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# The effect of chief sustainability officers on sustainability reporting—A management perspective

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## Abstract

More and more companies worldwide are appointing a chief sustainability officer (CSO) to anchor the topic of sustainability at the top management level. This study examines how a CSO on the management board influences the quantity and quality of sustainability reports. While quantity is measured by the amount of information disclosed (sustainability disclosure), quality is measured as the decision for external assurance of the sustainability report, using the Global Reporting Initiative (GRI) guidelines as a reporting framework and publishing a combined report. Using a sample of German listed companies for the years 2017–2020, regression analysis is first conducted to analyse the impact of CSOs on sustainability reports. Second, the study shows how a chief executive officer (CEO) and a chief financial officer (CFO) impact sustainability reports when they also serve as CSOs. The results suggest that CSOs improve sustainability disclosure. In addition, a CSO positively impacts the decision for external assurance of the sustainability report but shows no impact on using the GRI guidelines and publishing a combined report. The results also show that a CFO positively influences sustainability disclosure, while a CEO does not. This study contributes to the growing literature on sustainable governance and how having a CSO on the management board impacts sustainability reporting. The study has numerous implications for regulators and practitioners. The most important insight is which management position should be responsible for sustainability to improve reporting and the limitations of that decision.

## KEYWORDS

board structure, CSO, sustainability management, sustainability reporting, sustainable governance

## 1 | INTRODUCTION

In recent years, companies have been increasingly forced to address sustainability as shareholders pay more and more attention to sustainability performance. Accordingly, shareholders demand more information about companies' sustainability performance (Arvidsson & Dumay, 2022; Ferrer et al., 2020). In Europe, regulators are also

increasing pressure on companies to operate sustainably and disclose sustainability issues. On the one hand, there is the Sustainable Finance Disclosure Regulation (SFDR), which requires financial service providers to classify their products into different sustainability categories and thus rely on companies' sustainability reporting. On the other hand, the European Union is also increasing its pressure on sustainability reporting through the forthcoming Corporate Sustainability

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Reporting Directive (CSRD) and thus the requirements for sustainability reporting in Europe (Arvidsson & Dumay, 2022). While companies have sufficient knowledge for financial reporting, the knowledge for sustainability reporting needs to be built and developed. One possible way to address the need to improve sustainability knowledge in the company is to adapt the company's corporate governance by establishing a sustainability committee (Amran et al., 2014; Orazalin, 2020). Companies also address the need to increase their sustainability knowledge by appointing a chief sustainability officer (CSO) at the board level (Strand, 2013, 2014).

By establishing a CSO, sustainability becomes a corresponding priority for the company and becomes more embedded in strategic thinking (Strand, 2013; Wiengarten et al., 2017). Following Arora et al. (2020), sustainability is defined as a means to improve the impact of a company's operations on the environment and society while reducing negative impacts. Consequently, sustainability reporting is the communication of corporate sustainability activities. Thus, a sustainability report is a communication tool to inform stakeholders about sustainability activities and interactions with different stakeholder groups (García-Sánchez et al., 2019). Sustainability disclosure also affects analysts' forecasting accuracy and thus is an informational benefit to the stakeholders (Ferrer et al., 2020). Despite increasing regulation, companies still have wide leeway in publishing sustainability reports, for example, by avoiding disclosing unfavourable information (Caputo et al., 2021). Consequently, it is of interest how corporate governance can contribute to improving sustainability reporting, as investors obtain information on sustainability performance and use it to make their investment decision (Arvidsson & Dumay, 2022; Atif et al., 2022). One possible way to adapt corporate governance is to appoint a CSO.

Previous research on CSOs has mainly focused on their impact on sustainability performance. While Fu et al. (2020) focus on social performance and Kanashiro and Rivera (2019) analyse the impact on environmental performance, Henry et al. (2019) consider sustainability performance as a whole. The mixed results do not provide clear evidence that a CSO positively affects sustainability performance. One reason could be the marginalisation of CSOs when sustainability knowledge is also acquired externally (Risi & Wickert, 2017).

Regarding reporting, previous research shows that the voluntary adoption of sustainable corporate governance mechanisms improves environmental risk disclosure (Peters & Romi, 2014). These corporate governance mechanisms include the establishment of a sustainability committee or CSO. The impact of these sustainable corporate governance mechanisms on sustainability reporting has been researched mainly with regard to the sustainability committee (e.g., Adnan et al., 2018; Amran et al., 2014; Gallego-Álvarez & Pucheta-Martínez, 2020). Most studies examine the impact of sustainability committees and external assurance on sustainability reports or the impact of a CSO on sustainability performance (Velte & Stawinoga, 2020). Velte and Stawinoga (2020) show that research mostly finds a positive impact of sustainability committees and assurance. There has been little research on the impact of a CSO on sustainability reporting. Accordingly, the impact needs to be researched.

As sustainability is one of the most important issues in the coming years, it needs to be integrated into the responsibilities of top management. Therefore, it is necessary to understand how different top management positions, for example, a chief executive officer (CEO) and a chief financial officer (CFO) responsible for sustainability, affect sustainability reporting.

To the best of our knowledge, there is no comprehensive research on how a CSO affects the quantity and quality of sustainability reports. This study measures quantity as the amount of sustainability information disclosed (hereafter sustainability disclosure). The quality of sustainability reports is measured by its credibility, comparability and relevance. For this purpose, the decision to have the sustainability report externally assured (credibility), the adoption of the Global Reporting Initiative (GRI) guidelines as a reporting framework (comparability) and the publication of a combined report (relevance) are used. Therefore, this study provides new insights into how a CSO on the management board affects sustainability reporting. Consequently, we aim to answer the following research question: How does a CSO influence the quantity and the quality of sustainability reports?

To answer the research question, regression analysis is conducted to analyse the impact of CSOs on sustainability reporting. In addition, the study examines the impact of a CEO and CFO who also serve as CSOs on sustainability reporting. The analysis is based on a sample of 408 firm-year observations of German listed companies between 2017 and 2020. Based on regression analysis, we show that a CSO exerts a positive impact on sustainability disclosure. A CSO also positively influences the decision to have the sustainability report externally assured. The results differ for the individual board positions of CEO and CFO acting as CSO. While a CFO responsible for sustainability positively influences sustainability disclosure, the CFO does not promote the decision to have the sustainability report externally assured and use the GRI guidelines as a reporting framework. Furthermore, the results indicate that the CFO prefers a separate sustainability report over a combined report. In contrast, a CEO responsible for sustainability has no influence on sustainability disclosure and the quality of a sustainability report. It appears that a CEO is not bothered by sustainability reporting, as there is also no negative effect observed.

Thus, this study contributes to the growing literature on sustainable corporate governance. It provides new insights into how a CSO influences sustainability reporting. First, it analyses the effect on the amount of information provided in the sustainability report. Second, it analyses the impact on the quality of the sustainability report. Third, it shows the effect of the quality characteristics of a sustainability report on sustainability disclosure. Forth, it provides evidence for the distribution of responsibility of sustainability on the management board for an improved sustainability report.

The results are relevant to both researchers and practitioners. The results show that the impact of a management board member responsible for sustainability depends on the management board member's position. This finding has implications for the distribution of board responsibilities. Further, it adds to the understanding of how the roles of the CEO and CFO affect sustainability reporting when

they also serve as CSO. Considering the recent efforts to create globally accepted standards for sustainability reporting, this study shows that a CSO does not favour the adoption of reporting frameworks. Therefore, the results support the current developments regarding the global standardisation of sustainability reporting and the changes brought about by the CSRD (mandatory assurance and integration of the sustainability report into the annual report).

## 2 | INSTITUTIONAL SETTING AND THEORETICAL FRAMEWORK

### 2.1 | The corporate governance system of German Stock Corporations

In order to examine the effectiveness of a CSO, it is relevant to consider the respective corporate governance system. The following study focuses on the German capital market as an example of a corporate governance characterised by mainly two-tier board structures. The management and monitoring roles in German stock corporations are divided into two boards: the management board and the supervisory board. Comparable to the executive directors on a US board of directors, the management board is in charge of running the day-to-day business. As an independent body, the supervisory board is not involved in the company's day-to-day management but monitors the management board. In addition, the supervisory board appoints the members of the management board. The annual general meeting elects the members of the supervisory board. In co-determined companies, the company's employees elect up to half of the supervisory board members (Dauth et al., 2017).

On the management board, all members, including the CEO, have equal rights; that is, no member has the right to issue instructions to the other management board members. Similarly, the supervisory board has no right to issue instructions to the management board. As a result, a management board member responsible for sustainability has the necessary enforcement power for this topic.

### 2.2 | Stakeholder theory

Stakeholder theory (Freeman, 1984) states that a company has to meet the expectations of its shareholders and other stakeholder. For this reason, stakeholder theory is most widely used when examining how corporate governance affects sustainability outcomes (Gallego-Álvarez & Pucheta-Martínez, 2020; Hahn & Kühnen, 2013; Velte & Stawinoga, 2020). Stakeholder theory suggests that information must be provided not only about the financial aspects of the company but also about social and environmental aspects (Gallego-Álvarez & Pucheta-Martínez, 2020; Hahn & Kühnen, 2013). The goal is to provide stakeholders with all the information they need about whether their expectations and requirements are being met (Adel et al., 2019). A board member responsible for sustainability should respect the interests of the company's stakeholders and be interested in fulfilling

their interests. Accordingly, a CSO must recognise the demands of stakeholders and communicate with them. One means of communicating with all stakeholders is the sustainability report. Consequently, a CSO should be interested in producing a good sustainability report. Therefore, we believe that stakeholder theory is appropriate for explaining a CSO's influence on sustainability reporting.

## 3 | LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

### 3.1 | Sustainability disclosure

There are a growing number of studies on sustainability committees, reporting, performance and CSOs. However, few studies address the impact of CSOs on sustainability performance, and none have yet examined the impact on reporting (Velte & Stawinoga, 2020). For example, Fu et al. (2020) focus on the impact of a CSO on a company's social performance. The authors distinguish social performance between a company's socially responsible and socially irresponsible activities. They show that a CSO positively affects socially responsible activities and reduces irresponsible behaviour.

On the other hand, Kanashiro and Rivera (2019) examine the impact of a CSO on environmental performance in industries with high environmental impact. Surprisingly, there is a negative relationship between the appointment of a CSO and environmental performance as measured by the toxic emissions. However, when regulations are strict, a CSO can positively affect environmental performance. These results suggest that companies and CSOs need regulation to improve environmental performance. Peters et al. (2019) find similar results for companies with low sustainability performance. Furthermore, they can show that the expertise of a CSO affects its impact and that a CSO has a positive effect on sustainability performance in subsequent years. These results suggest that a company may only use a CSO as a symbol to signal that it cares about sustainability. Furthermore, for a CSO to be effective, sustainability must be considered an integral part of the company's business model and respective strategy. Henry et al. (2019) also provide evidence that a CSO does not improve sustainability performance. Based on upper echelon theory, they can show a positive relationship between sustainability performance and functional diversity of the top management team including the CSO position.

Although the results are mixed regarding the impact on sustainability performance, a CSO should then at least positively impact sustainability reporting. Peters and Romi (2014) examine how corporate governance mechanisms affect environmental risk disclosure for a sample period from 2002 to 2006. They find that CSOs are positively associated with environmental disclosure. The results of del Valle et al. (2019) show that a CSO increases the probability of being included in a sustainability index. The authors attribute the higher likelihood to the CSO as a factor in implementing sustainability measures.

Research on sustainability reporting has mainly focused on how a sustainability committee and other board characteristics affect

sustainability reporting. So far, there has been no research on how a CSO affects sustainability reporting, but other corporate governance characteristics or positions such as CEO or CFO have. Pucheta-Martínez and Gallego-Álvarez (2019) examine how board characteristics affect sustainability reporting. Based on a sample of 39 countries, they find a positive association between board size, CEO duality, board gender diversity and sustainability committees with sustainability reporting. In contrast, board independence shows a negative relationship. Gallego-Álvarez and Pucheta-Martínez (2020) report partially opposite results for developing countries. While board independence and sustainability committees are positively associated with sustainability disclosure, CEO duality and board gender diversity are negatively correlated. Adel et al. (2019) focus their research on corporate governance characteristics as drivers of sustainability reporting on a European sample of S&P Europe 350 companies. They also extend the literature by splitting their sustainability reporting score into several subscores. They find that sustainability committees have a strong positive effect on the quality of sustainability reporting. Director ownership and company size are also positively related to sustainability reporting quality.

Anchoring responsibility for sustainability at the management board level reflects an increased organisational and strategic importance for the company (Wiengarten et al., 2017). This increased importance should also be reflected in sustainability reporting. By creating a CSO position on the management board, companies provide a central role that should address stakeholder interests (Miller & Serafeim, 2014). Consequently, a CSO is responsible for the company's sustainability activities and communicating with stakeholders (Peters & Romi, 2014). In order to address all stakeholders, a sustainability report complements a CSO's and company's communication. Therefore, a CSO should be inclined to disclose an appropriate amount of information in a sustainability report. Hence, the first hypothesis is formulated as follows:

**H1.** The presence of a CSO on the management board is positively associated with sustainability disclosure.

### 3.2 | External assurance

A problem for stakeholders is the reliability of the information provided in the sustainability reports. External assurance of the sustainability report acts as a signal of credibility to stakeholders and thus reduces the reliability issue (Michelon et al., 2015; Ottenstein et al., 2022).

Kend (2015) uses a two-stage model to investigate what leads to the decision to voluntarily publish a standalone sustainability report and have it externally assured. The existence of an audit committee, especially the number of meetings, seems to impact the voluntary assurance of a sustainability report positively.

Another factor influencing the decision to assure a sustainability report is the presence of a CSO and an environmental committee (Peters & Romi, 2015). Peters and Romi (2015) show that the

presence of a CSO and its functional background influence which type of assurance is chosen. The more experience a CSO has, the higher the qualitative requirements for the assurance provider of the sustainability report. Furthermore, the authors show that a sustainability committee can be a figurehead if no committee members have sustainability expertise. However, committees with expert members positively impact the decision for assurance.

External assurance can be seen as a quality signal for sustainability reporting to increase the credibility of the information provided (Al-Shaer & Zaman, 2018; Martínez-Ferrero & García-Sánchez, 2017). External assurance is not yet mandatory but is acquired voluntarily. In the context of stakeholder theory, a CSO should be interested in increasing the credibility of sustainability reporting. On the one hand, the reason is that it signals the quality of sustainability reporting to the capital market and thus enhances reputation (Birkey et al., 2016). On the other hand, it increases stakeholders' trust in the company's sustainability activities (Hodge et al., 2009).

Consequently, credibility among stakeholders can be improved by acquiring external assurance. Therefore, a CSO should be interested in the external assurance of a sustainability report, thereby enhancing its credibility. Following these arguments, the second hypothesis emerges:

**H2.** The presence of a CSO on the management board is positively associated with the external assurance of the sustainability report.

### 3.3 | Use of GRI guidelines as a framework

Sustainability reporting frameworks enable the standardisation of providing sustainability information. In this way, sustainability reports can be made more comparable for the reader. One recognised framework is the guidelines published by the GRI. The GRI guidelines are the world's leading disclosure framework due to the absence of global standard setting (Zarzycka & Krasodomska, 2022). Dilling (2010) finds a positive influence of profitability and the presence of a sustainability committee on the publication of a sustainability report according to the GRI guidelines. Interestingly, the author finds that companies from Europe are more likely to publish a sustainability report according to the GRI guidelines. Fuente et al. (2017) add to these findings. They use the level of alignment with the GRI guidelines for sustainability reports as a proxy for sustainability disclosure and examine how board characteristics influence the decision to adopt GRI guidelines. The authors find that the presence of a sustainability committee is positively associated with adopting the GRI guidelines. Further, gender diversity on the board and non-executive members is also positively related to sustainability disclosure as measured by the adoption rate of GRI guidelines.

The GRI guidelines are one of the most widely used sustainability reporting frameworks (Fuente et al., 2017; Hahn & Kühnen, 2013; KPMG, 2020). Therefore, adopting the GRI guidelines ensures the comparability of sustainability reports worldwide. Moreover, adoption

increases the credibility and disclosure of sustainability reports (Caputo et al., 2021; Del Miras-Rodríguez & Di Pietra, 2018; Diouf & Boiral, 2017). In addition, shareholders and stakeholders demand comparability in sustainability reports (Friede, 2019). To improve communication with stakeholders, a CSO should be interested in preparing the sustainability report according to internationally accepted reporting frameworks to provide comparable sustainability information. Therefore, the following hypothesis is formulated:

**H3.** The presence of a CSO on the management board is positively associated with using GRI guidelines as sustainability reporting framework.

### 3.4 | Format of the sustainability report

A standalone sustainability report risks a lack of linkage between its content and the financial information provided in the annual report. The separation reduces the relevance of the information provided for decision-making and the value of the information provided to shareholders (Navarrete-Oyarce et al., 2022). To address this issue, companies have begun to include sustainability reports in annual reports (Vitolla et al., 2019).

By including a sustainability report in the annual report, a company must integrate sustainability aspects into the organisation (Adams & McNicholas, 2007). While Berthelot et al. (2012) argue that publishing a separate sustainability report is a signal to shareholders compared to disclosing sustainability information in the annual report, recent research suggests that integrated reporting has several advantages. One of the advantages is greater transparency to stakeholders (Navarrete-Oyarce et al., 2022) and thus better stakeholder engagement (Kannenberg & Schreck, 2019). This advantage is one reason a CSO should promote a combined sustainability and annual report.

Furthermore, standalone sustainability reports have the problem that they are often longer and more complex (Mauro et al., 2020). Accordingly, publishing a combined report forces companies to focus on the most essential and relevant information. To meet the information needs of stakeholders, a CSO should be interested in initiating the publication of a combined report to increase the relevance of the information provided. Additionally, Argento et al. (2019) show that a CSO promotes integrated reporting for a case company. These considerations lead to the following hypothesis:

**H4.** The presence of a CSO on the management board is positively associated with publishing of a combined report.

### 3.5 | Association of the CSO position with another management board position

While the responsibilities and authority of a CEO or CFO are usually well established across companies, the responsibilities and authority

of a CSO may vary from company to company (Miller & Serafeim, 2014). In practice, the CSO position may be linked to an existing management board position or designed to be solely responsible for sustainability. Furthermore, if there is no standalone CSO, the degree of institutionalisation of sustainability in the company should be considered higher (Risi & Wickert, 2017). Depending on the association of the CSO position, the association may have a positive or negative impact on the board member's ability to perform the respective sustainability tasks and take stakeholder interests into account. Accordingly, we examine how the association of the CSO position with the CEO and CFO affects the disclosure and quality of sustainability reporting.

#### 3.5.1 | Association of the CSO position with the CEO

The fact that responsibility for sustainability lies with the CEO means that this topic enjoys one of the highest levels of attention in companies. Even if the CEO is not directly involved in preparing the financial and sustainability report and its content, this could positively impact sustainability disclosure. This argument is supported by Al-Duais et al. (2021), who find a positive relationship between sustainability disclosure and CEO tenure. Based on the upper echelon theory, Shahab et al. (2020) study on how CEO characteristics affect sustainability and environmental performance and reporting. Using a sample of Chinese listed companies, they show that CEOs with research backgrounds are positively associated with sustainable and environmental performance and reporting. Additionally, CEOs with financial experience and younger CEOs also improve environmental reporting.

Further, stakeholders may be more interested in sustainability performance if the CEO is also responsible for sustainability, leading to more information being provided in the sustainability report. In this context, the CEO could directly and indirectly positively impact sustainability disclosure and the corresponding quality attributes of sustainability reporting. Jizi et al. (2014) find a positive relationship between CEO duality and sustainability disclosure. They argue that this could be a signal that these CEOs do not harm stakeholders' interests by disclosing more sustainability information. They also cannot rule out the possibility that these are risk-averse CEOs. In contrast, Garcia-Sanchez et al. (2021) find that CEOs reject the adoption of integrated reporting. The ambivalent theoretical implication of agency theory and stakeholder theory for the relationship between CEO duality and sustainability disclosure is also highlighted by Michelon and Parbonetti (2012). In their study, they find no relationship between sustainability disclosure and CEO duality.

Moreover, the CEO is in contact with many stakeholders and knows what they want and need to know. He can specifically address these issues as part of the sustainability report. Therefore, we adapt the beforementioned hypotheses for the case where a CSO position is associated with the CEO and argue that a CEO positively influences the disclosure and quality of the sustainability report:



**H1a.** A CEO responsible for sustainability is positively associated with sustainability disclosure.

**H2a.** A CEO responsible for sustainability is positively associated with the external assurance of the sustainability report.

**H3a.** A CEO responsible for sustainability is positively associated with using GRI guidelines as sustainability reporting framework.

**H4a.** A CEO responsible for sustainability is positively associated with publishing of a combined report.

### 3.5.2 | Association of the position of CSO with the CFO

The CFO is usually responsible for providing financial information within a company. The CFO is also involved in external financial communications and communicates with shareholders and other stakeholders. Therefore, the CFO knows what shareholders want to know. In addition, accounting expertise is increasingly in demand for sustainability initiatives and the integration of these initiatives into financial reporting (Ballou et al., 2012). Guo et al. (2021) show that the CFO's accounting knowledge positively impacts sustainability disclosure in the 10-Ks. Another aspect is the combination of resources and knowledge within the CFO's management position and staff. Shared responsibility for sustainability and finance should positively impact sustainability disclosures. Furthermore, the combination shows a higher institutionalisation of sustainability (Risi & Wickert, 2017) and should therefore lead to higher sustainability disclosure.

Additionally, the CFO should understand the value of external assurance and internationally recognised sustainability reporting guidelines. Furthermore, the CFO should be interested in publishing the sustainability report as part of the annual report. Thus, the related hypotheses regarding the association of the CSO with the CFO are:

**H1b.** A CFO responsible for sustainability is positively associated with sustainability disclosure.

**H2b.** A CFO responsible for sustainability is positively associated with the external assurance of the sustainability report.

**H3b.** A CFO responsible for sustainability is positively associated with using GRI guidelines as sustainability reporting framework.

**H4b.** A CFO responsible for sustainability is positively associated with publishing a combined report.

## 4 | METHODOLOGY

### 4.1 | Data and variables

This study examines the influence of CSOs on the management board on sustainability reports in Germany. The sample is based on publicly traded German companies listed in the DAX, MDAX or SDAX indices on 31 December 2020. The three indices comprise 160 companies. Thirteen non-German companies are excluded from the sample as the German corporate governance system does not cover them. Following the approach of Pucheta-Martínez and Gallego-Álvarez (2019), 20 financial and real estate companies are excluded due to their specific accounting and financial characteristics. Therefore, 127 companies are included in the sample of this study.

To determine the presence of a CSO on the management board, the annual reports for fiscal years 2017–2020 were analysed manually. In 2017, the European Directive 2014/95/EU on non-financial reporting (NFRD) came into effect, providing new comprehensive regulations on sustainability reporting. With starting the sample period with the fiscal year beginning in 2017, a consistent regulatory framework for sustainability reporting in Germany is effective during the sample period. The job descriptions of all management board members were researched in the annual reports. As there is not necessarily a management board member solely responsible for sustainability, a management board member is counted as a CSO if one of their departments or responsibilities is related to sustainability or has an environmental, social or governance (ESG) aspect. This includes, but is not limited to, areas of responsibility such as sustainability, environment, health, social or ethics. This approach is consistent with previous research that allows for different titles (Peters et al., 2019; Velte & Stawinoga, 2020) or role descriptions (Fu et al., 2020; Kanashiro & Rivera, 2019) for coding CSO. The variable CSO equals 1 if the company has a CSO and 0 otherwise. Further, we differentiate if the responsibility is in the CEO (or co-CEO) or CFO position. These variables are denominated with CEO and CFO, respectively; 144 observations were dropped because no annual report was available.

Sustainability disclosure is measured by the availability of information on the sustainability aspects of the company. Following Pucheta-Martínez and Gallego-Álvarez (2019) and Ottenstein et al. (2022), data are collected from Refinitiv ESG to construct a measure of sustainability disclosure. The score is formed by coding a 1 if an item is available in Refinitiv ESG and 0 otherwise. We follow the approach of Ottenstein et al. (2022) and construct a sustainability disclosure score based on 121 items from Refinitiv ESG, based on the information disclosed by the companies themselves and collected by Refinitiv analysts. Thus, the constructed score is a proxy for the sustainability disclosure of the respective companies. The selection of these 121 items is specifically designed to reflect the NFRD requirements applicable to the sample of this study (Ottenstein et al., 2022). Therefore, no adjustments are required to the selected items. The variable *SRD* (Sustainability Report's Disclosure) is defined as the sum of all disclosed items for each company divided by the maximum possible number of 121 and then multiplied by 100 to obtain a percentage

value. Due to missing data in Refinitiv ESG, we exclude four observations with an SRD score of 0.

We also manually collect whether the company has its sustainability report externally assured to test the second hypothesis. For the analysis, we define the variable *SRA* (Sustainability Report's Assurance) as a dummy variable that takes the value 1 if the sustainability report is assured with either reasonable or limited assurance and the value 0 otherwise.

We also collect if the company uses a framework to prepare its sustainability reports. As the GRI guidelines have been established as internationally recognised frameworks (KPMG, 2020), we use the adoption of GRI guidelines to measure comparability and to test our third hypothesis. The variable *GRI* takes the value 1 if a company fully applies the GRI guidelines and 0 otherwise.

Companies in Germany have the option of publishing their sustainability report as a standalone report at a different time than the publication of the annual report. Alternatively, the sustainability report can also be published as part of the annual report. In this case, companies can include the sustainability report as a separate chapter as a simpler variant or fully integrate it as a more sophisticated variant. *CR* (Combined Report) is defined as a dummy variable that takes the value 1 if the company publishes its sustainability report as part of the annual report (combined report) and 0 if the company publishes a standalone sustainability report. *CR* is used to test Hypothesis 4.

We include whether the company has a sustainability team or committee as control variable for a company's sustainability efforts that might influence sustainability reporting. The variable *SustCom* is collected via Refinitiv ESG. Based on existing research, a sustainability committee is expected to positively impact sustainability disclosure (Caputo et al., 2021; Helfaya & Moussa, 2017) and the decision to adopt the GRI guidelines (Fuente et al., 2017). Furthermore, we distinguish whether a company is required to prepare a sustainability report under the NFDR and refer to this variable as *Mand*.

We add other financial and company characteristics as control variables that could also influence sustainability disclosure or sustainability report quality and have been used in previous research. In particular, these are based on Clarkson et al. (2008), Dienes et al. (2016), Fuente et al. (2017) and Gallego-Álvarez and Pucheta-Martínez (2020). The first variable is *FirmSize*, measured as the natural logarithm of total assets. Another commonly used control variable is profitability. We use return on assets (*RoA*) as a measure of profitability (e.g., Adel et al., 2019). Leverage (*Leverage*) is measured as the ratio of total debt to total capital. We use *TobinsQ* to depict market expectations for growth opportunities. In addition, we include *FreeFloat* as an ownership variable. Even though free float shareholders are shareholders, they might represent various stakeholder interests and therefore influence the propensity to disclose more sustainability information. Board size (*BoardSize*) and board independence (*BoardInd*) are added as control variables for board characteristics. *BoardSize* measures the number of board members, while *BoardInd* measures the percentage of independent board members.

The information on financial, ownership and corporate governance control variables is retrieved from the Refinitiv database. Due

to missing data in the Refinitiv database, the final sample comprises 408 firm-year observations. Table 1 provides an overview of all variables used.

## 4.2 | Research model

Random effects regression is used to analyse the influence of the variables of interest on sustainability disclosure. We formulate the following model:

$$\begin{aligned} SRD_{it} = & \alpha_0 + \beta_1 CSO_{it} + \beta_2 FirmSize_{it} + \beta_3 ROA_{it} + \beta_4 Leverage_{it} \\ & + \beta_5 TobinsQ_{it} + \beta_6 FreeFloat_{it} + \beta_7 SustCom_{it} + \beta_8 Mand_{it} \\ & + \beta_9 BoardSize_{it} + \beta_{10} BoardInd_{it} + Industry\ dummies \\ & + Year\ dummies + \varepsilon_{it} \end{aligned} \quad (1)$$

where *i* stands for company *i* and *t* for year *t*.

Since the dependent variables in Hypotheses 2–4 are dummy variables, probit regressions are used to conduct the analysis. The models are formulated as follows:

$$\begin{aligned} SRA_{it} = & \alpha_0 + \beta_1 CSO_{it} + \beta_2 FirmSize_{it} + \beta_3 ROA_{it} + \beta_4 Leverage_{it} \\ & + \beta_5 TobinsQ_{it} + \beta_6 FreeFloat_{it} + \beta_7 SustCom_{it} + \beta_8 Mand_{it} \\ & + \beta_9 BoardSize_{it} + \beta_{10} BoardInd_{it} + Industry\ dummies \\ & + Year\ dummies + \varepsilon_{it} \end{aligned} \quad (2)$$

$$\begin{aligned} GRI_{it} = & \alpha_0 + \beta_1 CSO_{it} + \beta_2 FirmSize_{it} + \beta_3 ROA_{it} + \beta_4 Leverage_{it} \\ & + \beta_5 TobinsQ_{it} + \beta_6 FreeFloat_{it} + \beta_7 SustCom_{it} + \beta_8 Mand_{it} \\ & + \beta_9 BoardSize_{it} + \beta_{10} BoardInd_{it} + Industry\ dummies \\ & + Year\ dummies + \varepsilon_{it} \end{aligned} \quad (3)$$

$$\begin{aligned} CR_{it} = & \alpha_0 + \beta_1 CSO_{it} + \beta_2 FirmSize_{it} + \beta_3 ROA_{it} + \beta_4 Leverage_{it} \\ & + \beta_5 TobinsQ_{it} + \beta_6 FreeFloat_{it} + \beta_7 SustCom_{it} + \beta_8 Mand_{it} \\ & + \beta_9 BoardSize_{it} + \beta_{10} BoardInd_{it} + Industry\ dummies \\ & + Year\ dummies + \varepsilon_{it} \end{aligned} \quad (4)$$

where *i* stands for company *i* and *t* for year *t*. To control for industry specificities in sustainability reporting, industry fixed effects based on the first digit of the SIC code classification are added in all models. Also year fixed effects are used. All models employ firm-clustered standard errors.

## 5 | RESULTS

### 5.1 | Descriptive statistics

Table 2 provides a summary of the sample's descriptive statistics and the variables used for the analysis. The average SRD is 77, and the median is 78, indicating relatively good sustainability disclosure in Germany. This is supported by the fact that 66% of the observations obtained acquired limited or reasonable assurance for the sustainability report. The good sustainability disclosure is further supported by the fact that 44% of the observations have prepared the sustainability report in accordance with the GRI guidelines. Furthermore, 47% of sustainability reports are published as part of the annual report to provide a comprehensive overview of financial performance and



**TABLE 1** Variables overview

Variable	Description	Source
Dependent variables		
SRD	Sustainability Report's Disclosure—relative score of disclosure of 121 items in the Refinitiv ESG database. Based on Ottenstein et al. (2021)	Refinitiv
SRA	Sustainability Report's Assurance—dummy variable that takes the value 1 if there is an audit with reasonable or limited assurance and 0 otherwise	Hand-collected
GRI	Global Reporting Initiative—dummy variable that takes the value 1 if a company fully applies the GRI guidelines and 0 otherwise	Hand-collected
CR	Combined Report—dummy variable that takes the value 1 if the company publishes its sustainability report as part of the annual report (combined report) and 0 otherwise	Hand-collected
Independent variables		
CSO	Dummy variable that takes the value 1 if the company has a management board member responsible for sustainability and 0 otherwise	Hand-collected
CEO	Dummy variable that takes the value 1 if the CEO is responsible for sustainability and 0 otherwise	Hand-collected
CFO	Dummy variable that takes the value 1 if the CFO is responsible for sustainability and 0 otherwise	Hand-collected
COther	Dummy variable that takes the value 1 if the company has a management board member other than CEO or CFO responsible for sustainability and 0 otherwise	Hand-collected
Control variables		
FirmSize	The natural logarithm of total assets	Refinitiv
RoA	Return on Assets	Refinitiv
Leverage	Leverage—ratio of total debt to total capital	Refinitiv
TobinsQ	Tobin's Q—calculated as the ratio of market value of equity and liabilities to book value of equity and liabilities	Refinitiv
FreeFloat	Free float number of shares	Refinitiv
SustCom	Dummy variable that takes the value 1 if the company has a CSR committee or team and 0 otherwise	Refinitiv
Mand	Dummy variable that takes the value 1 if the company has to mandatorily publish a sustainability report in accordance with the NFDR and 0 otherwise	Hand-collected
BoardSize	The total number of board members at the end of the fiscal year	Refinitiv
BoardInd	Percentage of independent board members as reported by the company	Refinitiv

sustainability activities. Nevertheless, there is room for improvement for the quantity and quality of sustainability reports in Germany.

We manually collected information on CSOs and found that no single management board member is exclusively responsible for sustainability. There is a CSO in 38% of all observations, of which 14% are CEOs and 6% are CFOs responsible for sustainability. Even if there is no exclusive CSO, the number of CSOs illustrates the importance of sustainability to companies.

Table A1 in the Appendix provides the correlation table. The variance inflation factor (VIF) is obtained for each regression to test for multicollinearity. The VIF for each variable in each regression is below the value of five. The average VIF for each regression is below three. Thus, we do not consider multicollinearity a critical issue in this study.

## 5.2 | Main results

Table 3 shows the regression results for our main hypotheses H1–H4. The results show that the presence of a CSO (CSO) has a positive impact on the level of sustainability disclosure (SRD) ( $\beta = .408$ ,  $p = .091$ ). These results support hypothesis H1. Furthermore, FirmSize

has a highly significant relationship with SRD ( $\beta = .959$ ,  $p < .001$ ). This finding makes sense so far that larger companies have greater media exposure and engage with more stakeholders (Baldini et al., 2018). Larger companies provide more information in their sustainability report to meet the greater media attention and stakeholder interests. They also have more resources to prepare a sustainability report. A sustainability committee or team (SustCom) also shows a positive relationship with SRD ( $\beta = .842$ ,  $p = .062$ ). This result supports previous research that sustainability committees help management engage with their stakeholders and improve sustainability disclosure (Amran et al., 2014; Gallego-Álvarez & Pucheta-Martínez, 2020). BoardSize shows a positive relationship with SRD ( $\beta = .128$ ,  $p = .066$ ). One reason for this could be that larger boards provide the company with a broader knowledge base about sustainability and stakeholder perspectives (Mahmood et al., 2018). Accordingly, a larger board likely leads to more sustainability disclosure.

CSO also shows a positive relationship with external assurance (Model 2;  $\beta = .735$ ,  $p = .080$ ), supporting H2 and thus corroborating the findings of Peters and Romi (2015). Twelve observations are discarded for GRI prediction (Model 3) because no company in one industry applies the GRI guidelines. This industry predicts the non-

**TABLE 2** Descriptive statistic

	N Total	Mean	S.D.	Min	0.25	Median	0.75	Max
Dependent variables								
SRD	408	77.44	5.57	65.29	73.14	77.69	81.82	91.74
SRA	408	0.66	0.47	0	0	1	1	1
GRI	408	0.44	0.50	0	0	0	1	1
CR	408	0.47	0.50	0	0	0	1	1
Independent variables								
CSO	408	0.38	0.49	0	0	0	1	1
CEO	408	0.14	0.35	0	0	0	0	1
CFO	408	0.06	0.24	0	0	0	0	1
COther	408	0.18	0.38	0	0	0	0	1
Control variables								
FirmSize	408	15.41	1.71	11.32	14.18	15.30	16.40	20.00
RoA	408	5.03	7.56	−31.44	2.17	4.71	7.82	80.13
Leverage	408	36.24	21.37	0.00	18.88	36.25	51.21	91.73
TobinsQ	408	2.12	1.73	0.77	1.14	1.44	2.52	13.34
FreeFloat	408	65.94	23.42	10.00	48.00	69.00	86.00	100.00
SustCom	408	0.73	0.45	0	0	1	1	1
Mand	408	0.95	0.22	0	1	1	1	1
BoardSize	408	11.66	5.60	3.00	6.00	12.00	16.00	23.00
BoardInd	408	54.58	35.50	0	25	52.75	88.89	100

application of the GRI guidelines and is statistically removed. Model 3 does not show support that a CSO positively influences the application of the GRI guidelines as a reporting framework. Therefore, we reject hypothesis H3. One possible reason could be that the GRI guidelines are an internationally accepted framework and companies apply them regardless of who is responsible for sustainability (Zarzycka & Krasodomska, 2022).

Furthermore, a CSO does not influence the decision to publish the sustainability report as a combined report. A possible reason could be that a CSO has no responsibility for financial reporting and therefore cannot influence the publication of a combined report. Furthermore, the CFO could be solely responsible for publishing a combined report, and a CSO is only responsible in providing information (Miller & Serafeim, 2014). Therefore, we reject H4.

### 5.3 | The association of CSO

To determine the influence of a specific board position on sustainability reporting, the variable CSO is split into CEO, CFO and any other management board position (COther). In this way, the influence of each role can be determined, and additional insights into the hypotheses can be gained. The results are shown in Table 4.

If the responsibility for sustainability lies with the CFO, there is a positive effect on SRD ( $\beta = .769$ ,  $p = .033$ ), while there is no significant effect for CEO ( $\beta = .263$ ,  $p = .377$ ). The positive effect of CFO on the extent of sustainability disclosure confirms hypothesis H1b and results from research on the US capital market (Guo et al., 2021).

The results suggest that the CFO links his or her responsibilities and thus positively influences sustainability disclosure. However, hypothesis H1a cannot be confirmed. Thus, the CEO does not influence sustainability disclosure when he or she is responsible for sustainability. However, it is good news for companies and readers of the sustainability report that the largest group of CSOs does not negatively influence sustainability disclosure. One reason for this could be that the CEO rarely has responsibility for reporting. Moreover, the expected positive effect of a CEO on sustainability disclosure could be negated due to the negative impact according to agency theory (Michelon & Parbonetti, 2012).

For the decision to have the sustainability report externally assured, neither CEO nor CFO shows a positive relationship (CEO:  $\beta = .445$ ,  $p = .390$ ; CFO:  $\beta = 1.080$ ,  $p = .198$ ). To explain the use of the GRI guidelines as a reporting framework, also both variables show no significant relationship (CEO:  $\beta = .382$ ,  $p = .406$ ; CFO:  $\beta = .375$ ,  $p = .547$ ). One possible reason is that the CFO trusts his reporting knowledge and does not consider the GRI guidelines necessary. In the case of the CEO, it is noticeable that the CEO is not responsible for reporting and therefore does not invest in an external assurance and applying the GRI guidelines. As mentioned earlier, another reason could be that companies apply the GRI guidelines regardless of who is responsible for sustainability and that it is a widely accepted framework (Zarzycka & Krasodomska, 2022).

CFO is the only variable of interest that significantly affects the format of sustainability report publication (Model 8;  $\beta = -3.651$ ,  $p = .007$ ). This negative relationship contradicts hypothesis H3b. The CFO may desire to publish the sustainability report as a standalone

**TABLE 3** Regression results main hypotheses

Dependent variable Method Model	SRD Random effects 1	SRA Probit 2	GRI Probit 3	CR Probit 4
CSO	0.408* (0.091)	0.735* (0.080)	0.316 (0.352)	−0.661 (0.169)
FirmSize	0.959*** (0.000)	0.279 (0.187)	0.574*** (0.003)	0.149 (0.578)
RoA	−0.012 (0.293)	0.002 (0.914)	0.006 (0.765)	−0.044 (0.124)
Leverage	−0.012 (0.257)	0.015 (0.251)	−0.026** (0.034)	−0.001 (0.962)
TobinsQ	−0.052 (0.737)	0.016 (0.896)	−0.035 (0.767)	−0.194 (0.254)
FeeFloat	0.011 (0.185)	−0.016* (0.081)	0.006 (0.458)	−0.006 (0.579)
SustCom	0.842* (0.062)	0.163 (0.687)	0.593 (0.116)	−0.211 (0.684)
Mand	0.319 (0.516)	0.352 (0.557)	−0.470 (0.405)	−0.919 (0.262)
BoardSize	0.128* (0.066)	0.088 (0.114)	0.007 (0.889)	0.065 (0.399)
BoardInd	0.006 (0.281)	0.003 (0.613)	−0.006 (0.305)	0.015* (0.066)
Intercept	60.692***	−5.920*	−7.887***	1.431
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	408	408	396	408
Adj./Pseudo R <sup>2</sup>	.657	.288	.201	.281
F-/Chi <sup>2</sup> -statistic p value	.000	.071	.047	.004

Note: *p* values/*t* values in parentheses. Twelve observations are dropped in Model 3 because one industry does not have a company that applies the GRI guidelines. Therefore, this industry perfectly predicts failure.

\*\*\*Indicates a significance level of 1%.

\*\*Indicates a significance level of 5%.

\*Indicates a significance level of 10%.

report to separate the production of the annual report and the sustainability report in terms of time. This separation will reduce the workload of the CFO's employees, and the capacities can be better managed. The CFO could therefore favour a standalone sustainability report. In this way, potential negative impacts on the quality of both financial and sustainability reporting can be avoided.

## 5.4 | Additional analysis

To gain further insights into how disclosure in sustainability reports is influenced, we investigate the influence of reporting quality measures (SRA, GRI and CR) on sustainability disclosure (SRD). Therefore, the previously conducted analyses are repeated for SRD. The variables SRA, GRI and CR are subsequently added to the regressions and then

combined. In this way, the effects of the variables are also included in the analysis. The results are shown in Table 5. Models 9 through 12 show the regression results with CSO as the variable of interest. Models 9, 10, and 10 add the variables SRA, GRI, and CR are added. Model 12 includes all three additional variables. This procedure is repeated for models 13 through 16, but CSO is separated into CEO, CFO and COther.

The positive influence of a CSO is confirmed in all models except Model 9. In Model 9, the *p* value is slightly above the critical value of 10% ( $p = .104$ ). CSO is significant when GRI (Model 10) and CR (Model 11) are added individually and when all three variables are added simultaneously (Model 12). Additionally, GRI shows a positive association with SRD in Model 10 ( $\beta = .387$ ,  $p = .024$ ) and Model 12 ( $\beta = .416$ ,  $p = .015$ ). This is not surprising since the GRI guidelines provide a framework for sustainability reporting. Therefore, the GRI

**TABLE 4** Regression results CSO separation

Dependent variable Method Model	SRD Random effects 5	SRA Probit 6	GRI Probit 7	CR Probit 8
CEO	0.263 (0.377)	0.445 (0.390)	0.382 (0.406)	−0.091 (0.889)
CFO	0.769** (0.033)	1.080 (0.198)	0.375 (0.547)	−3.651*** (0.007)
COther	0.414 (0.164)	0.927* (0.094)	0.246 (0.560)	−0.355 (0.576)
FirmSize	0.964*** (0.000)	0.290 (0.180)	0.575*** (0.003)	0.092 (0.750)
RoA	−0.012 (0.295)	0.003 (0.873)	0.005 (0.794)	−0.050 (0.116)
Leverage	−0.013 (0.246)	0.016 (0.247)	−0.027** (0.033)	0.004 (0.806)
TobinsQ	−0.052 (0.738)	0.018 (0.887)	−0.034 (0.774)	−0.197 (0.270)
FeeFloat	0.011 (0.183)	−0.016* (0.085)	0.005 (0.469)	−0.008 (0.498)
SustCom	0.859* (0.060)	0.178 (0.664)	0.586 (0.122)	−0.261 (0.637)
Mand	0.327 (0.507)	0.368 (0.545)	−0.473 (0.403)	−1.046 (0.225)
BoardSize	0.129* (0.064)	0.089 (0.119)	0.008 (0.870)	0.073 (0.379)
BoardInd	0.006 (0.309)	0.003 (0.653)	−0.005 (0.321)	0.017* (0.057)
Intercept	60.577***	−6.204**	−7.875***	2.274
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	408	408	396	408
Adj./pseudo R <sup>2</sup>	.659	.290	.201	.299
F-/Chi <sup>2</sup> -statistic p value	.000	.136	.087	.022

Note: p values/t values in parentheses. Twelve observations are dropped in Model 7 because one industry does not have a company that applies the GRI guidelines. Therefore, this industry perfectly predicts failure.

\*\*\*Indicates a significance level of 1%.

\*\*Indicates a significance level of 5%.

\*Indicates a significance level of 10%.

guidelines are directly correlated with SRD. On the other hand, SRA and CR show no influence on SRD. This indicates that the external assurance only serves the credibility of the sustainability report but not sustainability disclosure. The format of the publication of the sustainability report also does not affect sustainability disclosure, while Caputo et al. (2021) find a negative effect of a combined report with environmental disclosures. Our results are consistent with Michelon et al. (2015), who found similar results with respect to assurance and standalone reports compared to combined reports. A negative impact on sustainability disclosure could have been expected in the case of

simultaneous publication, as resource constraints may arise when financial and sustainability reports are prepared simultaneously. On the other hand, it can be argued that companies consciously decide in favour of simultaneous reporting and, on the one hand, provide the corresponding resources and, on the other hand, pay attention to appropriate disclosure.

Similar results as in Models 9–12 are observed in Models 13–16 for CSO separation. SRA and CR show no significant relationship with SRD. On the other hand, GRI as a single variable (Model 14:  $\beta = .390$ ,  $p = .022$ ) and in the full model (Model 16:  $\beta = .420$ ,  $p = .015$ ) again

TABLE 5 Addition analysis SRD

Dependent variable	SRD Random effects 9	SRD Random effects 10	SRD Random effects 11	SRD Random effects 12	SRD Random effects 13	SRD Random effects 14	SRD Random effects 15	SRD Random effects 16
Method Model								
CSO	0.395 (0.104)	0.421* (0.066)	0.407* (0.092)	0.404* (0.079)				
CEO					0.260 (0.383)	0.255 (0.378)	0.257 (0.381)	0.242 (0.393)
CFO					0.741** (0.044)	0.804** (0.023)	0.794** (0.032)	0.801** (0.028)
COther					0.400 (0.175)	0.439 (0.122)	0.411 (0.171)	0.418 (0.140)
FirmSize	0.949*** (0.000)	0.931*** (0.000)	0.959*** (0.000)	0.915*** (0.000)	0.954*** (0.000)	0.937*** (0.000)	0.964*** (0.000)	0.922*** (0.000)
RoA	-0.012 (0.280)	-0.014 (0.233)	-0.012 (0.305)	-0.014 (0.227)	-0.012 (0.283)	-0.013 (0.236)	-0.012 (0.312)	-0.014 (0.231)
Leverage	-0.013 (0.218)	-0.013 (0.229)	-0.012 (0.263)	-0.014 (0.186)	-0.014 (0.210)	-0.013 (0.217)	-0.012 (0.254)	-0.014 (0.178)
TobinsQ	-0.055 (0.726)	-0.055 (0.726)	-0.051 (0.743)	-0.056 (0.720)	-0.055 (0.727)	-0.055 (0.726)	-0.050 (0.746)	-0.056 (0.722)
FeeFloat	0.012 (0.157)	0.013 (0.129)	0.011 (0.183)	0.014* (0.097)	0.012 (0.156)	0.013 (0.127)	0.011 (0.180)	0.014* (0.095)
SustCom	0.840* (0.063)	0.857* (0.054)	0.844* (0.057)	0.860** (0.006)	0.857* (0.061)	0.876* (0.052)	0.864* (0.053)	0.882** (0.044)
Mand	0.310 (0.527)	0.406 (0.416)	0.322 (0.517)	0.404 (0.423)	0.318 (0.518)	0.417 (0.406)	0.332 (0.506)	0.417 (0.410)
BoardSize	0.127* (0.067)	0.134** (0.049)	0.127* (0.067)	0.131* (0.051)	0.128* (0.065)	0.135** (0.048)	0.128* (0.065)	0.132** (0.049)
BoardInd	0.006 (0.263)	0.006 (0.244)	0.006 (0.284)	0.007 (0.224)	0.006 (0.288)	0.006 (0.271)	0.006 (0.313)	0.006 (0.250)
SRA	0.190 (0.246)			0.252 (0.123)	0.182 (0.268)			0.243 (0.136)
GRI		0.387** (0.024)		0.416** (0.015)		0.390** (0.022)		0.420** (0.015)
CR			0.052 (0.818)	0.066 (0.763)			0.076 (0.737)	0.091 (0.680)
Intercept	60.758***	60.641***	60.645***	60.669***	60.643***	60.504***	60.499***	60.491***
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	408	408	408	408	408	408	408	408
Adj. R <sup>2</sup>	.659	.673	.656	.677	.661	.675	.658	.680
F-statistic p value	.000	.000	.000	.000	.000	.000	.000	.000

\*\*\*Indicates a significance level of 1%.

\*\*Indicates a significance level of 5%.

\*Indicates a significance level of 10%.

**TABLE 6** Additional analysis SRD—lagged model

Dependent variable	SRD Random effects	SRD Random effects	SRD Random effects	SRD Random effects	SRD Random effects	SRD Random effects	SRD Random effects	SRD Random effects
Method Model	Lagged-1	Lagged-2	Lagged-3	Lagged-4	Lagged-5	Lagged-6	Lagged-7	Lagged-8
CSO	2.234** (0.042)	2.288** (0.036)	2.313** (0.040)	2.267** (0.037)				
CEO					1.772 (0.148)	1.911 (0.121)	1.861 (0.133)	1.815 (0.124)
CFO					3.056** (0.016)	3.016** (0.024)	3.208** (0.016)	3.354** (0.020)
COther					2.323* (0.078)	2.339* (0.067)	2.370* (0.074)	2.245* (0.074)
FirmSize	1.248* (0.062)	1.067 (0.109)	1.236* (0.073)	0.925 (0.126)	1.254* (0.067)	1.076 (0.114)	1.244* (0.077)	0.936 (0.130)
RoA	−0.001 (0.983)	−0.006 (0.852)	0.004 (0.898)	0.006 (0.849)	0.002 (0.955)	−0.004 (0.900)	0.007 (0.832)	0.009 (0.770)
Leverage	−0.004 (0.924)	0.012 (0.819)	−0.003 (0.953)	0.010 (0.835)	−0.005 (0.923)	0.011 (0.825)	−0.003 (0.950)	0.010 (0.847)
TobinsQ	0.044 (0.917)	0.100 (0.819)	0.068 (0.872)	0.146 (0.740)	0.033 (0.937)	0.090 (0.838)	0.058 (0.893)	0.133 (0.765)
FeeFloat	0.016 (0.576)	0.012 (0.660)	0.016 (0.568)	0.017 (0.552)	0.017 (0.568)	0.012 (0.655)	0.016 (0.562)	0.017 (0.547)
SustCom	0.003 (0.998)	−0.269 (0.868)	0.169 (0.911)	−0.105 (0.947)	−0.031 (0.985)	−0.303 (0.854)	0.136 (0.930)	−0.147 (0.927)
Mand	−0.768 (0.517)	−0.544 (0.686)	−0.763 (0.538)	−0.650 (0.542)	−0.590 (0.623)	−0.387 (0.777)	−0.575 (0.645)	−0.426 (0.694)
BoardSize	0.118 (0.528)	0.134 (0.454)	0.130 (0.472)	0.105 (0.559)	0.115 (0.542)	0.132 (0.464)	0.127 (0.485)	0.103 (0.573)
BoardInd	0.007 (0.716)	0.009 (0.596)	0.006 (0.753)	0.004 (0.831)	0.006 (0.730)	0.009 (0.604)	0.005 (0.769)	0.004 (0.847)
SRA	1.120 (0.269)			1.233 (0.221)	1.141 (0.261)			1.262 (0.212)
GRI		2.280** (0.015)		2.631** (0.015)		2.273** (0.017)		2.632** (0.015)
CR			1.094 (0.248)	1.391 (0.165)			1.124 (0.237)	1.427 (0.155)
Intercept	54.335***	55.778***	54.105***	55.833***	54.243***	55.700***	54.010***	55.747***
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	351	351	351	351	351	351	351	351
Adj. R <sup>2</sup>	.291	.302	.292	.313	.292	.302	.292	.314
F-statistic p value	.000	.000	.000	.000	.000	.000	.000	.000

\*\*\*Indicates a significance level of 1%.

\*\*Indicates a significance level of 5%.

\*Indicates a significance level of 10%.



shows a positive relationship. As in the analysis of CSO separation (see Table 4), there is a positive relationship between CFO and SRD. This influence is also not affected by adding GRI as a variable. Thus, hypothesis H1b can be confirmed that a CFO who is also CSO positively influences sustainability disclosure. CEO does not influence SRD when the quality attributes of a sustainability report are considered. This result confirms the previous findings.

This analysis might be subject to reverse-causality concern. The reverse causality concern refers to the potential appointment of a CSO when a company already has good sustainability disclosure. To address this issue and following Peters et al. (2019) and Fu et al. (2020), the following lagged regression model is employed:

$$\begin{aligned} SRD_{it} = & \alpha_0 + \beta_1 CSO_{it-1} + \beta_2 FirmSize_{it} + \beta_3 ROA_{it} + \beta_4 Leverage_{it} \\ & + \beta_5 TobinsQ_{it} + \beta_6 FreeFloat_{it-1} + \beta_7 SustCom_{it-1} + \beta_8 Mand_{it-1} \\ & + \beta_9 BoardSize_{it} + \beta_{10} BoardInd_{it} + Industry\ dummies \\ & + Year\ dummies + \varepsilon_{it} \end{aligned} \quad (5)$$

Table 6 shows the results of the lagged regression model. The relevant results do not change. CSO and CFO continue to have a positive impact on SRD. Interestingly, *COther* now also has a positive impact on SRD. These results suggest that management board members other than the CEO or CFO need some time to influence sustainability disclosure positively. This result raises the question of why the CEO does not influence sustainability disclosure. One simple reason is that the CEO places less importance on sustainability reporting, which is supported by the fact that the CEO does not influence the quality of sustainability reporting. One could argue that the priority is to improve sustainability performance rather than reporting.

## 5.5 | Robustness and endogeneity tests

To ensure the validity of the results, we perform several robustness tests. In the first step, we adjust all models' definitions of the control variables. The natural logarithm of market capitalisation now measures *FirmSize*. Return on equity replaces Return on Assets (RoA), and the ratio of total capital to total assets is used as an adjusted definition of leverage (*Leverage*). Book to market now measures market expected growth opportunities instead of Tobin's Q (*TobinsQ*). Board independence is substituted by board diversity. The untabulated results of these adjustments support the results shown earlier.

In a second test, logit models are used instead of probit regressions to explain SRA, GRI and CR. The results are similar to those obtained using probit regressions.

Finally, to control for potential self-selection and following Peters et al. (2019), a two-step Heckman correction is performed (Heckman, 1979). In the first step, the probability that a company appoints a CSO is modelled, and the inverse Mills ratio is calculated based on this regression. The inverse Mills ratio is included as an additional independent variable in the regression models. The untabulated results<sup>1</sup> support the findings shown earlier.

## 6 | LIMITATIONS AND FUTURE RESEARCH

The study is subject to certain limitations that restrict the generalisability of the findings. First, we limit our sample to German companies. Since country-specific factors play a role in sustainability reporting, it is necessary to investigate the impact of a CSO on sustainability reporting in other countries to account for different political, cultural and regulatory environments (Baldini et al., 2018). Furthermore, the sample period is limited to the regulatory frame of the NFD, which the CSRD will replace in 2023. Future research could analyse how the implementation of the CSRD changes sustainability reporting beyond the mandatory changes.

As this study only analysed the presence of a CSO on the management board and based on upper-echelon theory, future research can extend existing research (Wiengarten et al., 2017) on what characteristics influence CSO effectiveness and performance. In particular, sustainability knowledge and financial reporting knowledge are of interest. Thus, the question arises about how a CSO influences the interplay between sustainability performance and reporting. In this context, finding out how sustainability should be embedded in a company's organisation is essential. Furthermore, it is of interest of how CSOs below the management board influence sustainability reporting. Future research could also explore what motivates companies to appoint a CSO. In this context, it should also be investigated how the personnel structure of the sustainability committee affects sustainability performance and reporting. The impact of the audit committee and its composition on sustainability reporting is also of interest.

Since Opferkuch et al. (2021) found a missing link between circular economy and sustainability reporting, future research could investigate how a CSO can improve this link and promote circular economy.

## 7 | CONCLUSION

In addition to sustainability performance, companies must also address reporting on these issues. The objective of this study is to investigate the impact of a CSO on the sustainability report. While recent studies show mixed effects of a CSO on sustainability performance (Kanashiro & Rivera, 2019; Peters et al., 2019), it is reasonable to assume that a CSO would have at least a positive impact on sustainability reporting. In this study, we investigated the impact of a CSO on the amount of sustainability information disclosed (sustainability disclosure) and the quality of sustainability reports. The quality is measured by the decision for external assurance, the use of the GRI guidelines as a reporting framework and the publication of a combined sustainability and annual report.

The results show a positive influence of CSOs on sustainability disclosure and external assurance of the sustainability report. However, this positive influence does not apply to all CSOs. While the CFO positively impacts sustainability disclosure if responsible for sustainability, this effect cannot be observed when the CEO or another board member is responsible for sustainability. Thus, a CSO is not just

a symbolic gesture but has at least some influence on companies' sustainability reporting activities, even if the influence is limited.

Furthermore, the results show that external assurance does not affect sustainability disclosure. Therefore, it can be assumed that external assurance only serves to enhance the credibility of the reported information. On the other hand, using the GRI guidelines as a reporting framework positively affects sustainability disclosure. The publication of a combined report also does not impact sustainability disclosure.

Several implications can be drawn from the results. First, a CSO does not positively affect the use of the GRI guidelines as a reporting framework. Therefore, it may be helpful for regulators to make using a globally recognised sustainability reporting framework mandatory. Mandatory use of reporting frameworks also encourages sustainability disclosure. Therefore, the findings support current developments in Europe with the CSRD regarding the mandatory use of sustainability frameworks and assurance.

From a corporate perspective, there are also several implications. On the one hand, companies can adopt the GRI guidelines to enhance their sustainability disclosure. On the other hand, the results have implications for the board structure regarding an ideal distribution of responsibility for sustainability and sustainability reporting. Responsibility for sustainability on the management board should lie with the CFO to improve sustainability reporting. If the CEO is responsible for sustainability issues in the company, another person should be responsible for reporting, as the CEO does not affect sustainability reporting. Therefore, it is essential to consider who is responsible for sustainability when structuring the board's responsibilities for sustainability reporting. This consideration is important because the company may be suspected of actionism if the CSO is not successful.

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## ENDNOTE

<sup>1</sup> Available upon request.

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## APPENDIX A

TABLE A1 Correlation matrix

	SRD	SRA	GRI	CR	CSO	CEO	CFO	COTHer	FirmSize	RoA	Leverage	TobinsQ	FreeFloat	SustCom	Mand	BoardInd	BoardSize
SRD	1	.3484*	.4919*	.0542	.2223*	.0559	.0393	.2061*	.6036*	-.1310*	.1632*	-.3047*	.2990*	.4534*	.2470*	.2946*	.6034*
SRA	.3601*	1	.0755	.1607*	.1998*	.0714	-.0091	.1936*	.3264*	-.0740	.1023*	-.2285*	.0579	.1961*	.1340*	.1012*	.3328*
GRI	.4941*	.0755	1	-.1367*	.0602	.0236	-.0389	.0789	.3521*	-.0077	.0645	-.1152*	.1307*	.2428*	.0921*	.1634*	.2912*
CR	.0668	.1607*	-.1367*	1	.0804	.0539	-.0545	.0867*	.1872*	-.1744*	.1519*	-.1182*	.0075	.0307	-.0479	.1525*	.1092*
CSO	.2272*	.1998*	.0602	.0804	1	.5146*	.3233*	.5996*	.0956*	-.1947*	.0729	-.2082*	.1150*	.0869*	.0894*	.0147	.1409*
CEO	.0593	.0714	.0236	.0539	.5146*	1	-.1015*	-.1882*	.0273	-.0282	.0215	-.1395*	.0474	.0735	.0926*	.0065	.0253
CFO	.0388	-.0091	-.0389	-.0545	.3233*	-.1015*	1	-.1183*	-.0349	-.0751	.0565	.0325	.0824*	-.0051	-.0804	-.0407	-.0348
COTHer	.2096*	.1936*	.0789	.0867*	.5996*	-.1882*	-.1183*	1	.1177*	-.1741*	.0378	-.1573*	.0516	.0467	.0793	.0379	.1767*
FirmSize	.6099*	.3276*	.3505*	.1749*	.0670	.0119	-.0608	.1115*	1	-.1831*	.3700*	-.4520*	.1680*	.4100*	.1871*	.1967*	.7167*
RoA	-.1009*	-.0813*	.0240	-.1865*	-.1806*	-.0062	-.1176*	-.1498*	-.1219*	1	-.3006*	.4924*	-.0361	.0167	.1166*	-.0956*	-.1872*
Leverage	.1367*	.0822*	.0532	.1554*	.0743	.0367	.0397	.0363	.3834*	-.2444*	1	-.2834*	.1099*	.1025*	.0810*	.1012*	.2663*
TobinsQ	-.3686*	-.1759*	-.1709*	-.1218*	-.2396*	-.1506*	.0163	-.1769*	-.4357*	.3190*	-.2731*	1	-.0971*	-.0882*	-.1400*	-.0517	-.4056*
FreeFloat	.2888*	.0545	.1159*	.0175	.1185*	.0564	.0813*	.0486	.1782*	-.0277	.1113*	-.1814*	1	.0872*	.0540	.2028*	.1676*
SustCom	.4552*	.1961*	.2428*	.0307	.0869*	.0735	-.0051	.0467	.3931*	.0435	.0954*	-.0260	.0804	1	.2050*	.0548	.3326*
Mand	.2516*	.1340*	.0921*	-.0479	.0894*	.0926*	-.0804	.0793	.1747*	.1272*	.0811*	-.1848*	.0709	.2050*	1	.1283*	.1839*
BoardInd	.3826*	.1611*	.1984*	.1537*	.0702	.0122	-.0173	.0884*	.2776*	-.1474*	.1139*	-.2849*	.2452*	.1218*	.1736*	1	.3257*
BoardSize	.6128*	.3298*	.2949*	.1196*	.1381*	.0344	-.0450	.1712*	.7125*	-.1413*	.2668*	-.3631*	.1589*	.3322*	.1795*	.4129*	1

Note: Pearson correlation coefficients are shown below and Spearman correlations coefficients above the diagonal.

\*Indicates a significance level of 10%.