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# Does sustainable corporate governance have an impact on materiality disclosure quality in integrated reporting? International evidence

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## Abstract

This study examines the influence of sustainable corporate governance on the materiality disclosure quality (MDQ) in integrated reporting in an international setting. Referring to stakeholder theory, we focus on gender diversity, sustainability committees, and sustainability-related executive compensation. Based on European and South African firms (672 firm-year observations) between 2014 and 2019, we found that board gender diversity and sustainability-related executive compensation were significantly positively linked to MDQ. However, the implementation of sustainability committees does not affect the MDQ. Thus, only specific sustainable corporate governance variables in concrete contexts may be related to integrated reporting decisions. We also included Chief Executive Officer (CEO) power (pay slice, ownership, and tenure) as a moderator variable due to the strategic impact of CEOs, based on upper echelons theory, and found that the link between our included sustainable corporate governance variables and MDQ was weakened. Our results are robust to several variations and provide valuable insights for research, business practice and future regulations on integrated reporting. In view of massive regulatory reform initiatives on sustainable corporate governance and integrated reporting, sustainability expertise (also with regard to CEOs) should be better addressed in boards of directors during the next years to come.

## KEYWORDS

gender diversity, integrated reporting, sustainability expertise, sustainable corporate governance, sustainable management compensation

## 1 | INTRODUCTION

The extension of traditional financial reports by stand-alone sustainability reports, based on the Global Reporting Initiative (GRI) standards, may be linked with the risks of greenwashing, information overload and decreased decision usefulness of stakeholders

(Boiral, 2013; Chelli & Gendron, 2013; de Villiers et al., 2014; Dingwerth & Eichinger, 2010; Sethi et al., 2017). While the GRI standards refer to double materiality and thus overcome the limitations of a too narrow view on investors, these standards have been also criticized for their “box-ticking-mentality.” This may not immediately ensure decision useful sustainability reporting (Boiral, 2013). The

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double materiality concept was also criticized in view of its lack of operationalization and its character of compromise and trade-offs between heterogeneous and conflicting stakeholder demands (Boiral, 2013; Chelli & Gendron, 2013). Integrated reporting (IR) represents a totally different concept as it aims to combine material financial, environmental, and social and governance (ESG) information into one business report in order to strengthen transparency (Lai et al., 2016). In line with financial reporting, materiality represents a major principle of IR, as the information needs of shareholders and other stakeholders should be explicitly reflected during the preparation of the report (Deegan & Rankin, 1997). In contrast to sustainability reporting in line with GRI standards, IR is more related to an investor materiality focus (outside-in-perspective). As a consequence, it may be easier for executives with integrated reports to operationalize the materiality principle, as there are main similarities to the materiality principle in traditional financial reporting. As the board of directors is familiar with financial reports, the inclusion of sustainability information in the financial report as an integrated report may lead to increased transparency of the materiality principle.

However, in view of the voluntary character of IR (with the exception of South Africa) and the lack of comparability among IR preparers, the risks of greenwashing and information overload may also be crucial in this context. As a solution to overcome these risks, a strong reliance on the materiality principle and the “integrated thinking” approach is necessary. In view of the principle-based nature of the <IR> Framework by the International Integrated Reporting Council (IIRC), recently consolidated with the Sustainability Standards Board (SASB) as the Value Reporting Foundation, managerial discretion in IR may be high (Lai et al., 2016). Only a strong recognition of materiality and the disclosure of operationalization in the context of IR may lead to an added value in comparison to stand-alone sustainability reporting. As materiality constitutes one of the seven core principles of the <IR> Framework, this principle will have a huge impact on firm strategy and risk management (Higgins et al., 2014; IIRC, 2013a). The significance of the materiality concept is also stated in an IIRC background paper on materiality (IIRC, 2013b). Material information is “of such relevance and importance that it could substantively influence the assessments of providers of financial capital with regard to the organization's ability to create value over the short, medium and long term” (IIRC, 2013b, paragraph 8).

In view of the afore-mentioned managerial discretion of executives, prior research analyses on corporate governance as a monitoring and incentive mechanism may have a positive impact on IR quality (see the literature review by Velte & Stawinoga, 2017). Board composition, ownership structure and stakeholder pressure can be identified as the three main categories. Compared to “classical” board variables (board independence or board size), research on sustainable corporate governance has increased during the last few years (Endrikat et al., 2021). Board diversity, especially an increase in female board members, represents the most attractive proxy in this context. Among others, Gerwanski et al. (2019) and

Kilic and Kuzey (2019) included gender diversity and found a positive effect on IR quality. In contrast, Fasan and Mio (2017) found an opposite effect. Sustainability board expertise can also be achieved by institutional aspects, such as the implementation of sustainability committees. Haji and Anifowose (2016) and Wang et al. (2020) argued that a firm's sustainability committee has an essential role in supporting its audit committee's monitoring role in IR, and should thus lead to higher IR quality. The authors found that both the existence and effectiveness of sustainability committees increased IR quality. Finally, management compensation represents a key incentive alignment mechanism in corporate governance. Since the financial crisis of 2008–09, stakeholders are demanding a clear integration of financial and sustainability aspects (also climate change targets) within variable top management compensation. Thus, sustainability-related expertise should lead to increased sustainability awareness and openness among top managers. This has been researched in a South African study by Wang et al. (2020), who found an increased effect on IR quality. In line with the three main categories of sustainable corporate governance, we stress the importance of the individual characteristics of board members, of the Chief Executive Officer (CEO) in particular, on IR strategies. While Marrone (2020) found a negative link between CEO duality and IR quality, Garcia-Sánchez et al. (2021) reported a negative impact of CEO power on IR adoption, stressing opportunistic management behavior.

In summary, our main research question was linked to the three most important sustainable corporate governance variables in prior archival research (board gender diversity, sustainability committees, and sustainability-related executive compensation) and their impact on materiality disclosure quality (MDQ) in integrated reports. Moreover, the moderating influence of CEO power was included. To our best knowledge, we present the first study on this relationship. In line with prior research results (Gerwanski et al., 2019; Haji & Anifowose, 2016; Wang et al., 2020) and our theoretical framework, mainly based on stakeholder-, and upper echelons theory, we assumed a positive impact of sustainable corporate governance on MDQ in order to fulfill stakeholder demands and a weakened moderating influence of CEO power due to opportunistic behavior. As stand-alone sustainability reporting and IR represent different instruments, due to different materiality concepts, we focused on IR and on materiality disclosure in our research. Due to the risks of greenwashing and information overflow, a sound operationalization of the materiality principle in integrated reports was needed. We assumed that sustainable corporate governance may increase the awareness of disclosure on these issues in line with stakeholder demands. Our results should be very helpful for researchers, business practice and standard setters in the future.

Using a unique hand-collected dataset of 672 firm-year observations between 2014 and 2019 to analyze the impact of sustainable corporate governance on MDQ, we contributed to prior studies in several important ways. First, as we concentrated on materiality disclosures within IR, we noted very few studies (Fasan & Mio, 2017; Gerwanski et al., 2019) on this IR variable. Second, as we were

interested in the impact of sustainable corporate governance, to the best of our knowledge, no prior study has exclusively included selective sustainable board proxies (gender diversity, sustainability committees, and sustainability-related executive compensation). Third, we are not aware of a prior study on MDQ with the inclusion of CEO power as a moderator variable of this link. In line with recent archival research on the impact of sustainable corporate governance on corporate social responsibility (CSR) (Endrikat et al., 2021), we know very little about its contribution to MDQ while this relationship is of major relevance to contribute to better sustainable development. Finally, we addressed the demand for research on IR materiality from both scholars and standard setters (de Villiers et al., 2014), which also highlights the relevance of the topic. We relied on an international sample of European and South African firms and stressed their main differences. South African firms listed on the Johannesburg Stock Exchange are linked to a de facto mandatory (“apply or explain”) IR regime (Dumay et al., 2016). According to the EU Directive 2014/95, large capital market-oriented corporations must prepare a nonfinancial declaration resulting in a potential of 6000 new IR preparers with the EU (Howitt, 2018). A mandatory nonfinancial declaration may be included in a voluntary integrated report. Thus, we included both voluntary and mandatory settings in our sample.

According to our regression analyses, we found a positive association between board gender diversity, sustainability-related executive compensation and MDQ. Against our expectations, we did not find any significant association between sustainability committees and the MDQ. Referring to our moderator analyses, CEO power weakened the relationship between the included sustainable corporate governance variables and MDQ. Our results were robust to different model specifications.

The paper is structured as follows: in Section 2, we outline the theoretical foundation and derive our hypotheses. In Section 3, we describe our methodology which comprises the sample selection, variable definition and model specifications. In Section 4, we provide descriptive and different multivariate statistics and discuss them. Section 5 contains the concluding remarks.

## 2 | THEORETICAL FOUNDATION AND HYPOTHESES

Prior archival research on IR quality has included a variety of different theories (Velte & Stawinoga, 2017). With regard to board characteristics, among others, Songini et al. (2021) included stakeholder theory, agency theory, upper echelons theory, critical mass theory, and token theory. Legitimacy and stakeholder (agent) theory are stated as the most important theories in archival IR research (Velte & Stawinoga, 2017). Consistent with this, we mainly relied on stakeholder theory (Freeman, 1984) as our main theory, in line with prior studies (Gerwanski et al., 2019; Vaz et al., 2016).

The goal of IR is to provide decision-useful information not only to providers of financial capital but also to a broad range of other stakeholders (Flower, 2015; IIRC, 2013a). Stakeholder theory states that the board of directors must balance the information needs of

“those groups who can affect or are affected by the achievement of an organisation's purpose” (Freeman, 1984, p. 49). As major conflicts of interest between shareholders and other stakeholders may arise, financial reporting must be extended by material non-financial information. In the context of IR, “an organization's ability to create value over time depends on (...) the quality of its relationships with, and assessments by, its stakeholders” (IIRC, 2013b, p. 1). IR should satisfy the information needs of various stakeholder groups (Romero et al., 2018). Stakeholder demands are only fulfilled if the organization discloses “its unique value creation story in a meaningful and transparent way” (IIRC, 2013b, p. 1), as determined by materiality considerations. The materiality section of the integrated report is crucial in this context, as it should ensure a trade-off between conflicting stakeholder interests and solely the fulfillment of investor preferences. An intensive stakeholder dialog is needed to identify which issues are material to the heterogeneous group of report addressees (Stubbs & Higgins, 2018). The specific holistic approach of IR requires a transdisciplinary perspective rather than an isolated analysis within the confines of any sub-discipline (“integrated thinking”).

To meet these challenges, the board of directors should put pressure on executives to increase IR quality, especially with regard to materiality disclosure. Corporate governance mechanisms as monitoring tools and sustainability-related incentives may be helpful to increase managers' efforts on IR in line with stakeholder preferences. Corporate governance may reduce greenwashing policies and increase stakeholder trust. The board of directors is responsible for balancing stakeholder interests, has the fiduciary duty to oversee materiality identification (Ben-Amar & McIlkenny, 2015), and thus has a central role in MDQ (Frias-Aceituno et al., 2013). In comparison to “classical” corporate governance variables (board independence and others), the probability of a successful stakeholder balance within the board of directors may be higher by the inclusion of sustainable corporate governance proxies, for example, board gender diversity. In our analysis, we include the three most important sustainable board variables in recent research (board gender diversity, sustainability committees, and sustainability-related executive compensation). The recognition of those aspects should better reflect stakeholder demands and lead to better materiality disclosure in integrated reports.

Moreover, with regard to the moderator analysis, we also include upper echelons theory. Traditional economics theories and empirical research on the business case of IR predominantly address group-, firm-, and country-specific governance factors and neglect individual characteristics within the board of directors or top management team (Habib & Hossain, 2013). Behavioral economics, however, assumes that IR will be predominantly influenced by incentives and the characteristics of top management team members. In particular, the main impact of CEO variables on IR can be justified by upper echelons theory (Hambrick, 2007; Hambrick & Mason, 1984).

### 2.1 | Gender diversity

Building on stakeholder theory, greater diversity of the board of directors should be in line with stakeholder interests in social and

environmental aspects, which should also lead to greater IR transparency (Francoeur et al., 2008). Gender diversity is one of the key sustainable corporate governance variables in prior studies. It is assumed that the range of female directors will affect the strategic and operational decisions of the board of directors (Fernandez-Feijoo et al., 2014), which also influences both CSR (Rao & Tilt, 2016) and IR quality. In particular, female representation increases board dynamics by contributing different stakeholder perspectives, skills, values and beliefs (Ruigrok et al., 2007) and thus improves IR quality. Songini et al. (2021) referred to a mixture of stakeholder theory, upper echelons theory, critical mass theory, and token theory; the authors also assumed a positive impact of board gender diversity on IR quality. In this context, Songini et al. (2021) stressed that female directors can only have a significant impact if they reach a critical mass (Kanter, 1977). Stakeholders expect an adequate representation of female directors on boards, which should reflect their interests and positively relate to MDQ in integrated reports. These theoretical assumptions were also reflected in prior archival research. Frias-Aceituno et al. (2013) found a positive relationship between board gender diversity and IR adoption. According to Marrone (2020), Gervanski et al. (2019), and Kilic and Kuzey (2019), gender diversity also positively affected IR quality. Hence, in line with stakeholder theory and prior empirical results, our first hypothesis (H1) was as follows:

**H1.** Gender diversity is positively associated with MDQ.

## 2.2 | Sustainability committees

In line with gender diversity, a complementary strategy for firms to increase sustainable corporate governance to address stakeholder demands is to implement specific institutions for sustainable board expertise as sustainability committees. As these institutions within the board signal an increased awareness of stakeholder inclusion, they may enhance stakeholder attraction and thus firm reputation (Freeman, 1984). Moreover, these top management decisions represent a response to societal expectations regarding environmental and social challenges (including climate change policies). This should also lead to increased transparency of the materiality principle within integrated reports. The link between sustainability committees and corporate sustainability has been an attractive research topic in recent years (Garcia Martin & Herrero, 2020; Helfaya & Moussa, 2017). With regard to the existence of a sustainability committee, the majority of prior studies have found a positive impact on corporate sustainability (Baraibar-Diez & Odriozola, 2019). Two studies in South Africa's mandatory IR setting have concentrated on sustainability committees as promoters of IR in line with the increased stakeholder awareness. Haji and Anifowose (2016) and Wang et al. (2020) argued that a firm's sustainability committee has an essential role in supporting its audit committee's monitoring role in IR, and should thus lead to higher IR quality. There were indications that both the existence (Haji & Anifowose, 2016) and the effectiveness (Wang et al., 2020) of sustainability committees increased MDQ. Thus, due to stakeholder

theory and prior research results, we deduced our second hypothesis as follows:

**H2.** Institutionalized sustainability board expertise via sustainability committees is positively associated with MDQ.

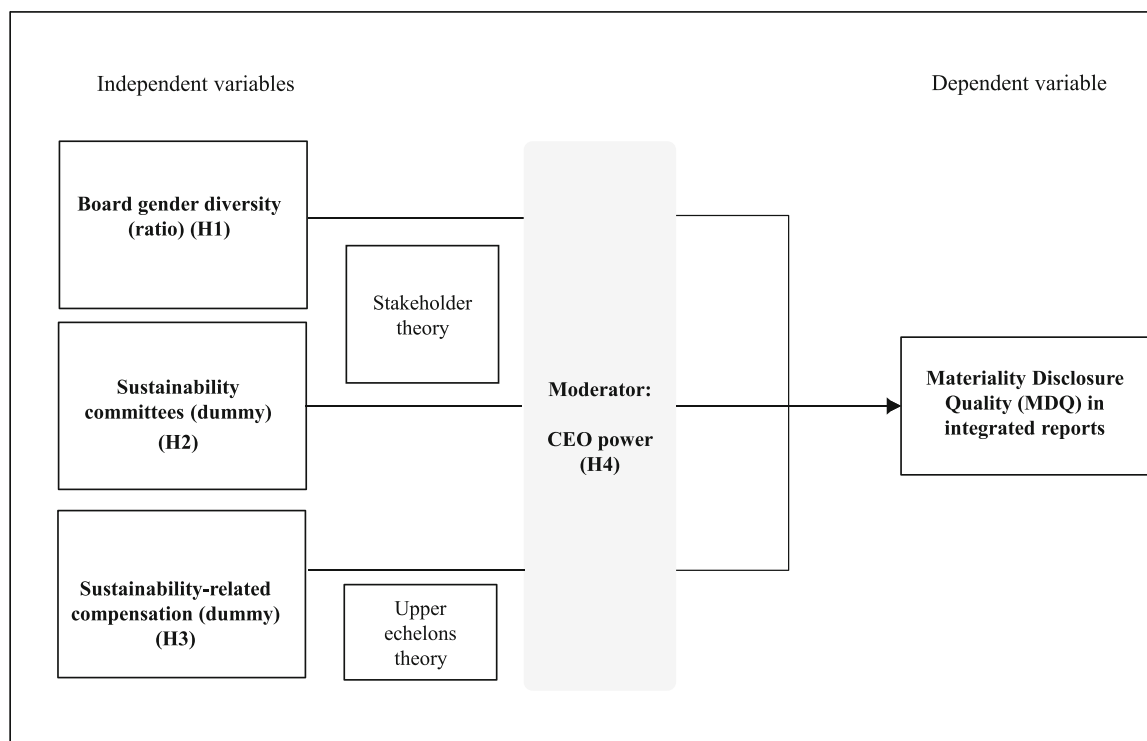
## 2.3 | Sustainability-related executive compensation

The two afore-mentioned sustainable corporate governance variables refer to board composition. However, sustainable corporate governance should also ensure the appropriate inclusion of stakeholder goals in incentive packages for the executive directors. Incentive alignment between management and stakeholders can be achieved through sustainability-related executive compensation in business practice. While prior compensation packages were dominated by financial performance goals and shareholder goals, stakeholders expect the inclusion of environmental and social aspects in management compensation contracts (Winschel & Stawinoga, 2019). As the board of directors is responsible for the development of executive compensation systems, the recognition of sustainability goals may be in line with stakeholder needs and will increase firm reputation (Freeman, 1984). These incentives may also lead to more extrinsic motivation to extend MDQ within integrated reports, as balancing stakeholder interests should be reflected there. Increasing archival research activity can be seen with regard to the impact of executive compensation on corporate sustainability (McGuire et al., 2003; Winschel & Stawinoga, 2019), boosting the hypothesis, that long-term and incentive-based executive compensation has a positive influence on sustainability performance. While prior research has also analyzed the impact of environmental or social-related goals in executive compensation contracts and corporate sustainability outputs (Velte, 2016), we only identified one archival study on the link between sustainability-related management compensation and IR quality (Wang et al., 2020). The authors relied on the South African mandatory IR setting and found an increased effect on IR quality. In line with stakeholder theory and empirical research, we stated the third hypothesis:

**H3.** Sustainability-related executive compensation is positively associated with MDQ.

## 2.4 | Moderating effect of CEO power

In line with stakeholder theory, upper echelons theory assumes that the influence of the CEO is intensive within the top management team and within the firm in order to significantly influence IR quality. Not only group-related determinants within the board of directors, but also the central role of the CEO itself may be crucial in influencing



**FIGURE 1** Conceptual framework of the analysis

IR quality (Hambrick, 2007; Hambrick & Mason, 1984). If CEO behavior is in line with stakeholder demands, the CEO should be more interested in establishing successful IR strategies. In addition, an increased degree of power can be helpful if the CEO is motivated to include IR in line with stakeholder demands. As IR should be linked to a holistic view of the firm and a massive integrated thinking process, prior business strategies and models should be extended to sustainability issues. The CEO is responsible for the strategic development of the firm. However, CEO power can also represent an opportunity for CEO discretion and opportunistic behavior that contrasts stakeholders' needs (Bebchuk & Fried, 2006). During the last decade, there have been a variety of empirical studies on the impact of CEO incentives (compensation, power, and duality) on corporate sustainability (Busenbark et al., 2016). While some papers have found a positive impact of CEO power on sustainability outputs, we also noted a negative relationship (Muttakin et al., 2018; Sheikh, 2019). With regard to IR, we identified only one study on the impact of CEO power on IR adoption (García-Sánchez et al., 2021), that documented a negative impact. In line with upper echelons theory and prior results, we stated the following hypothesis:

**H4.** CEO power weakens the positive link between the included sustainable corporate governance variables (board gender diversity, sustainability committees, and sustainability-related executive compensation) and MDQ.

Figure 1 provides an overview of our conceptual framework.

### 3 | METHODOLOGY

#### 3.1 | Sample selection

We included European and South African firms for the following reasons. First, we noted the high relevance of IR in both regimes (Sierra-García et al., 2015) due to regulatory issues. South African firms listed on the Johannesburg Stock Exchange are linked to a de facto mandatory ("apply or explain") IR regime (Dumay et al., 2016). Moreover, several EU regulations on sustainable finance and sustainability reporting have been finalized in recent years. According to Directive 2014/95/EU, large capital market-oriented corporations must prepare a nonfinancial declaration resulting in a potential of 6000 new IR preparers with the EU (Howitt, 2018). The EU Commission published a new draft version of a directive on future sustainability reporting in April 2021. Finally, the business environment is similar in both regimes with respect to country-specific determinants, such as investor protection (Frias-Aceituno et al., 2013) and the cultural system (Hofstede, 1983), which have been shown to affect MDQ.

Our initial sample included 2316 firm-year observations of 386 firms listed in the Integrated Reporting Examples Database with headquarters in either a European country or South Africa between 2014 and 2019. Due to the central role of Europe and South Africa in the application of IR, about two-thirds of all firms listed in the database were linked to these regimes. Sample selection began with removing 14 firms that were listed twice. Next, we excluded 99 non-publicly listed firms that lacked Datastream coverage and 58 firms



**TABLE 1** Sample selection and composition

Sample selection	Firms	Firm-years
Firms listed on the IIRC Examples Database	386	2316
Double-listed firms	(14)	(84)
No Datastream coverage	(99)	(594)
Financial services firms (SIC 6000–6999)	(58)	(348)
No IIRC reference	(48)	(288)
Missing data items	(55)	(333)
Sample	112	672

that belonged to the financial services industry (SIC 6000–6999). We excluded financial services firms with regard to the main differences in view of their asset structure and financial leverage (Fama & French, 1992), their accounting standards and practice (Frias-Aceituno et al., 2013) and stronger sector-specific disclosure regulation and supervision (Barth et al., 2004). Reference to the IIRC's <IR> Framework (IIRC, 2013a, 2021) represented a major constitutive requirement for inclusion in the sample. This strategy can be justified as follows: first, the IIRC framework ensures IR comparability between different regulatory environments. Second, the IIRC framework defines, institutionalizes and standardizes applicable requirements for materiality disclosure in integrated reports, which IR reporting firms should apply. Accordingly, after manually reviewing the integrated reports, we excluded 48 firms that lacked an explicit alignment to the IIRC. Finally, after excluding 333 firm-year observations due to missing values, our final sample consisted of 672 firm-year observations from 112 firms between 2014 and 2019 (see Table 1).

### 3.2 | Dependent variable

The quality of IR is usually measured using the scoreboard model derived from the quality assessment attributes by Hammond and Miles (2004). The IR scoreboard by Pistoni et al. (2018), among others, does not evaluate quality only in terms of content. The authors included four different areas: content, background, assurance and reliability, and form. Other researchers (Vitolla et al., 2020) also relied on this concept. In contrast to these overall IR quality scores, we concentrated on the materiality principle in integrated reports. Proper disclosure of the operationalization of material information within integrated reports is needed to ensure adequate transparency for shareholders and other stakeholder groups. We assumed that the included sustainable corporate governance variables would increase the quality of MDQ in integrated reports. In line with prior research (Fasan & Mio, 2017; Gerwanski et al., 2019), we applied content analysis to construct a hand-collected MDQ score, which aimed to include major characteristics that determine IR materiality disclosure and to provide proper guidelines for IR quality assessment. We relied on Gerwanski et al. (2019), who focused on the core properties of materiality, put forward by the <IR> Framework (IIRC, 2013a, 2013b). The

authors referred to the following scoring components: (1) materiality section, (2) identification process, (3) description of material aspects, (4) time horizon, (5) materiality matrix, (6) risks and opportunities, and (7) mitigation actions. Table 2 summarizes the categories of the MDQ score and the respective IIRC references. The score ranged from a minimum of 0 to a maximum of 12.

We explain the MDQ score as follows: A separate *materiality section* (1) stresses the importance of the materiality concept in IR and improves the readability for the stakeholders (0: no materiality section, 1: materiality section included, 2: high importance of concept of materiality with the materiality section listed in the table of contents). The *identification process* (2) represents a key element of the materiality principle and includes an analysis of the impact of potential issues on the value creation of the firm (Simnett & Huggins, 2015). Stakeholder interaction should be recognized in order to address both internal and external value factors (0: no information disclosed, 1: identification process mentioned, 2: identification process described in detail with stakeholder interaction). The *description of the material issues* (3) was evaluated between 0 and 2, with respect to the level of detail, conciseness, and usefulness of the information. The *Time horizon of material issues* (4) is relevant for the assessment of strategic decisions and future prospects (0: no time reference, 1: aggregated or boilerplate information, 2: material matters are categorized and described according to their short-, medium-, and long-term impact). A *materiality matrix* (5) is necessary to prioritize issues due to the relevance for in- and external stakeholders (0: no materiality matrix, 1: materiality matrix present). Moreover, one additional point is awarded if a firm specifically connects both *risks and opportunities* (6) to its material matters. *Mitigation actions* as our last criterion (7) refers to their degree of detail (0: no information, 1: superficial, non-differentiated description of actions, 2: detailed description).

### 3.3 | Independent variables

As we already noted, we included three sustainable corporate governance variables (gender diversity, sustainability committees and sustainability-related executive compensation) as independent variables. First, gender diversity (*GENDER*) was measured using the Blau (1977) index of diversity. This commonly used index (Campbell & Mínguez-Vera, 2008) specifies the gender diversity of a group by

$$1 - \sum_c s_c^2,$$

where,  $k$  is the number of categories ( $k = 2$ , female and male) and  $s_c$  represents the fraction of board members with characteristic  $c$ , and  $ergo$  the fraction of female or male board members.

Second, sustainability committees (*SUSC*) represents a dummy variable = 1, if the firm includes a sustainability committee (environmental or social committee) within the board of directors. As implementation is voluntary from an international perspective, the range of duties of this committee is heterogeneous, for example, restricted to

**TABLE 2** Composition of the MDQ score

MDQ score			
Item #	Scoring element	Point range	Reference
1	Materiality section	0–2	IIRC (2013b): 8, 35
2	Identification process	0–2	IIRC (2013a): 3.18, 3.21–30; IIRC (2013b): 10–34, 39–40; Eccles and Krzus (2015)
3	Description of material aspects	0–2	IIRC (2013a): 3.17, 3.28, 3.30–32; IIRC (2013b): 36; Eccles and Krzus (2015)
4	Time horizon	0–2	IIRC (2013a): 3.17, 3.23; IIRC (2013b): 8
5	Materiality matrix	0–1	Eccles and Krzus (2015)
6	Risks and opportunities	0–1	IIRC (2013a): 3.19, 3.30, 3.34–35, 3.39, 4.23–26; Eccles and Krzus (2015)
7	Mitigation actions	0–2	IIRC (2013a): 2.27, 3.23, 4.25; Eccles and Krzus (2015)
	$\Sigma$	0–12	

Note: The table depicts the seven scoring elements of MDQ in line with Gerwanski et al. (2019), the corresponding point range as well as the reference from which the score element is derived. Both the scoring elements' materiality matrix (#4) as well as risks and opportunities (#7) are scored with 0 or 1, according to whether they are included or not, whereas the remaining five scores rely on a more differentiated basis (0–2).

environmental or social aspects or covering all sustainability issues. In view of the restricted validity of this dummy variable, we tried to hand-collect more information on the included sustainability committees. We noted a rather low transparency of the included firms due to the composition of sustainability committees. Many firms did not upload the CVs of sustainability committee members. Consequently, a more detailed analysis of composition variables would lead to a significant reduction of observations and thus bear the risk of a reduced validity of our regressions. Thus, we solely referred to the dummy variable.

Third, sustainability-related executive compensation (*SUSE*) also represents a dummy variable = 1 if the company includes environmental or social issues as part of the variable compensation of the executive directors. In line with our second variable, sustainability-related compensation packages were not mandatory for our included firms. Thus, heterogeneous use of this measure can be emphasized, with regard to the variety of included sustainability factors.

### 3.4 | Moderator and control variables

As a moderator variable, we referred to *CEOPOWER*. A CEO's power is often measured by the Bebchuk et al. (2011) pay slice model. However, other similar models have been also established (Veprauskaite & Adams, 2013). We decided to use a CEO power index by integrating three relevant power proxies: (1) CEO pay slice, (2) CEO ownership, and (3) CEO tenure. This strategy is in line with Sheikh (2019) and Muttakin et al. (2018), who also include a combination of CEO dimensions as a power index. First, CEO pay slice is measured as the fraction of the aggregate compensation of the top (five) executive team captured by the CEO and is linked with an increased CEO influence on firm strategy. Second, CEO stock ownership is the percentage of company stock held by the CEO. Third, CEO tenure is the number of

years the CEO has been in office. We created indicator variables that equaled 1 if the three dimensions of CEO power were above the industry median because CEO power is sensitive to industry. As we were interested in the overall effect, we built a CEO power index (*CEOPOWER*) as the addition of indicator variables that ranged between 0 and 3. We assumed that *CEOPOWER* would weaken the positive impact of our three sustainable corporate governance variables on MDQ.

As control variables, we recognized a number of firm-, and corporate governance-specific variables that extant literature has shown to be associated with disclosure quality (Gerwanski et al., 2019). All variables are presented in Table 3. Regarding *firm-level controls*, firm size (*SIZE*) was measured as the natural logarithm of total assets at the end of the financial year. Financial performance was included by its return on equity (*ROE*), and its investment growth opportunities by year-end Tobin's *Q* (*TOBIN'SQ*). Leverage (*LEV*) was measured by long-term debt scaled by total assets. We also included the combined environmental and social performance score (*ES*) from the Refinitiv (formerly known as AssetFour) database to control for the association between a firm's sustainability performance and MDQ (Hummel & Schlick, 2016). To measure earnings quality (*EQ*), we referred to the absolute value of industry-division and performance-adjusted abnormal accruals equal to the absolute residuals of the Kothari et al. (2005) modification of the Jones (1991) model estimated by industry-year for those industries with at least 10 observations. Please note that accruals represent an inverse measure of earnings quality. We assumed a positive impact of those firm-related controls on MDQ with the exception of leverage. Regarding *corporate governance* factors, we recognized board size (*BOARDS*) because the number of board members can have either a positive or negative impact on MDQ (Fasan & Mio, 2017). Board independence (*BOARDIN*) represents the ratio of independent board directors and should be related to an increased MDQ. As an external



**TABLE 3** Variable definition and description

Variables	Variable definition
Dependent variable	
MDQ	Integrated reporting quality score composed of the seven scoring components on materiality: (1) materiality section, (2) identification process, (3) description of material aspects, (4) materiality matrix, (5) time horizon, (6) mitigation actions, and (7) risks and opportunities
Explanatory variables	
GENDER	Blau index of board gender diversity
SUSC	Indicator variable taking the value 1 if a corporate sustainability committee was implemented within the board of directors (obtained by Eikon)
SUSE	Indicator variable taking the value 1 if the management compensation contract of executives includes environmental and/or social goals (obtained by Eikon)
Control variables	
CEOPOWER (also used as moderator variable)	CEO power index as addition of indicator variables (related to the standard deviation of industry median) of (1) CEO pay slice (fraction of the aggregate compensation of the top (five) executives captured by the CEO related to industry median), (2) CEO ownership (percentage of company stock held by the CEO related to industry median), and (3) CEO tenure (number of years the CEO has been in office related to industry median)
SIZE	Natural logarithm of total assets
ROE	Return on equity
TOBIN'SQ	Measure for a firm's investment growth opportunities by year-end
LEV	Leverage as long-term debt scaled by total assets
ES	Equally weighted environmental and social score
EQ	Absolute value of industry division and performance-adjusted abnormal accruals equal to the absolute residuals from the Kothari et al. (2005) modification of the Jones (1991) model estimated by industry-year for those industries with at least 10 observations * (−1)
BOARDS	amount of directors on the board
BOARDIN	Ratio of independent board members compared to total number of directors
FREEFLOAT	Proportion of shares in the hands of public investors
ASSURANCE	Indicator variable taking the value 1 if the non-financial information in the integrated report is assured by an independent external party, and 0 otherwise
DJSI	Indicator variable taking the value 1 if the firm is listed in the Dow Jones Sustainability Index in the corresponding year, and 0 otherwise
ENVSEN	Indicator variable taking the value 1 if the firm is operating in an environmentally sensitive industry (SIC codes: 08, 10–14, 26, 28, 33–34, 49), and 0 otherwise
INST	Indicator variable taking the value 1 if the disclosure of an integrated report is voluntary in the corresponding setting (Europe), and 0 otherwise (South Africa)

corporate governance variable, we referred to *FREEFLOAT* as the firm's ownership dispersion (Khan et al., 2013) and assumed a positive impact on MDQ. Moreover, *ASSURANCE* is an indicator variable that takes the value of 1 when non-financial information provided in the integrated report is assured by an external third party (either a professional accountant or a specialized consultant, either with a positive or negative assurance), and 0 otherwise. Our measure for a firm's listing on a sustainability index referred to Dow Jones Sustainability Index (*DJSI*) membership. We included a hand-collected indicator variable (*DJSI*), which equaled 1 if the firm was listed on the *DJSI* for each year of interest, and 0 otherwise. To recognize the impact of industry affiliation on IR (Fasan & Mio, 2017), we included the indicator variable *ENVSEN*, which takes the value 1 if the firm belongs to an environmentally sensitive industry (two-digit SIC codes 08, 10–14, 26, 28, 33–34, 49),

and 0 otherwise (Reverte, 2009). The variable *INST* addressed whether a voluntary IR regime (European countries: 1) was present or not (South Africa: 0).

### 3.5 | Regression models

The following linear regression model was deduced for hypotheses 1–3:

$$1. \text{MDQ}_{i,t} = \beta_0 + \beta_1 \text{GENDER}_{i,t} + \beta_2 \text{SUSC}_{i,t} + \beta_3 \text{SUSE}_{i,t} + \beta_4 \text{CEOPOWER}_{i,t} + \beta_5 \text{SIZE}_{i,t} + \beta_6 \text{ROE}_{i,t} + \beta_7 \text{TOBIN'SQ}_{i,t} + \beta_8 \text{LEV}_{i,t} + \beta_9 \text{ES}_{i,t} + \beta_{10} \text{EQ}_{i,t} + \beta_{11} \text{BOARDS}_{i,t} + \beta_{12} \text{BOARDIN}_{i,t} + \beta_{13} \text{FREEFLOAT}_{i,t} + \beta_{14} \text{ASSURANCE}_{i,t} + \beta_{15} \text{DJSI}_{i,t} + \beta_{16} \text{ENVSEN}_{i,t} + \beta_{17} \text{INST}_{i,t} + u_i + e_{i,t}$$

Hypothesis 4 relates to the following regression models.

$$2. MDQ_{i,t} = \beta_0 + \beta_1 GENDER_{i,t} + \beta_2 SUSC_{i,t} + \beta_3 SUSE_{i,t} + \beta_4 CEOPOWER_{i,t} + \beta_5 GENDER * CEOPOWER_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 ROE_{i,t} + \beta_8 TOBIN'SQ_{i,t} + \beta_9 LEV_{i,t} + \beta_{10} ES_{i,t} + \beta_{11} EQ_{i,t} + \beta_{12} BOARDS_{i,t} + \beta_{13} BOARDIN_{i,t} + \beta_{14} FREEFLOAT_{i,t} + \beta_{15} ASSURANCE_{i,t} + \beta_{16} DJSI_{i,t} + \beta_{17} ENVSEN_{i,t} + \beta_{18} INST_{i,t} u_i + e_{i,t}$$

$$3. MDQ_{i,t} = \beta_0 + \beta_1 GENDER_{i,t} + \beta_2 SUSC_{i,t} + \beta_3 SUSE_{i,t} + \beta_4 CEOPOWER_{i,t} + \beta_5 SUSC * CEOPOWER_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 ROE_{i,t} + \beta_8 TOBIN'SQ_{i,t} + \beta_9 LEV_{i,t} + \beta_{10} ES_{i,t} + \beta_{11} EQ_{i,t} + \beta_{12} BOARDS_{i,t} + \beta_{13} BOARDIN_{i,t} + \beta_{14} FREEFLOAT_{i,t} + \beta_{15} ASSURANCE_{i,t} + \beta_{16} DJSI_{i,t} + \beta_{17} ENVSEN_{i,t} + \beta_{18} INST_{i,t} u_i + e_{i,t}$$

$$4. MDQ_{i,t} = \beta_0 + \beta_1 GENDER_{i,t} + \beta_2 SUSC_{i,t} + \beta_3 SUSE_{i,t} + \beta_4 CEOPOWER_{i,t} + \beta_5 SUSE * CEOPOWER_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 ROE_{i,t} + \beta_8 TOBIN'SQ_{i,t} + \beta_9 LEV_{i,t} + \beta_{10} ES_{i,t} + \beta_{11} EQ_{i,t} + \beta_{12} BOARDS_{i,t} + \beta_{13} BOARDIN_{i,t} + \beta_{14} FREEFLOAT_{i,t} + \beta_{15} ASSURANCE_{i,t} + \beta_{16} DJSI_{i,t} + \beta_{17} ENVSEN_{i,t} + \beta_{18} INST_{i,t} u_i + e_{i,t}$$

We also recognized time-, industry-, and country-fixed effects in the regression models. Panel data structure recognizes effects that are not detectable in pure cross-sectional and time series designs (Evans & Schwartz, 2014). Due to possible within-cluster correlations, a GLS random effects (RE) estimator with firm-clustered standard errors (Huber-White sandwich estimator) was included in line with earlier research (Bell & Jones, 2015). The model applies autocorrelation and heteroscedasticity robust standard errors. Collinearity diagnostics based on variance inflation factors (VIF) (mean VIF = 1.79; highest VIF = 2.79) are not linked with the challenge of multicollinearity. The random intercept model was chosen because we were interested in higher-level processes in our data that were not captured by removing higher-level variance through within transformation (Bell & Jones, 2015). The choice of a random effect can also be justified by the Hausman test (1978) ( $p$ -value = .2318). Instead of explicitly modeling the impact of environmentally sensitive industries (ENVSEN) on IR quality, Model 2 includes industry division-level fixed effects, which capture the time-invariant impact of industry affiliation on MDQ (Holder-Webb et al., 2009). Model 3 was further extended to include time-fixed effects in lieu of possible learning effects. Our full model (4) also included country-fixed effects to account for the impact of different legal and socio-economic environments on IR quality.

## 4 | EMPIRICAL RESULTS

### 4.1 | Descriptive statistics

Table 4 provides an overview of the descriptive statistics for the variables included in the study. Our dependent variable MDQ has an average of 6.248 with a standard deviation of 3.002. Thus, on average, only about half of the maximum quality score was achieved in our sample. With regard to sustainable corporate governance, while average gender

diversity (0.345) and sustainable-related executive compensation (0.447) are rather moderate, sustainability committees within boards seem to be more relevant (0.727). The descriptive statistics for our moderator variable (CEOPOWER) state a moderate mean (1.634).

In Table 5, we further separated the different components of MDQ. We stressed a rather low description of time horizon (0.369) and risks and opportunities (0.390).

### 4.2 | Correlation analysis

Table 6 presents the Pearson correlation matrix for the dependent, independent, and the control variables. In line with our prediction, MDQ was positively and significantly correlated with GENDER (0.141\*\*) and SUSE (0.142\*\*), indicating a possible positive association. Against our expectations, SUSC was not significantly correlated with MDQ (0.085). We also stress a rather low correlation between GENDER and SUSC (0.102\*), and between GENDER and SUSE (0.115\*). Thus, the included sustainable corporate governance variables are only interrelated to a moderate level.

### 4.3 | Multivariate results and robustness checks

The results of the multivariate regression analyses are explained in Table 7. In line with Hypothesis 1, the significant regression coefficients show the positive impact of gender diversity (GENDER) on MDQ in models 1–4. As female representation on the board will lead to increased stakeholder interaction and higher IR awareness, our findings are in line with prior MDQ studies (Gerwanski et al., 2019) and our stakeholder-theoretical foundation. As stakeholders demand an appropriate inclusion of female directors in the board of directors, multiple stakeholder information needs may be better recognized. This should lead to higher MDQ scores in integrated reports to increased transparency.

Against our stakeholder-theoretical foundation and in contrast to Hypothesis 2, the existence of a sustainability committee within the board of directors (SUSC) did not have a significant impact on MDQ in models 1–4, while we found a positive link. Insignificant results on the link between sustainability committees and corporate sustainability have been found in prior studies (Elsayih et al., 2018). The literature assumes a symbolic use of institutionalized sustainability board expertise in business practice (Rodrigue et al., 2013). As stakeholders have been very sensitive in including social and environmental issues in board composition during the last few years, firms may address those wishes suboptimally. Anecdotal evidence stresses the challenge that financial expertise on boards is still dominant in business practice, while sustainability expertise is only included in a rather low proportion. On the one hand, the implementation of a sustainability committee will not positively impact stakeholder needs, if the communication process with other board members is problematic. Sustainability committees may only represent a first step in addressing sustainable corporate governance attributes. The second step should be a clear integration of sustainability expertise in other board committees (risk-,

Variables	N	Mean	SD	Min	Median	Max
MDQ	672	6.248	3.002	0	6.000	12.000
GENDER	672	0.345	0.149	0	0.364	0.600
SUSC	672	0.727	0.232	0	1.000	1.000
SUSE	672	0.447	0.225	0	0.000	1.000
CEOPOWER	672	1.634	0.504	0	1.000	3.000
SIZE	672	13.467	1.415	9.321	13.787	18.142
ROE	672	12.965	22.898	-153.01	12.014	120.12
TOBIN'SQ	672	1.567	1.277	0.021	0.812	12.798
LEV	672	0.292	0.202	0.103	0.224	0.614
ES	672	76.465	16.321	10.214	74.221	83.204
EQ	672	0.034	0.072	0	0.232	1.421
BOARDS	672	12.432	3.472	4	12	22
BOARDIN	672	0.398	19.203	0	0.476	0.800
FREEFLOAT	672	71.423	23.276	0	71	100
ASSURANCE	672	0.548	0.465	0	1	1
DJSI	672	0.327	0.429	0	0	1
ENVSEN	672	0.394	0.432	0	0	1
INST	672	0.319	0.419	0	0	1

TABLE 4 Summary statistics

Note: Variable definitions and descriptions are provided in Table 3. The table above represents corresponding means and standard deviations of our variables, as well as median, minimum, and maximum values.

MDQ categories	N	Mean	SD	Min	Median	Max
Materiality section	672	1.314	0.787	0	2	3
Identification process	672	1.346	0.731	0	1	3
Description	672	1.303	0.814	0	1	2
Time horizon	672	0.369	0.405	0	0	3
Materiality matrix	672	0.342	0.454	0	0	2
Risks & opportunities	672	0.390	0.445	0	0	2
Mitigation actions	672	1.315	0.891	0	2	3

TABLE 5 Summary statistics of MDQ categories

strategy-, and audit committees). We see a major need for the inclusion of sustainability expertise in audit committees, as they supervise both financial reporting and IR.

In line with stakeholder theory and Hypothesis 3, we noted a significant positive influence of sustainability-related executive compensation (SUSE) on MDQ in all models. Thus, incentive-based compensation packages of top managers strengthened their motivations to include stakeholder interests in environmental or social topics, which should also lead to increased IR awareness. Thus, our findings are in line with prior empirical results on corporate sustainability (Velte, 2016). In line with board composition, executive directors must have adequate incentives to address stakeholder goals in business models and strategies. Extrinsic motivations are activated to increase the transparency of environmental and social information within integrated reports. As many regulations on mandatory say-on-pay-voting by shareholders have been implemented in recent years, shareholder

pressure on the structure of executive compensation and its relation to sustainability issues has also increased in the EU.

Our regression analyses also indicate that CEO power as a moderator variable weakens the positive impact of our included sustainable corporate governance variables on MDQ in models 5–7 (see Table 8). Thus, in line with upper echelons theory, there are indications that CEOs may have a negative influence on MDQ due to opportunistic motivations. The negative impact of CEO power on corporate sustainability has also been stated in prior archival research (Muttakin et al., 2018). Classical CEO education and experience in multinational listed firms were not linked with sustainability expertise and incentives. This can also be explained by the voluntary inclusion of an additional Chief Sustainability Officer (CSO) in many firms in recent times. Our CEO power proxies (pay slice, ownership, and tenure) indicate that CEO power may lead to classical financial incentives and suboptimal recognition of other stakeholder interests. As a

TABLE 6 Pearson correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) MDQ	1.000																	
(2) GENDER	0.141**	1.000																
(3) SUSC	0.085	0.102*	1.000															
(4) SUSE	0.142**	0.115*	0.125*	1.000														
(5) CEOPOWER	−0.125**	−0.167*	−0.105*	−0.114**	1.000													
(6) SIZE	−0.124	0.115**	0.121**	0.042	−0.076	1.000												
(7) ROE	0.122*	0.156*	0.127*	0.126**	0.113	−0.043	1.000											
(8) TOBIN'SQ	−0.122**	0.134*	0.134**	0.143**	0.089	−0.042	−0.121**	1.000										
(9) LEV	0.122**	0.024	−0.013	−0.103	0.114	−0.025	0.145*	−0.141*	1.000									
(10) ES	0.114	0.451	0.211**	0.178**	−0.121**	0.414***	−0.058	−0.022	−0.121*	1.000								
(11) EQ	0.013	−0.242*	−0.114*	−0.102	0.056	0.132**	0.067	0.121**	−0.114	0.132	1.000							
(12) BOARDS	0.014	0.024	0.143**	0.122	−0.121*	0.368**	0.154**	−0.068	0.153	0.134	0.078	1.000						
(13) BOARDIN	−0.012	0.066	0.067	0.121*	−0.111**	0.056	−0.131*	−0.054	0.112*	0.112	0.132	0.152	1.000					
(14) FREEFLOAT	−0.141**	0.189	0.057	0.153	0.112	−0.089	0.143	0.112	0.104	0.065	0.154	−0.121*	0.167	1.000				
(15) ASSURANCE	0.319**	0.154*	0.142*	0.153*	0.024	0.115*	0.323**	0.144*	0.065	0.176*	0.067	0.078	0.089	0.075	1.000			
(16) DJSI	0.032	0.168**	0.165**	0.134*	0.045	0.427**	0.021	0.122*	−0.176	0.154*	0.132	0.065	0.021	0.011	0.142*	1.000		
(17) ENVSEN	0.065	−0.043	0.182**	0.165**	0.121	0.131	−0.201*	−0.113*	0.141	0.204*	0.141	−0.114	0.086	−0.046	0.099	0.117	1.000	
(18) INST	−0.144**	0.232*	0.147*	0.121*	0.117	0.521***	−0.087	0.106	0.126	0.344*	0.087	0.021	0.165	0.113	0.176*	0.125	0.054	1.000

\*Significance at the 10% level.

\*\*Significance at the 5% level.

\*\*\*Significance at the 1% level.

**TABLE 7** Regression analyses (hypotheses 1–3)

Variables	Model (1)	Model (2)	Model (3)	Model (4)
GENDER	3.031** (1.214)	3.143** (1.204)	2.956* (1.245)	2.787* (1.276)
SUSC	1.489 (1.032)	1.413 (1.131)	1.764 (1.287)	1.221 (1.212)
SUSE	1.165** (0.509)	1.222** (0.509)	1.265** (0.512)	1.212** (0.508)
CEOPOWER	−0.276** (0.050)	−0.254** (0.043)	−0.262** (0.052)	−0.251* (0.053)
SIZE	−0.231 (0.269)	−0.277 (0.254)	−0.221 (0.229)	−0.288 (0.227)
ROE	0.021** (0.006)	0.016** (0.004)	0.015** (0.009)	0.019** (0.008)
TOBIN'SQ	0.203 (0.145)	0.215 (0.173)	0.226 (0.212)	0.211 (0.189)
LEV	−0.203 (0.021)	−0.223 (0.030)	−0.241 (0.020)	−0.201 (0.025)
ES	0.009 (0.023)	0.008 (0.020)	0.007 (0.022)	0.006 (0.021)
EQ	1.031 (1.021)	1.039 (1.029)	1.040 (1.026)	1.045 (1.028)
BOARDS	0.195* (0.061)	0.186* (0.064)	0.176* (0.069)	0.164* (0.061)
BOARDIN	0.155* (0.063)	0.160* (0.068)	0.165* (0.063)	0.168 (0.070)
FREEFLOAT	−0.031** (0.009)	−0.037** (0.004)	−0.037** (0.008)	−0.042** (0.007)
ASSURANCE	1.212** (0.332)	1.242** (0.343)	1.251** (0.344)	1.244** (0.343)
DJSI	0.319 (0.728)	0.302 (0.721)	0.321 (0.723)	0.331 (0.734)
ENVSEN	0.257 (0.513)	–	–	–
INST	−0.322 (0.731)	−0.363 (0.712)	−0.321 (0.697)	–
Constant	12.05*** (3.141)	12.21*** (3.026)	12.54*** (3.055)	12.89*** (3.131)
Industry-fixed	No	Yes	Yes	Yes
Time-fixed	No	No	Yes	Yes
Country-fixed	No	No	No	Yes
Observations	672	672	672	672
R <sup>2</sup>	27.23%	27.65%	28.27%	29.02%

\*Significance at the 10% level.

\*\*Significance at the 5% level.

\*\*\*Significance at the 1% level.

**TABLE 8** Regression analyses (hypothesis 4)

Variables	Model (5)	Model (6)	Model (7)
GENDER	3.121** (1.313)	3.187** (1.311)	3.198* (1.321)
GENDER * CEOPOWER	3.054* (1.056)	–	–
SUSC	1.321 (1.009)	1.367 (1.086)	1.332 (1.123)
SUSC * CEOPOWER	–	1.105 (1.037)	–
SUSE	1.149** (0.501)	1.143** (0.505)	1.127** (0.507)
SUSE * CEOPOWER	–	–	1.088* (0.307)
CEOPOWER	–0.289** (0.048)	–0.283** (0.043)	–0.286** (0.045)
SIZE	–0.229 (0.256)	–0.232 (0.257)	–0.237 (0.254)
ROE	0.032** (0.006)	0.031** (0.005)	0.031** (0.004)
TOBIN'SQ	0.204 (0.133)	0.221 (0.155)	0.221 (0.155)
LEV	–0.208 (0.021)	–0.211 (0.024)	–0.214 (0.021)
ES	0.009 (0.026)	0.006 (0.021)	0.001 (0.027)
EQ	1.056 (1.014)	1.051 (1.015)	1.041 (1.016)
BOARDS	0.198* (0.055)	0.192* (0.051)	0.190* (0.051)
BOARDIN	0.178* (0.098)	0.174* (0.092)	0.172* (0.095)
FREEFLOAT	–0.011** (0.004)	–0.014** (0.005)	–0.016** (0.009)
ASSURANCE	1.298* (0.312)	1.265* (0.305)	1.276* (0.309)
DJSI	0.301 (0.716)	0.315 (0.721)	0.318 (0.720)
ENVSEN	–	–	–
INST	–	–	–
Constant	12.49*** (3.032)	12.57*** (3.058)	12.87*** (3.076)
Industry-fixed	Yes	Yes	Yes
Time-fixed	Yes	Yes	Yes
Country-fixed	Yes	Yes	Yes

(Continues)

**TABLE 8** (Continued)

Variables	Model (5)	Model (6)	Model (7)
Observations	672	672	672
R <sup>2</sup>	25.32%	26.21%	26.54%

\*Significance at the 10% level.

\*\*Significance at the 5% level.

\*\*\*Significance at the 1% level.

consequence, CEO power mitigates the stakeholder balancing function of the board, which may not imply major increases in MRQ in integrated reports. Thus, if the board of directors in general is sustainability-oriented but not the CEO, sustainable corporate governance may be problematic in business practice.

To check for robustness, we modified either our dependent or independent variables. First, we measured the ratio of female directors on the board instead of the Blau index and found similar results for both Hypotheses 1 and 4. Second, we used the combined economic, environmental, social and governance scores instead of our MDQ score. In line with the results of the main regressions, gender diversity and sustainability-related executive compensation were significantly and positively related to the combined financial and sustainability performance score. The results of the robustness checks are not tabulated.

## 5 | DISCUSSION AND CONCLUSION

With regard to the current discussion on greenwashing behavior and the information overload of business reporting, this study analyzed the impact of sustainable corporate governance on MDQ. Moreover, we included CEO power as a moderator of this relationship. Stakeholder and upper echelons theory suggests that the relationship between corporate governance and MDQ will be mainly explained by sustainability board expertise and related incentives. As greenwashing and information overload represent major challenges in business practices, we referred to the materiality principle by preparing the integrated report as the main focus. The key goal of IR, based on materiality, is to strengthen transparency to key stakeholders, entirely in line with the integrated thinking process. The risks of greenwashing and information overload will be higher if firms neglect materiality disclosures in integrated reports or refer to boiler plates. To meet stakeholder preferences, we included board gender diversity, sustainability committees, and sustainability-related executive compensation as independent variables and assumed a positive impact on our hand-collected MDQ score. Utilizing a multiple regression research design with 672 firm-year observations between 2014 and 2019 from an international perspective (Europe and South Africa), we found that gender diversity and sustainability-related executive compensation



had a significant positive impact on MDQ, while the existence of sustainability committees played no significant role. Moreover, CEO power as our moderator variable weakened the positive impact of the included sustainable corporate governance proxies on MDQ.

Our research results are relevant to the ongoing debate on future regulations on sustainable corporate governance and reporting, based on the current EU Green Deal project. Although many regimes have implemented mandatory gender quotas on board directors, other sustainable corporate governance attributes, such as sustainable committees or sustainable-related compensation systems, are still voluntary from an international perspective. There are many current debates on whether regulations on sustainable corporate governance, mandatory sustainable board duties, compensation, and composition requirements based on environmental and social issues, may lead to increased sustainable finance and sustainability reporting. As the European Commission recently plans to implement regulations on sustainable board duties and sustainable executive compensation systems, mainly related to climate issues, our results may be helpful for future evidence-based regulations.

This paper also provides various avenues for future research. As we concentrated on board governance, future researchers could analyze the relationship between internal and external corporate governance and IR. Sustainable board governance and sustainable institutional investors may represent either complementary or substitutive monitoring tools (Garcia-Sanchez et al., 2022; Jansson & Biel, 2011; Pucheta-Martinez & Chiva-Ortells, 2018). As sustainable investors put pressure on management to increase sustainable goals within a firm, future studies may include the signatures of the UN Principles for Responsible Investments (PRIs) and their impact on MDQ (Garcia-Sanchez et al., 2022). Furthermore, we know very little about the interplay between sustainable board governance and sustainability assurance by professional accountants. In this context, the relationship between audit and sustainability committees, financial and sustainability auditors and their contribution to IR should be reflected in future designs (Haji & Anifowose, 2016). We should also increase our knowledge of the relationship between sustainable corporate governance and “classical” corporate governance proxies (independence, busy boards, or networks). While current IR also includes corporate governance information that relates directly to sustainability (e.g., board diversity), a more holistic view on the impact of (sustainable) corporate governance on MDQ in integrated reports is needed. It is useful to include sustainable corporate governance scores as a mixture of different items and compare them with “classical” corporate governance scores. As IR includes both financial and sustainability information, financial- and industry expertise within the board and related committees is important. We did not identify any study on the combined financial-, industry, and sustainability expertise of board members on IR decisions and stress for future research on that topics.

We would also like to emphasize some practical implications and recommendations. While stand-alone sustainability reporting represents a “best practice” for most multinational listed firms from an international perspective, a clear reference to the IR concept by the

IIRC is yet of rather low relevance. We would like to mention the current establishment of the International Sustainability Standards Board (ISSB) and the goal of a global sustainability reporting standard. This future reporting standard will be mainly related to the guidelines of the G20 Task Force on Climate-related Financial Disclosures (TCFD) as an integrated report for climate issues. Thus, managers should be aware of the increased demand from capital market providers and other stakeholders to implement an integrated report, at least for climate issues. As we have already emphasized the risks of greenwashing and information overload, stakeholders may also question the decision usefulness of IR. A proper reliance on the materiality principle and the disclosure of the operationalization of material ESG topics should be a basic requirement (Whitelock, 2019). As a complementary mechanism to foster MDQ, the role of the board of directors and related sustainable corporate governance variables are of central importance for better stakeholder relations management. Our results indicate that sustainability expertise within the boards should be increased and not be limited to a sustainability committee. Both the executive and non-executive directors should increase their knowledge on sustainability topics with special reference to climate change policies. This expertise should also be included in sustainability and integrated reports to inform stakeholders. As the concept of the ISSB and the future European reporting framework mainly differs with regard to the materiality principle, a close cooperation between the two standard setters is crucial for European firms to avoid the publication of two future sustainability reports.

Finally, we accentuate the limitations of our study. First, as we relied on content analysis to select our dependent variable, IR scores may be perceived as subjective, although we defined clear operationalized criteria and double-checked the scores. Second, the results referred to integrated reports, which were prepared in accordance with the <IR> Framework. Future research should investigate and compare whether alignment with different frameworks delivers comparable results. Third, we focused only on the existence of sustainability-related compensation and sustainability committees and neglected the heterogeneity of compensation contracts and the individual profile of the committees. Future research should go one step further and analyze the range of environmental and social goals within compensation systems and the profile of committee members, their independence or their specific sustainability background. Some researchers (Wang et al., 2020) have already included more detailed sustainability committee variables, such as independence, diligence, size, and expertise. Future researchers are also invited to include both the sustainability committee and audit committee composition. In line with our sustainability board proxies, we also stress the limitations of the included CEO power variables. Pay slice, ownership, and tenure only addressed the “traditional” and financial aspects of CEO influence. There should be a combination of influence and sustainability skills or the expertise of the CEO in future research designs. CEOs should have both sustainability incentives and adequate knowledge to promote sustainability strategies and business models, which should also increase the MDQ in integrated reports. Fourth, we restricted our analysis to European and South African firms only with a clear

reference to the IIRC framework. Our results are not directly transferable to other regimes due to the intensive sustainability regulations in South Africa and the EU since the financial crisis of 2008–09. Finally, as we have already addressed some endogeneity concerns in our study, advanced regression models, such as the dynamic panel GMM approach or instrumental variable designs may be helpful in future research on that topic (Fu et al., 2020).

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