responsibility practices.

Furthermore, firms with more independent directors have higher reliability (Yadav and Jain, 2023), transparency and accountability (Amran *et al.*, 2014). Moreover, independent directors are less dependent on CEOs (Jizi *et al.*, 2014), more concerned about their reputation (Amran *et al.*, 2014) and, unlike top management and inside directors, their compensation and remuneration are not based on short-term firm performance (Jizi, 2017). Hence, they act as counterweight mechanisms that keep management concentrating on long-term corporate interests (e.g. incorporating sustainability activities in business and management) and reduce managers' opportunistic behavior, maximizing firm value and enhancing transparency.

Empirically, Jizi (2017) and Githaiga and Kosgei (2023), for example, find a significant and positive impact on certain SR aspects. By contrast, Adel *et al.* (2019) and Alkayed and Omar (2023) find a significant but negative impact on certain pillars of SR. Other studies find no significant effect (e.g. Barakat *et al.*, 2015; Biswas *et al.*, 2019). However, consistent with the stakeholder-agency theoretical perspective, and based on the above discussion, we argue that independent directors can pressure managers to report sustainability information. Thus, we draw our second set of hypotheses as follows:

*H2.* Board independence has a positive influence on sustainability reporting.

*H2a.* Board independence has a positive influence on economic reporting.

*H2b.* Board independence has a positive influence on environmental reporting.

*H2c.* Board independence has a positive influence on social reporting.

*2.2.3 CEO duality.* In line with the stakeholder-agency theory, management's private interests are likely to affect the interests of various stakeholders (i.e. the level of SR) as firms' relationship with their stakeholders is greatly influenced by the CEOs' decisions (Jones and Wicks, 1999). In this regard, CEO duality could represent executive power (Jizi *et al.*, 2014; Jizi, 2017). Thus, it might allow CEOs to influence directors' decisions, affect the boards' appointments for their benefit (Haniffa and Cooke, 2002; Yadav and Jain, 2023) and hide valuable information from other board members (Li *et al.*, 2008). This, in turn, diminishes the board's objectivity as a controlling mechanism, reduces its independence and decreases the transparency and accountability of the company. According to Donnelly and Mulcahy (2008), when firms have no independent leaders, their boards execute their functions with difficulty, thus reducing the intention to disclose information.

Similar to board independence, previous studies report mixed results between CEO duality and certain SR aspects. For instance, Jizi *et al.* (2014) and Biswas *et al.* (2019) report a significant and positive relationship, while Shamil *et al.* (2014) and Zaid *et al.* (2019) show a significant but negative impact. Conversely, others find no significant influence (e.g. Jizi, 2017; Mudiyansele, 2018). However, based on the stakeholder-agency theory and the

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above discussions, separating the roles of CEO and chairperson can enhance SR practices. We, therefore, propose our third set of hypotheses as follows:

- H3.* CEO duality has a negative influence on sustainability reporting.
- H3a.* CEO duality has a negative influence on economic reporting.
- H3b.* CEO duality has a negative influence on environmental reporting.
- H3c.* CEO duality has a negative influence on social reporting.

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*2.2.4 Board gender diversity.* According to the stakeholder-agency theoretical perspective, more diversified boards can better monitor functions and are more likely to represent various stakeholder groups (Raimo *et al.*, 2021). Gender diversity is considered one of the most critical concerns to modern contemporary organizations (Rao and Tilt, 2016). From a stakeholder-agency viewpoint, boards have the power to control a company's managers and ensure that they act in the best interests of stakeholders (Hill and Jones, 1992). In this regard, women on boards are likely to affect companies and their governance significantly (Nuhu and Alam, 2024) and be more concerned with protecting stakeholders' interests (Hussain *et al.*, 2018), for instance, in sustainability practices.

Several explanations may underline the role of gender-diverse boards in sustainability activities. According to Jizi (2017), women on boards are more afraid of litigations and loss of reputation, thus having higher transparency levels and better monitoring management practices. Furthermore, gender-diverse boards are more stakeholder-oriented and more sensitive to social responsibility matters (Hussain *et al.*, 2018) because female directors care and engage more in environmental and social issues than male directors (Amran *et al.*, 2014; Rao and Tilt, 2016). As a result, they are motivated to engage more in sustainability issues (Helfaya and Moussa, 2017; Cabeza-García *et al.*, 2018) and move faster toward economic, environmental and social aspects (Katmon *et al.*, 2019).

Empirical findings on the impact of gender diversity on specific dimensions of SR are inconclusive, e.g. significant and positive (Nicolò *et al.*, 2022), significant but negative (Shamil *et al.*, 2014) and insignificant (Adel *et al.*, 2019). However, drawing on the stakeholder-agency theory and the above discussion, we argue that female directors help reduce sustainability information asymmetry. Our fourth set of hypotheses is as follows:

- H4.* Board gender diversity has a positive influence on sustainability reporting.
- H4a.* Board gender diversity has a positive influence on economic reporting.
- H4b.* Board gender diversity has a positive influence on environmental reporting.
- H4c.* Board gender diversity has a positive influence on social reporting.

*2.2.5 Sustainability committee.* The sustainability/CSR committee is another component of our bundle that has long been neglected but has recently been examined by disclosure literature (e.g. Helfaya and Moussa, 2017; Adel *et al.*, 2019; Giannarakis *et al.*, 2020). According to the stakeholder-agency perspective (Hill and Jones, 1992), boards monitor organizations' sustainable behavior and ensure that companies are accountable to a broad set of stakeholders. In this regard, the board's effectiveness depends on its governance structure and not only on its composition. Given the importance of creating a SC to urge boards toward sustainability practices, it can be argued that the presence of an SC, according to the stakeholder-agency paradigm, helps to satisfy stakeholders' needs and interests (Raimo *et al.*, 2021).

Indeed, establishing a SC is expected to be a powerful monitoring mechanism (Walls *et al.*, 2012; Meqbel *et al.*, 2023). Also, such committees are seen as a capital resource for firms, where the knowledge and experience of the SCs are assumed to perform a significant function in guaranteeing the sustainability aspect (Amran *et al.*, 2014). Moreover, according to Jain and Zaman (2020), SCs are committed to proposing social responsibility strategies to the board. Accordingly, SCs within firms help enhance corporate behavior to satisfy stakeholders' needs regarding sustainability information (Michelon and Parbonetti, 2012).

Nevertheless, there is no clear-cut relationship according to prior empirical results. The literature shows both a positive (e.g. Amran *et al.*, 2014; Adel *et al.*, 2019; Yadav and Jain, 2023) and insignificant impact (e.g. Michelin and Parbonetti, 2012; Giannarakis *et al.*, 2020) of SC on SR. However, from the stakeholder-agency perspective, we expect that the SC will lead to more SR practices. Our fifth set of hypotheses in this regard is:

- H5. The sustainability committee has a positive influence on sustainability reporting.
- H5a. The sustainability committee has a positive influence on economic reporting.
- H5b. The sustainability committee has a positive influence on environmental reporting.
- H5c. The sustainability committee has a positive influence on social reporting.

### 3. Data and methodology

#### 3.1 Sample selection

Based on an international approach, our sample was taken from a GRI list of reporting companies for the 2017 calendar year. We chose this year because it was the year following GRI standards (i.e. 2016) [2]. We included a company in our sample if it met the following three criteria. First, the company should have issued a report covering 2017, prepared according to GRI standards and verified and submitted to the GRI. Second, the company should be listed on a stock exchange. Third, the issued report should be prepared in the English language. Then, firms with missing data were excluded. We ended up examining a sample of 370 companies from 50 countries [3]. Table 1 summarizes the sample description regarding the sample size and number of countries.

#### 3.2 Dependent variable(s): sustainability reporting

To quantify the extent of SR, we perform a content analysis using a broad range of SR sources (i.e. sustainability reports, annual/integrated reports and websites) because concentrating on one specific source may not truly reflect SR (Michelon and Parbonetti, 2012) and penalize companies for non-disclosure information. In this regard, several

No. of companies in 2017	878	No. of countries in 2017	77
<i>Less</i>		<i>Less</i>	
Non-listed companies	369	Countries with non-listed companies	14
Non-English reports	114	Countries with non-English reports	6
Missing data	25	Countries with missing data	7
<i>Total</i>	<i>370</i>	<i>Total</i>	<i>50</i>

**Note:** This table summarizes the sample description regarding sample size and the number of countries  
**Source:** Created by authors

**Table 1.**  
Sample description

guidelines (e.g. ISO 14000 series, SA8000 standard, AA1000 standards and GRI guidelines) have been developed by several national and international institutions to inform various stakeholders concerning corporations' commitment toward achieving sustainability (Lozano and Huisingh, 2011; Giannarakis *et al.*, 2020). However, GRI is the primary driver of SR practices and is considered the most accepted and recognized initiative in the SR field (Hussain *et al.*, 2018; Kumar *et al.*, 2023).

Accordingly, in this paper, our disclosure index is based on standards issued by GRI, which have 77 items in total; 13 items are related to the economic dimension, 30 to the environmental dimension and 34 to the social dimension (see Appendix). For each sampled company, we compute the aggregate score for SR and each of its dimensions, whereby a firm is awarded one if an item is disclosed, and zero otherwise.

For economic, environmental and social reporting, we calculate the score as follows:

$$Firm_j, SR_{eco,env,soc} = (Number\ of\ items\ disclosed) / (Total\ number\ of\ items) \quad (1)$$

where  $SR_{eco,env,soc}$  represents three dependent variables (i.e. economic, environmental and social dimensions).

As we acknowledge the equal weight of the three dimensions, we calculate the aggregate score as follows:

$$Firm_j, SR_{total} = \left( Score_{eco} * \frac{1}{3} \right) + \left( Score_{env} * \frac{1}{3} \right) + \left( Score_{soc} * \frac{1}{3} \right) \quad (2)$$

### 3.3 Independent variables: corporate governance

To test our five sets of hypotheses, we investigate a specific bundle of board-level characteristics. The data for these variables are collected from BoardEx, and we illustrate their measurements in detail in Table 2.

### 3.4 Control variables

To avoid model misspecification, we control for two sets of variables (i.e. firm-level characteristics and country-level institutional factors). Moreover, the sector fixed effect is controlled to capture the sector-specific variation based on the GRI's sector classification. The data for the first set of control variables is obtained from DataStream and annual reports. By contrast, data for the second set is gathered from multiple sources (i.e. the World Bank database, the Worldwide Governance Indicators and the World Economic Forum's Global Gender Gap score).

For firm-level characteristics, we control the firm size since large companies experience greater attention from different groups in society (Khan *et al.*, 2013), thus disclosing more information (Boshnak, 2022). Following Jizi *et al.* (2014), we incorporate a variable that captures profitability, as profitable firms influence SR positively (Hussainey *et al.*, 2011). As sustainability report assurance enhances SR credibility and reliability (Meqbel *et al.*, 2023), we also account for assurance quality. We also control for the impact of firm leverage since firms with high leverage have fewer chances to disclose social responsibility information (Jizi, 2017; Boshnak, 2022). Finally, we control the firm age, as older companies reveal more social responsibility disclosures (Khan *et al.*, 2013).

For country-level factors, we first control for the investor protection strength. According to Ioannou and Serafeim (2012), in countries with a great level of shareholder interest protection, other stakeholders' interests are significantly lowered. We also control for legal system strength, as the degree of law enforcement in a country is one of the most significant



factors determining the level of pressure to report information (Barakat *et al.*, 2015). Also, we account for gender parity, as it affects decision-making processes and board decisions, and ultimately, firm outcomes (Post and Byron, 2015), for example, SR. Finally, following empirical disclosure literature (e.g. Lu and Wang, 2021), we control for GDP growth.

### 3.5 Empirical model

The following model using OLS multiple regression is used to test our five sets of hypotheses:

$$\begin{aligned} \chi_{SR,eco,env,soc} = & \alpha + \beta_1 BS + \beta_2 BI + \beta_3 Dual + \beta_4 BGD + \beta_5 SC + \beta_6 FS + \beta_7 ROA \\ & + \beta_8 AQ + \beta_9 LEV + \beta_{10} FA + \beta_{11} IPS + \beta_{12} LSS + \beta_{13} GP \\ & + \beta_{14} GDPG + \sum_{n=15}^{47} \beta_n Sector_n + \varepsilon \end{aligned}$$

Table 2 defines our dependent, independent and control variables.

Variable	Symbol	Measurement
<i>Dependent variables</i>		
Sustainability reporting	<i>SR</i>	(1/3)* (score for Eco + score for Env + score for Soc)
Economic reporting	<i>Eco</i>	Number of economic items disclosed divided by the total number of economic items
Environmental reporting	<i>Env</i>	Number of environmental items disclosed divided by the total number of environmental items
Social reporting	<i>Soc</i>	Number of social items disclosed divided by the total number of social items
<i>Independent variables</i>		
Board size	<i>BS</i>	The number of directors on the board
Board independence	<i>BI</i>	The proportion of independent directors on the board
CEO duality	<i>Dual</i>	Dummy variable equals to one if the CEO and the chairman are the same person and zero otherwise
Board gender diversity	<i>BGD</i>	The proportion of female directors on the board
Sustainability committee	<i>SC</i>	Dummy variable equals to one if the firm has an SC, and zero otherwise
<i>Control variables</i>		
Firm size	<i>FS</i>	The logarithmic of total assets
Profitability	<i>ROA</i>	The ratio of earnings before interest and tax to total assets
Assurance quality	<i>AQ</i>	Dummy variable equals to one if the sustainability/integrated report is externally assured, and zero otherwise
Leverage	<i>LEV</i>	The ratio of total liabilities to total assets
Firm age	<i>FA</i>	The logarithm of the period the firm has been listed on a stock exchange
Investor protection strength	<i>IPS</i>	Using the strength of investor protection index (World Bank)
Legal system strength	<i>LSS</i>	Using the sum score of Worldwide Governance Indicators ranging from -15 (weak) to 15 (strong)
Gender parity	<i>GP</i>	Using the World Economic Forum's Global Gender Gap score
GDP growth	<i>GDPG</i>	The annual percentage change of GDP growth based on constant 2010 US\$ (World Bank)

**Table 2.**  
Definition of  
variables

Source: Created by authors

## 4. Empirical results and discussion

### 4.1 Descriptive statistics and correlation analysis

**Table 3** presents descriptive statistics for all the variables. The results indicate that the mean for the total SR scores is 44.3%, suggesting that the level of SR is moderate. For individual dimensions, firms, on average, disclose more information related to the economic dimension (as indicated by a mean of 47.2%), followed by the social dimension (with a mean of 43%) and the environmental dimension (as suggested by the mean of 42.8%). In terms of the independent variables, the mean for the board size is about 11 members. The results also show that the mean of board independence is 57.5%, while only about 22.2% of firms have role duality. Regarding gender diversity, the results show low levels of female engagement, as the mean is 18.8%, which is a sign of male-dominated boards. On average, about 65.4% of companies have established a SC, suggesting that such committees are becoming common.

**Table 4** presents the correlations among all variables. The results show that all correlation values fall below the threat value ( $r = 0.8$ ) recommended by [Field \(2013\)](#). Hence, there is no indication of a multicollinearity issue. Nevertheless, although no correlation value is found to be very large, some degree of multicollinearity can remain ([Myers, 1990](#)). Thus, we additionally use the VIF test to detect multicollinearity issues. The maximum VIF is 2.36 (with a mean of 1.62), which confirms that multicollinearity does not affect the examined models in our study.

### 4.2 Regressions analysis

Our baseline results are presented in **Table 5**. The relationships between board variables and total SR, economic reporting, environmental reporting and social reporting are investigated in Model 1, Model 2, Model 3 and Model 4, respectively. The R-squared values for our four models are 0.369, 0.281, 0.433 and 0.326, respectively, which indicate the variabilities in our dependent variables that the examined variables could explain.

Variables	Mean	SD	Min	Max
SR	0.443	0.233	0.055	1.00
Eco	0.472	0.270	0.077	1.00
Env	0.428	0.251	0.000	1.00
Soc	0.430	0.249	0.029	1.00
BS	10.630	3.404	5	29
BI	0.575	0.247	0.00	1.00
Dual	0.222	0.416	0	1
BGD	0.188	0.124	0.00	0.500
SC	0.654	0.476	0	1
FS	9.872	0.839	7.185	12.259
ROA	0.066	0.082	-0.596	0.531
AQ	0.532	0.500	0	1
LEV	0.618	0.235	0.028	2.225
FA	1.639	0.386	0.301	2.544
IPS	6.710	0.986	3.500	8.300
LSS	6.079	4.479	-6.186	10.917
GP	0.723	0.050	0.584	0.830
GDPG	0.032	0.016	-0.047	0.082

**Table 3.**  
Summary descriptive  
statistics for all  
variables

**Source:** Created by authors

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. SR	1																	
2. Eco	0.914***	1																
3. Env	0.882***	0.672***	1															
4. Soc	0.934***	0.809***	0.744***	1														
5. BS	0.301***	0.283***	0.262***	0.276***	1													
6. BI	-0.102**	-0.129**	-0.018	-0.129**	-0.080	1												
7. Dual	-0.085	-0.079	-0.053	-0.099*	0.031	0.161***	1											
8. BGD	0.018	0.033	-0.004	0.019	0.092*	0.318***	0.010	1										
9. SC	0.310***	0.238***	0.322***	0.290***	0.192***	0.163***	0.019	0.060	1									
10. FS	0.200***	0.220***	0.176***	0.149***	0.441***	0.196***	0.114**	0.293***	0.276***	1								
11. ROA	0.074	0.034	0.136***	0.034	-0.001	0.064	-0.044	0.046	-0.013	-0.091*	1							
12. AQ	0.350***	0.300***	0.336***	0.322***	0.328***	-0.016	0.017	0.190***	0.241***	0.335***	0.024	1						
13. LEV	-0.112**	-0.036	-0.190***	-0.085	0.083	0.075	0.064	0.093*	-0.009	0.279***	-0.141***	-0.039	1					
14. FA	0.063	0.068	0.024	0.080	0.107**	0.135***	0.117**	0.167***	0.144***	0.280***	-0.050	0.100*	0.047	1				
15. IPS	-0.167***	-0.176***	-0.132**	-0.147***	-0.197***	0.055	-0.056	-0.074	0.050	-0.203***	-0.093*	-0.065	-0.134***	0.029	1			
16. LSS	-0.129**	-0.131**	-0.099*	-0.12**	-0.101*	0.384***	0.076	0.293***	-0.023	0.033	-0.031	-0.065	-0.026	0.00	0.313***	1		
17. GP	-0.087*	-0.079	-0.083	-0.077	-0.034	0.258***	-0.013	0.473***	-0.164***	0.054	0.054	0.049	-0.028	0.058	-0.088*	0.550***	1	
18. GDPG	0.043	0.002	0.062	0.055	-0.039	-0.249***	-0.028	-0.170***	0.009	-0.196***	-0.069	0.009	-0.149***	0.042	0.250***	-0.148***	-0.201***	1

Notes: The detailed definitions of the variables can be found in Table 2; \*Significance at 0.1 level; \*\*Significance at 0.05 level; \*\*\*Significance at 0.01 level

Source: Created by authors

Table 4.  
Pearson correlation

	Model 1. SR	Model 2. Eco	Model 3. Env	Model 4. Soc
BS	0.008** (0.003)	0.009** (0.004)	0.005 (0.003)	0.009** (0.004)
BI	-0.120** (0.050)	-0.161*** (0.061)	-0.046 (0.053)	-0.151*** (0.057)
Dual	-0.054** (0.026)	-0.056* (0.033)	-0.037 (0.025)	-0.068** (0.029)
BGD	0.004 (0.104)	0.039 (0.129)	-0.069 (0.105)	0.039 (0.116)
SC	0.099*** (0.023)	0.087*** (0.028)	0.102*** (0.025)	0.107*** (0.025)
FS	0.049*** (0.018)	0.048** (0.021)	0.071*** (0.020)	0.030 (0.021)
ROA	0.033 (0.150)	0.008 (0.174)	0.154 (0.156)	-0.070 (0.154)
AQ	0.081*** (0.025)	0.078** (0.031)	0.078*** (0.026)	0.087*** (0.028)
LEV	-0.073 (0.045)	-0.066 (0.058)	-0.115** (0.053)	-0.041 (0.047)
FA	-0.003 (0.031)	-0.007 (0.036)	-0.025 (0.033)	0.023 (0.032)
IPS	-0.047*** (0.014)	-0.051*** (0.018)	-0.047*** (0.014)	-0.042*** (0.015)
LSS	0.002 (0.004)	0.003 (0.004)	0.003 (0.004)	0.001 (0.004)
GP	-0.296 (0.316)	-0.308 (0.384)	-0.318 (0.331)	-0.261 (0.346)
GDPG	1.110 (0.877)	0.623 (1.016)	1.753** (0.881)	0.933 (0.959)
Sector fixed effect	Included	Included	Included	Included
_cons	0.430 (0.324)	0.482 (0.392)	0.298 (0.343)	0.516 (0.317)
R <sup>2</sup>	0.369	0.281	0.433	0.326

**Notes:** This table presents our baseline results. Model 1, Model 2, Model 3 and Model 4 examine the impact of board characteristics on sustainability, economic, environmental and social reporting, respectively. Sector fixed effect is included in the estimations but not reported. Robust standard errors in parentheses. Detailed definition of all the variables is in [Table 2](#); \*Significance at 0.1 level; \*\*significance at 0.05 level; \*\*\*significance at 0.01 level

**Source:** Created by authors

**Table 5.**  
Baseline regressions  
results

Our results demonstrate that board size has a significant and positive impact on total SR, economic reporting and social reporting. However, there is no significant relationship with environmental reporting. Thus, *H1*, *H1a* and *H1c* are supported, but not *H1b*. Apart from environmental reporting, these results are in line with the stakeholder-agency theory and support previous research reporting a similar relationship between board size and total SR or specific aspects of SR (e.g. [Jizi et al., 2014](#); [Pucheta-Martínez and Gallego-Álvarez, 2019](#)). Regarding environmental reporting, we find no significant relationship; however, this result is consistent with prior empirical results (e.g. [Fernandes et al., 2019](#)). One plausible reason for the insignificant association is that larger boards are associated with less monitoring of organization governance ([Hussain et al., 2018](#)) and coordination and communication problems ([Wang and Hussainey, 2013](#)), which may be the case regarding the environmental dimension in the examined sample.

Interestingly, apart from the environmental reporting result, which indicates an insignificant effect, board independence is negatively related to total SR, economic reporting and social reporting. Therefore, *H2*, *H2a*, *H2b* and *H2c* are rejected. Although the negative effects aligns with prior studies (e.g. [Adel et al., 2019](#); [Alkayed and Omar, 2023](#)), they are quite surprising, as independent directors are expected to meet various stakeholders' interests ([Hill and Jones, 1992](#)). One reason may be due to the cost of disclosing sustainability information to owners. For instance, when firms disclose large amounts of sustainability-related information to stakeholders, this may be at the expense of shareholders. In that case, independent directors may oppose SR to preserve and not undermine shareholders' interests, as they may consider their relationships with shareholders compared to other stakeholders to be more of a priority for their firm ([Pucheta-Martínez and Gallego-Álvarez, 2019](#)). Another reason is that independent directors may not be truly independent in practice because of being outside the firm ([Barako et al., 2006](#)) or because of the effects that powerful CEOs have, thus undermining their decisions and professional judgements toward sustainability activities ([Taurigana and Chithambo, 2015](#)).

Similarly, CEO duality has a significant and negative impact on total SR, economic reporting and social reporting but has an insignificant influence on environmental reporting. Hence, *H3*, *H3a* and *H3c* are confirmed, but not *H3b*. Except for environmental reporting, these results are in line with our theoretical argument, where separating the role of chairman and CEO reduces the information asymmetry between management and stakeholders. Also, these results are consistent with prior studies that examine the impact of CEO duality on total SR or certain aspects of SR (e.g. [Zaid et al., 2019](#); [Harun et al., 2020](#)). In terms of environmental reporting, consistent with [Fernandes et al. \(2019\)](#), our results show an insignificant association.

The results also show that board gender diversity has no significant influence on total SR or, separately, on its three dimensions. Accordingly, none of our hypotheses (*H4*, *H4a*, *H4b* and *H4c*) is supported. This is contrary to our expectations but in line with prior empirical results (e.g. [Adel et al., 2019](#); [Alkayed and Omar, 2023](#); [Yadav and Jain, 2023](#)). One possible reason might be the barriers (e.g. stereotyping and gender bias) that female directors are likely to encounter, restricting their abilities to fully contribute to corporate strategy and oversight ([Rao and Tilt, 2016](#); [Alazzami et al., 2017](#)). Another explanation for the insignificant influence might be that the boards in our sample, on average, comprise only 18.8% of female directors, with only 33.2% of the sampled firms having more than two female directors. In such male-dominated boards, female directors may have little chance to be active or vocal, thus falling behind in decision-making processes, ultimately leading to the failure to affect SR ([Amran et al., 2014](#)).

Finally, we find a highly significant and positive relationship between the existence of the SC and our four dependent variables; thereby, *H5*, *H5a*, *H5b* and *H5c* are confirmed. This suggests that SC is a powerful mechanism that helps align managerial interests with various stakeholders' interests by reducing sustainability information asymmetry. Our results align with the stakeholder–agency paradigm and the theoretical underpinning, combined with common sense, that such a committee positively affects sustainability activities. Our results are also in line with previous studies, such as [Helfaya and Moussa \(2017\)](#) and [Adel et al. \(2019\)](#).

#### 4.3 Robustness checks

To address the endogeneity problem in the models proposed, explanatory and control variables are lagged by one year (i.e. 2016), which is in line with several studies (e.g. [Cabeza-Garcia et al., 2018](#); [Mudiyanselage, 2018](#)) that support using the lagged explanatory variables to alleviate possible endogeneity concerns. However, the results shown in [Table 6](#) are consistent with the baseline findings, confirming that the potential endogeneity is not an issue in our analysis.

Furthermore, small firms have fewer resources to engage in sustainability activities and may have less vigilant CG mechanisms ([Hussain et al., 2018](#)), which may influence our main results. Thus, based on GRI classification, we drop all 25 small and medium-sized enterprises (SMEs) from our sample and re-run the regressions. However, as [Table 7](#) indicated, we find no substantial differences from our original findings.

Moreover, we measure total SR alternatively as the number of items disclosed divided by the total number of items (i.e. 77 items). Nevertheless, the results are consistent with our baseline results. Finally, we conduct further robustness checks to confirm our results regarding board independence and gender diversity. We check for a U-shaped relationship ([Lind and Mehlum, 2010](#)) between board independence and SR as it may result in the significant negative impact; however, we do not find evidence. For the board gender diversity, and based on critical mass theory ([Cabeza-Garcia et al., 2018](#)), we investigate whether the results are driven by tokenism (i.e. whether the critical mass is a matter in our sample). Still, we discover that the insignificant impacts of gender diversity on SR practices

	SR	Eco	Env	Soc
BS	0.007** (0.004)	0.008* (0.005)	0.005 (0.004)	0.010** (0.004)
BI	-0.112** (0.049)	-0.149** (0.060)	-0.040 (0.051)	-0.145** (0.057)
Dual	-0.055** (0.025)	-0.058* (0.032)	-0.038 (0.025)	-0.067** (0.028)
BGD	0.048 (0.101)	0.083 (0.127)	-0.000 (0.102)	0.060 (0.112)
SC	0.106*** (0.022)	0.094*** (0.028)	0.112*** (0.024)	0.113*** (0.025)
Control variables	Included	Included	Included	Included
Sector fixed effect	Included	Included	Included	Included
_cons	0.533 (0.337)	0.596 (0.411)	0.427 (0.362)	0.571 (0.363)
R <sup>2</sup>	0.383	0.286	0.452	0.337

**Table 6.**  
Regressions results  
after the use of  
lagged explanatory  
and control variables

**Notes:** This table presents the results after lagging our explanatory and control variables by one year. Control variables and sector fixed effect are included in the estimations but not reported. Robust standard errors are in parentheses. A detailed definition of all the variables is in [Table 2](#); \*Significance at 0.1 level; \*\*significance at 0.05 level; \*\*\*significance at 0.01 level

**Source:** Created by authors

	SR	Eco	Env	Soc
BS	0.008** (0.003)	0.009** (0.004)	0.005 (0.003)	0.010** (0.004)
BI	-0.117** (0.052)	-0.148** (0.062)	-0.052 (0.056)	-0.149** (0.060)
Dual	-0.056** (0.027)	-0.056* (0.035)	-0.039 (0.027)	-0.071** (0.031)
BGD	-0.004 (0.117)	-0.008 (0.144)	-0.062 (0.118)	0.056 (0.132)
SC	0.088*** (0.024)	0.075** (0.029)	0.094*** (0.026)	0.096*** (0.027)
Control variables	Included	Included	Included	Included
Sector fixed effect	Included	Included	Included	Included
_cons	0.369 (0.335)	0.386 (0.401)	0.259 (0.357)	0.459 (0.365)
R <sup>2</sup>	0.362	0.281	0.442	0.323

**Notes:** This table presents the results after excluding SMEs. Control variables and sector fixed effect are included in the estimations but not reported. Robust standard errors are in parentheses. A detailed definition of all the variables is in [Table 2](#); \*Significance at 0.1 level; \*\*significance at 0.05 level; \*\*\*significance at 0.01 level

**Table 7.**  
Regressions results  
after excluding SMEs

**Source:** Created by authors

hold, irrespective of the number of female directors (the results are not reported but are available upon request).

## 5. Conclusion

This paper investigates the impact of a specific bundle of board characteristics (i.e. size, independence, CEO duality, gender diversity and SC) on total SR and, separately, on its three dimensions. Using an international sample of 370 companies, various sustainability information sources and GRI standards, we find a strong positive influence of the SC on total SR and all its three dimensions. Our results also document a significant and positive influence of board size on SR and two dimensions (economic and social). By contrast, board independence and CEO duality are significantly and negatively associated with SR and the same two dimensions. Board gender has no significant impact on SR and all its dimensions.

The results reported should be interpreted given the following limitations. First, our results are limited to one year, which restricts considering additional perspectives from

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underrepresented countries or sectors. Therefore, it would be interesting for future studies to use a more extended analysis period (i.e. conduct a longitudinal study). This, for instance, would further enrich this study's findings, allow the examination of these relationships in different sectors or regions separately and show how the relationship between board attributes and SR evolves over time. Second, our sample stems from a GRI list of reporting companies. Hence, future research could analyze the board characteristics–SR nexus in non-GRI reporting firms. Third, we only focus on internal CG mechanisms (i.e. board attributes). Examining external CG mechanisms (e.g. ownership attributes) or institutional CG mechanisms (e.g. legal and cultural systems) may offer new insights and knowledge.

Finally, the analysis was conducted using only a quantitative approach. Hence, future studies can apply other research methods (i.e. qualitative approach) to investigate these relationships that better capture board members' demographic characteristics (Hussain *et al.*, 2018) and raise the rationality of research. Furthermore, given the reported results, the relationship between SC characteristics and SR could be an interesting research question. Moreover, because this study reports interesting results regarding board independence and gender diversity, future studies might investigate, for example, independent and female members' compensation, age and tenure.

Our findings have important academic, theoretical and practical implications. For academic implications, this research enriches the existing literature by incorporating an empirical study that supports the multi-dimensional of sustainability because there is a dearth of studies unpacking the dimensions of sustainability (Jain and Jamali, 2016; Ali *et al.*, 2017). The results can greatly benefit academia as they encourage disaggregating the SR dimensions. Regarding the implication for theory, the results suggest that stakeholder–agency theory (Hill and Jones, 1992) does not explain why some board characteristics are not effective in aligning managers' and stakeholders' interests regarding SR and its three dimensions, or why some could affect one dimension (i.e. economic or social) but not the other (i.e. environmental).

In terms of practical implications, the results have important implications for CG reforms internationally. Our findings – which indicate that the significant and positive relationship between SC and SR holds, irrespective of its three dimensions – provide valuable insights to carry out further reforms in the CG arena. Therefore, policymakers and firms should focus on SC in their CG reforms, particularly in developing countries where establishing such committees is not a common practice. Furthermore, this study shows the differences in firms' specific patterns of SR strategies (i.e. which dimensions are emphasized), thus putting into place the board structure needed to enhance firms' sustainability strategies. In this regard, our results have implications for standard setters to revise the role and structure of boards towards the environmental dimension. Moreover, regarding the GRI, this study provides valuable insights regarding the extent to which companies disclose the three dimensions of sustainability one year after issuing its SR standards. This helps GRI better understand SR worldwide by assessing whether and to what extent the firms worldwide comply with its standards. Overall, this can improve the ongoing standard-setting process, especially the economic dimension that GRI has widely multi-modified over the past few years (Hussain *et al.*, 2018).

## Notes

1. The study focuses on these characteristics because they have been examined mainly in sustainability-related literature, with mixed results. This is evident in several review papers (Dwekat *et al.*, 2020; Endrikat *et al.*, 2021; Dwekat *et al.*, 2022; Velte, 2022), showing that these variables are the primary determinant of sustainability-related information.
2. The information for other years was incomplete during data collection because of the continuous gathering of data and the Standards Report Registration process by GRI. Currently, the GRI

disclosure database is not available. Still, using one year aligns with several previous studies (e.g. [Helfaya and Moussa, 2017](#); [Adel et al., 2019](#); [Giannarakis et al., 2020](#); [Ong and Djajadikerta, 2020](#)).

- Following several prior studies (e.g. [Khan et al., 2013](#); [Cabeza-Garcia et al., 2018](#)), we do not exclude financial firms from our sample.

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GRI standard	Item
<i>Economic dimension</i>	
GRI 201 – economic performance	201–1:Direct economic value generated and distributed 201–2:Financial implications and other risks and opportunities due to climate change 201–3:Defined benefit plan obligations and other retirement plans 201–4:Financial assistance received from government
GRI 202 – market presence	202–1:Ratios of standard entry level wage by gender compared to local minimum wage 202–2:Proportion of senior management hired from the local community
GRI 203 – indirect economic impacts	203–1:Infrastructure investments and services supported
GRI 204 – procurement practices	203–2:Significant indirect economic impacts 204–1:Proportion of spending on local suppliers
GRI 205 – anti-corruption	205–1:Operations assessed for risks related to corruption 205–2:Communication and training about anti-corruption policies and procedures 205–3:Confirmed incidents of corruption and actions taken
GRI 206 – anti-competitive behavior	206–1:Legal actions for anti-competitive behavior, anti-trust and monopoly practices
<i>Environmental dimension</i>	
GRI 301 – materials	301–1:Materials used by weight or volume 301–2:Recycled input materials used 301–3:Reclaimed products and their packaging materials
GRI 302 – energy	302–1:Energy consumption within the organization 302–2:Energy consumption outside of the organization 302–3:Energy intensity 302–4:Reduction of energy consumption 302–5:Reductions in energy requirements of products and services
GRI 303 – water	303–1:Water withdrawal by source 303–2:Water sources significantly affected by withdrawal of water 303–3:Water recycled and reused
GRI 304 – biodiversity	304–1:Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas 304–2:Significant impacts of activities, products and services on biodiversity 304–3:Habitats protected or restored 304–4:IUCN Red List species and national conservation list species with habitats in areas affected by operations
GRI 305 – emissions	305–1:Direct (Scope 1) GHG emissions 305–2:Energy indirect (Scope 2) GHG emissions 305–3:Other indirect (Scope 3) GHG emissions 305–4:GHG emissions intensity 305–5:Reduction of GHG emissions 305–6:Emissions of ozone-depleting substances (ODS) 305–7:Nitrogen oxides (NOX), sulfur oxides (SOX) and other significant air emissions

**Table A1.**  
Disclosure index  
scorecard based on  
GRI standards

(continued)

GRI standard	Item
GRI 306 – effluents and waste	306–1:Water discharge by quality and destination 306–2:Waste by type and disposal method 306–3:Significant spills 306–4:Transport of hazardous waste 306–5:Water bodies affected by water discharges and/or runoff 307–1:Non-compliance with environmental laws and regulations
GRI 307 – environmental compliance	
GRI 308 – supplier environmental assessment	308–1:New suppliers that were screened using environmental criteria 308–2:Negative environmental impacts in the supply chain and actions taken
<i>Social dimension</i>	
GRI 401 – employment	401–1:New employee hires and employee turnover 401–2:Benefits provided to full-time employees that are not provided to temporary or part-time employees 401–3:Parental leave 402–1:Minimum notice periods regarding operational changes
GRI 402 – labor/management relations	
GRI 403 – occupational health and safety	403–1:Workers’ representation in formal joint management–worker health and safety committees 403–2:Types of injury and rates of injury, occupational diseases, lost days, and absenteeism and number of work-related fatalities 403–3:Workers with high incidence or high risk of diseases related to their occupation 403–4:Health and safety topics covered in formal agreements with trade unions
GRI 404 – training and education	404–1:Average hours of training per year per employee 404–2:Programs for upgrading employee skills and transition assistance programs 404–3:Percentage of employees receiving regular performance and career development reviews
GRI 405 – diversity and equal opportunity	405–1:Diversity of governance bodies and employees 405–2:Ratio of basic salary and remuneration of women to men
GRI 406 – non-discrimination	406–1:Incidents of discrimination and corrective actions taken
GRI 407 – freedom of association and collective bargaining	407–1:Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk
GRI 408 – child Labor	408–1:Operations and suppliers at significant risk for incidents of child labor
GRI 409 – forced or compulsory labor	409–1:Operations and suppliers at significant risk for incidents of forced or compulsory labor
GRI 410 – security practices	410–1:Security personnel trained in human rights policies or procedures
GRI 411 – rights of indigenous peoples	411–1:Incidents of violations involving rights of indigenous peoples
GRI 412 – human rights assessment	412–1:Operations that have been subject to human rights reviews or impact assessments 412–2:Employee training on human rights policies or procedures 412–3:Significant investment agreements and contracts that include human rights clauses or that underwent human rights screening

(continued)

GRI standard	Item
GRI 413 – local communities	413–1:Operations with local community engagement, impact assessments and development programs 413–2:Operations with significant actual and potential negative impacts on local communities
GRI 414 – supplier social assessment	414–1:New suppliers that were screened using social criteria 414–2:Negative social impacts in the supply chain and actions taken
GRI 415 – public policy	415–1:Political contributions
GRI 416 – customer health and safety	416–1:Assessment of the health and safety impacts of product and service categories 416–2:Incidents of non-compliance concerning the health and safety impacts of products and services
GRI 417 – marketing and labeling	417–1:Requirements for product and service information and labeling 417–2:Incidents of non-compliance concerning product and service information and labeling 417–3:Incidents of non-compliance concerning marketing communications
GRI 418 – customer privacy	418–1:Substantiated complaints concerning breaches of customer privacy and losses of customer data
GRI 419 – socioeconomic compliance	419–1:Non-compliance with laws and regulations in the social and economic area

**Table A1.** Source: Created by authors based on GRI standards

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