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RESEARCH ARTICLE

Managing sustainability—Does the integration of environmental, social and governance key performance indicators in the internal management systems contribute to companies' environmental, social and governance performance?

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Abstract

Assessing whether a company is sustainable or not is challenging for investors. For this reason, it is particularly important how companies integrate and manage sustainability. This paper primarily aims to investigate the effects of implementing environmental, social and governance (ESG) key performance indicators (KPIs) in the internal management system (IMS) on ESG performance. Further, the effect of a consistent use of ESG KPIs in the IMS and the management compensation scheme (MCS) on ESG performance is examined. Using hand-collected data of the largest German-listed companies, this study employs *t* tests for differences in means and ordinary least square (OLS) regressions to study these associations. The results indicate that the implementation of ESG KPIs in the IMS increases ESG performance. In addition, the performance for environmental and social sub-dimensions is enhanced. No significant influence of a consistent use of ESG KPIs in the IMS and the MCS on ESG performance is observed. The results highlight that implementing ESG KPIs in the IMS is a practical approach to manage sustainability and to increase ESG performance. Our findings have practical and theoretical implications for researchers, regulators and companies considering the integration of sustainability and further communicating transparently and strengthening investor trust.

KEYWORDS

ESG KPIs, ESG performance, internal management system, management compensation scheme, sustainability management

1 | INTRODUCTION

In recent years, environmental, social and governance (ESG) performance has become increasingly important for investment decisions (Amel-Zadeh & Serafeim, 2018; Eccles et al., 2017; Mervelskemper &

Streit, 2017). Investors are looking for companies with good ESG performance, for instance, to manage the risk of their portfolios (Pinney et al., 2019). However, they encounter barriers and raise concerns about data availability, comparability or reliability in assessing the ESG performance of a company (Amel-Zadeh & Serafeim, 2018;

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Friede, 2019; Hain et al., 2022; Siri & Zhu, 2019). For instance, greenwashing by companies is a particular problem (Lashitew, 2021; Torelli et al., 2020; Wedari et al., 2021), which leads to a loss of investor trust (Guo et al., 2018; Pizzetti et al., 2021). This situation leads to companies facing challenges such as increased reputation risk (Jahdi & Acikdilli, 2009; Pizzetti et al., 2021), increased cost of capital (Ghannam et al., 2019; Kothari et al., 2009; Kravet & Shevlin, 2010; Tseng & Guo, 2021) or increased shareholder activism (Perrault, 2015). In 2021, investors increasingly used their rights at annual general meetings. They refused to discharge individual board members because they were dissatisfied with their commitment to sustainability aspects (Kishan, 2021).

One of the main demands of investors is to link the management compensation scheme (MCS) with sustainability aspects (Nauman, 2021). However, this linkage is insufficient as, for instance, too low targets do not represent an intensification for managers to integrate sustainability into the company (Ioannou et al., 2016; Luo et al., 2021). Therefore, a management strategy is needed to impact ESG performance (Velte, 2017). Silvestre et al. (2022) provide five key factors for sustainability integration in a company. One of these factors refers to the commitment to sustainability, especially from top management. For instance, Hristov et al. (2022) investigate the application of key performance indicators (KPIs) as a possibility to integrate sustainability aspects into business strategy.

For investors to consider this integration into their investment decisions, they need to gain insights into the company and how the management acts on sustainability. Applying the management approach, the German Accounting Standard (GAS) 20 ensures that investors are provided with all relevant information that management uses in its decision-making (ASCG, 2019). According to GAS 20, capital market-oriented companies are required to disclose the internal management system (IMS) and the KPIs used to manage the group. KPIs are regularly used in management reporting and reported at the board level (Oliver, 2000). Due to a range of global frameworks for sustainability reporting and the lack of harmonisation, many ESG KPIs are disclosed in corporate reporting (Tsagas & Villiers, 2020).

However, the disclosure does not provide investors with any indication of which ESG KPIs are used for management decisions. Therefore, the disclosure of KPIs in the IMS, according to GAS 20, helps investors identify relevant KPIs. Concerning greenwashing, this takes on particular importance. We presume a reduced level of greenwashing, as ESG KPIs used in the IMS need to be disclosed in the management report in Germany and thus are made transparent for investors. Through this integration and simultaneous transparency towards the capital market, companies can distinguish themselves from other companies that practise greenwashing and create credibility towards investors.

Building on studies like Hristov et al. (2022) and Silvestre et al. (2022), this study aims to provide companies with more clarity, especially regarding potential ways to improve their ESG performance. In particular, the following two research questions (RQs) are being investigated:

1. (RQ1) Does the implementation of ESG KPIs in the IMS influence the ESG performance of companies?

2. (RQ2) Does the consistent use of ESG KPIs in the IMS and the MCS influence the ESG performance of companies?

To answer our RQs, we use data from German capital market-oriented companies, which are required to report their KPIs used in the IMS according to GAS 20. The KPI information was hand-collected from the companies' annual reports. Like previous studies (Baraibar-Diez et al., 2019; Orazalin, 2020), we employ the ESG-Scores from the Refinitiv ESG database as proxies for ESG performance. To test our hypotheses, we use *t* tests for differences in means and ordinary least square (OLS) regressions.

The paper findings indicate a positive relationship between the use of ESG KPIs in the IMS and ESG performance in general and social performance. Regarding environmental performance, inconclusive results and for governance performance, no results are found.

Surprisingly, we do not observe any significant association between the consistent use of ESG KPIs in the IMS and the MCS and ESG performance. Overall, the results reveal that companies can influence their ESG performance by implementing ESG KPIs in their IMS.

Therefore, this study contributes to the present literature in several ways. First, most studies focus on implementing sustainability aspects in the MCS and examine the impact on ESG performance (Baraibar-Diez et al., 2019; Haque & Ntim, 2020; Maas, 2018). A positive relationship between the integration of sustainability aspects in the MCS and the ESG performance of companies can be observed (Baraibar-Diez et al., 2019; Haque & Ntim, 2020). In contrast, Maas (2018) could not find clear evidence that using sustainability targets in the MCS improves social performance. Thus, further research needs to investigate possible ways to influence the ESG performance of a company. To do so, we examine the impact of implementing ESG KPIs in the IMS and complement studies, such as Henri and Journeault (2010) and Gond et al. (2012).

Prior research shows that investors' trust can be strengthened through transparent disclosure and communication (Camilleri, 2018; Hahn & Lülfs, 2014). Therefore, corporate reporting is an essential instrument for gaining the trust of investors (Krasodomska et al., 2021). Concerns that the reporting of sustainability data lacks reliability have grown recently (Amel-Zadeh & Serafeim, 2018; Bini et al., 2021; Siri & Zhu, 2019). Prior research suggests consistency in corporate reporting behaviour amounts to credibility and reliability (Bini et al., 2021; Depoers et al., 2016). Taking up these findings from the corporate reporting field, we investigate the effects on ESG performance of a consistent implementation of ESG KPIs into the IMS and the MCS in a second step. To the best of our knowledge, our paper presents the first to examine ESG KPIs in the IMS and provide evidence on how companies manage their businesses with ESG KPIs.

Second, focusing on ESG KPIs, our study extends the literature on non-financial KPIs.¹ Most studies investigate non-financial KPIs (Arvidsson, 2011; Bayne & Wee, 2019; Bini et al., 2021; Zarzycka & Krasodomska, 2022). Only a few studies examine ESG KPIs. For

¹Not all non-financial KPIs relate to ESG issues. Therefore, ESG KPIs represent a sub-set of all non-financial KPIs.

instance, Zarzycka and Krasodomska (2021) focus on environmental KPIs. Our study provides insights into the effects of ESG KPIs and therefore extends the literature focusing on the usage of non-financial KPIs.

Third, we focus on Germany, which is particularly interesting for regulators, as disclosing KPIs in the IMS is already mandatory for capital market-oriented companies in Germany. The publicly available information resulting from the regulation enables research on the use and impact of KPIs. Further, the data allow us to gain insights into the influence of ESG KPIs on ESG performance. Therefore, our paper contributes to the research on ESG performance and the research on sustainability management.

Fourth, when it comes to ESG performance, previous studies focus on the overall ESG performance and provide little information on the individual sub-dimensions (environmental, social, governance). Hence, this offers an exciting opportunity to investigate the influences on the sub-dimensions. By studying all three sub-dimensions, our paper complements examinations such as Maas (2018), who only focuses on social performance, or Orazalin (2020), who provides evidence for the effects on social and environmental performance.

The remainder of this paper is structured as follows. The second section briefly explains the regulatory setting, followed by an overview of the existing literature and hypotheses development in Section 3. The fourth section describes the sample and data collection process, followed by an overview of the underlying variables of the models and finishes with explanations of the research approach. The fifth section presents the results. In the sixth section, the paper concludes by summarising the findings of this study, addressing the limitations and providing suggestions for future research and implications.

2 | KPIs IN THE IMS

The GAS 20 provides guidelines on the content of the management report at the group level. It requires providing users of the management report, particularly investors, with information management uses in its decision-making. GAS 20 refers to this concept as the management approach (ASCG, 2019). GAS 20 explicitly requires the presentation of the IMS used to manage the group and the disclosure of the KPIs used (GAS 20.P45). This requirement only applies to capital market-oriented companies and aims to satisfy the information requirements of the capital market (ASCG, 2019). GAS 20 defines an *indicator* as a 'quantitative measure that is used to report in condensed form on business-related matters' (GAS 20.11).

The KPIs in the IMS are characterised by being reported to the management board regularly during the year and used for management decisions (Oliver, 2000). As companies are managed individually, and the focus is on transparency towards investors regarding the IMS, GAS 20 does not specify which KPIs should be reported in the group management report. The disclosure depends solely on the use of the KPIs for management decisions. Therefore, financial and non-financial, including ESG, KPIs need to be disclosed. In contrast, the KPIs

disclosed in the sustainability report are not necessarily used by the management for decision-making.

Further, as part of the German management report, the disclosed IMS and the KPIs are part of the audit. The auditor must determine whether the KPIs used in the IMS are part of the presentation of the IMS in the management report (IDW, 2021). Therefore, the KPIs have a different information relevance for investors than, for example, the KPIs in the sustainability report. In the case of KPIs outside the IMS, investors do not know whether they are relevant for management decisions.

3 | THEORETICAL BACKGROUND, LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

3.1 | Sustainability aspects in the IMS

Sustainability management usually refers to integrating sustainability aspects into the strategic management process and the strategic planning of companies (e.g., Baumgartner & Rauter, 2017; Schaltegger & Hörisch, 2017). A growing number of academic research have been dealing with integrating sustainability aspects into management (Gond et al., 2012; Henri & Journeault, 2010; Lisi, 2015, 2018), as companies' ability to manage sustainability activities has become an important factor to be competitive (Churet & Eccles, 2014).

Schaltegger and Hörisch (2017) suggest that sustainability management reduces negative social and environmental impacts and secures economic competitiveness. They also note that research on why companies engage in sustainability management is generally based on profit- or legitimacy-seeking argumentation. Following profit-seeking argumentation, sustainability management leads to better financial performance (Gao & Bansal, 2013). Whereas, legitimacy-seeking argumentation rests upon legitimacy theory, to which the alignment of corporate and societal goals is essential for companies' survival (Dowling & Pfeffer, 1975). Following either argumentation, managers recognise the importance of integrating sustainability aspects into business (Baumgartner, 2014).

Baumgartner and Korhonen (2010) find the integration of sustainability aspects to often lack strategic orientation. However, integrating sustainability aspects on strategic levels is necessary to affect mid- and long-term ESG performance (Baumgartner & Rauter, 2017). Further, integrating sustainability aspects on strategic levels and reporting on them may enhance transparent communication, which, according to the stakeholder and neo-institutional theories, contributes to companies' 'license to operate' (Drempetic et al., 2020).

Only a few studies investigate the implementation of sustainability aspects in the IMS of companies (e.g., Gond et al., 2012; Henri & Journeault, 2010). For instance, Gond et al. (2012) suggest integrating sustainability aspects in the IMS to enhance the fulfilment of ESG responsibilities. Moreover, Hristov and Appolloni (2022) study the application of ESG KPIs as a possibility to integrate sustainability aspects into business strategy and provide a framework on how to

integrate sustainability aspects in management systems. They recommend future research to study the effects of ESG KPI integration.

As most studies find integrating ESG aspects to improve ESG performance (e.g., Henri & Journeault, 2010; Lisi, 2015, 2018), research also offers insights on why a positive effect on ESG performance may be less feasible. First, as ESG KPIs are used as a specific performance measure (e.g., CO₂ emissions), integrating such KPIs may not automatically impact a general ESG performance. van Zanten and van Tulder (2021) address companies opportunistically 'cherry-picking' sustainability development goals, which are particularly easy to improve but may have little impact on overall ESG performance. Following this argumentation, companies may similarly choose ESG-KPIs easy to improve but with limited impact on ESG performance. Other factors, such as top management, employees, competitors, investors and stakeholders' sustainability commitment, may be a more substantial influence on companies to adapt to sustainable corporate practices than a deep integration of sustainability aspects in the IMS (Boiral et al., 2012; Epstein, 2010; Ervin et al., 2013; Hristov & Appoloni, 2022).

Yet, good ESG performance may not only lead to improved financial performance (e.g., Haque & Ntim, 2020; Henri & Journeault, 2010; Lisi, 2018; Velte, 2017). Further, good ESG performance is important for companies to attract capital as it is increasingly considered in investors' investment decisions (Amel-Zadeh & Serafeim, 2018; Eccles et al., 2017; Mervelskemper & Streit, 2017). Investors are also looking for companies with good ESG performance to manage portfolio risk (Pinney et al., 2019). Last, a good ESG performance may be in managers' self-interest as investors increasingly refused to discharge individual board members as they were dissatisfied with their commitment to sustainability aspects (Kishan, 2021).

Based upon the argumentations mentioned above, we develop the following hypotheses to study the integration of ESG KPIs in the IMS on ESG performance:

H1. The use of ESG KPIs in the internal management system positively affects ESG performance.

H1a. The use of ESG KPIs in the internal management system positively affects environmental performance.

H1b. The use of ESG KPIs in the internal management system positively affects social performance.

H1c. The use of ESG KPIs in the internal management system positively affects governance performance.

In addition to studying how overall ESG performance is influenced, different studies focus on certain ESG sub-dimensions. For instance, Henri and Journeault (2010) study the influence on environmental performance, and Lisi (2018) examines the effect on social performance. Henri and Journeault (2010) find that integrating environmental aspects increases environmental performance. Lisi (2018) similarly observes that integrating social performance

indicators increases social performance. To complement these studies, we investigate the effects of environmental- and social-related KPIs in the IMS on the respective sub-dimensions of ESG performance. Accordingly, we develop the following hypotheses²:

H2a. The use of environmental-related KPIs in the internal management system positively affects environmental performance.

H2b. The use of social-related KPIs in the internal management system positively affects social performance.

3.2 | Sustainability aspects in the IMS and the MCS

Research on the MCS is generally based on the concepts of agency theory (Callan & Thomas, 2014). Agency theory explains the conflict of interest between principals (suppliers of capital) and agents (management) that results from the delegation of decision-making power to agents (Jensen & Meckling, 1976). Management compensation may be an effective tool to align the interests of principals and agents through financial incentives (Bonner & Sprinkle, 2002). Further, managerial power theory and tournament theory are used as argumentation in the context of the MCS. Managerial power theory suggests that management has the power to influence the design and structure of management compensation to their benefit through their influence over the board of directors and to the disadvantage of shareholders (Bebchuk & Fried, 2004). According to tournament theory, top management has reached the highest job level in the company and thus has lost the incentive to compete with their peers to get promoted to positions with increased compensation (Lambert et al., 1993). Consequently, the MCS has to compensate for this effect (Lambert et al., 1993).

MCS research traditionally centred mostly on financial performance (Baraibar-Diez et al., 2019). Prior studies examining the influence of performance-based compensation on general performance measures provide evidence that management does follow these incentives in the intended direction (e.g., Sun et al., 2013). Regarding integrating sustainability aspects into the MCS, Al-Shaer and Zaman (2019) recognise increased emphasis on linking management compensation with sustainability aspects.

In 2012, Principles for Responsible Investment (PRI) published guidance linking ESG performance to executive pay and instruments to increase management accountability for achieving sustainable business goals and gaining investors' trust (PRI, 2016). PRI recommends integrating sustainability aspects into executive compensation to 'protect and create value for companies and investors' (PRI, 2016). For

²The hypothesis that corporate governance-related KPIs in the IMS positively affect governance performance was not formulated and tested because not enough sample companies use corporate governance-related KPIs to obtain reliable results. Therefore, governance-related KPIs were not used as independent variables.

example, Campbell et al. (2007) explain that management compensation linked to environmental performance prevents management from behaviour that may induce fines or penalties. According to PRI, ESG KPIs significantly influence shareholder value and the company's long-term strategy (PRI, 2016).

Research on integrating sustainability aspects into the MCS provides divergent evidence on the effects on ESG performance. For instance, Maas (2018) finds that ESG performance targets incorporated in the MCS do not necessarily lead to better ESG performance. McGuire et al. (2003) note that the MCS have no significant effect on social performance. Stanwick and Stanwick (2001) recognise CEO compensation as inversely related to environmental performance. Further, as Callan and Thomas (2011) find many studies on the influence of the MCS on general company performance to observe non-significant or weak relationships, the general effect of the MCS on performance may be weak. Yet, most research finds that implementing sustainability aspects in the MCS increases ESG performance, at least for some ESG dimensions (e.g., Baraibar-Diez et al., 2019; Haque & Ntim, 2020; Hong et al., 2016; Velte, 2016).

Further, investors' trust may be a significant factor in determining MCS (Kanagaretnam et al., 2018). Transparent disclosures and communication are recognised as increasing investors' trust (Camilleri, 2018; Hahn & Lülfs, 2014; Zarzycka & Krasodomska, 2022) and leading to positive economic effects (Elzahar et al., 2015; Jana & McMeeking, 2020). However, investors only use information companies disclose if they perceive it as credible (Jennings, 1987; Mercer, 2004). Disclosure credibility may be enhanced through consistency in corporate disclosures (Depoers et al., 2016). Contrary, inconsistent disclosures may confuse investors (CDSB, 2012) and induce additional costs (Farvaque et al., 2011). Conducting interviews among equity analysts, Smith and van der Heijden (2017) document that investors recognise inconsistent disclosures. Regulatory bodies further emphasise the importance of consistent disclosures (e.g., IASB, 2015).

Research finds consistency also relevant in non-financial disclosures. Bini et al. (2021) argue that inconsistencies in non-financial KPI disclosures are a 'significant threat' to non-financial reporting. Similarly, Depoers et al. (2016) explain inconsistencies in environmental disclosures to potentially affect management's credibility because investors may assume that management hides information. This impression might be especially harmful to companies as management's credibility is essential for disclosures to have capital market effects (Jennings, 1987).

Theoretical and empirical evidence suggests that the MCS design may influence ESG performance. Considering the relevance of consistency in corporate disclosures to increase investors' trust, we expect the consistent use of ESG KPIs in the IMS and the MCS to have the same positive effect. Further, practical and theoretical recommendations exist to use ESG KPIs in the IMS and the MCS consistently. Therefore, we develop the following hypothesis to study the influence of the consistent use of ESG KPIs in the IMS and the MCS:

H3. The consistent use of ESG KPIs in the internal management system and the management compensation scheme positively affects ESG performance.

4 | DATA AND METHODOLOGY

4.1 | Sample and data collection

To investigate our RQs and test our hypotheses, our sample is initially based on the 160 publicly listed German companies in the DAX, MDAX and SDAX as of 31 December 2020. Thirteen companies are excluded from the sample because they are not German companies. Hence, they are not required to prepare their management report in accordance with German regulations. According to the GAS 20, the IMS and the KPIs used for the group shall be disclosed for publicly traded companies. This standard provides a unique framework for collecting data from the management report on which KPIs are used in listed German companies.

For the remaining 147 companies, as a first step, information on all non-financial KPIs used in the IMS was hand-collected from annual reports for fiscal years ending in 2020. Further, the compensation report was checked to determine whether the identified non-financial KPIs used are linked to the MCS. After collecting this data, we separately classified each identified non-financial KPI as ESG KPI or non-ESG KPI. To differentiate between non-financial KPIs and ESG KPIs, provisions from frameworks (e.g., Global Reporting Initiative Guidelines) or regulations (e.g., EU Taxonomy) were considered.

Furthermore, independently from the other authors, we classified each ESG KPI as an environmental-, social- or governance-related KPI. Guidelines such as 'KPIs for ESG' of EFFAS and DVFA³ or scholarly papers (Bayne & Wee, 2019; She & Michelon, 2019; Zarzycka & Krasodomska, 2021) were used as guidance for the allocation to the sub-dimensions. We discussed our assessments in the case of different assessments between us for an ESG KPI or classification into one of the sub-dimensions. The final decision and classification were made unanimously. This procedure ensures a high level of quality by reducing the risk of misclassification by only one author. We restrict our sample to annual reports for the fiscal year 2020 because, first, content analysis of the IMS and the MCS presented in the management report is required. Therefore, we conduct a substantial quality assurance process. Second, by choosing 2020, this study can analyse the recent use of ESG KPIs in the IMS in Germany. This approach is in line with recent previous research using hand-collected data and a one-year sample (e.g., Al-Shaer & Zaman, 2018; Caputo et al., 2021; Eberhardt-Toth, 2017; Machado et al., 2021).

Financial information and company characteristics were obtained from the Refinitiv Database. Due to missing data in the Refinitiv database, another eight observations were excluded. Hence, the final

³European Federation of Financial Analysts Societies (EFFAS) and Deutsche Vereinigung für Finanzanalyse und Asset Management (DVFA).

TABLE 1 Variables overview

Variable	Description	Source
Dependent variables		
<i>ESG-Score</i>	Refinitiv's ESG overall company score	Refinitiv
<i>E-Score</i>	Refinitiv's environment pillar score	Refinitiv
<i>S-Score</i>	Refinitiv's social pillar score	Refinitiv
<i>G-Score</i>	Refinitiv's governance pillar score	Refinitiv
Independent variables		
<i>ESG-KPI</i>	Dummy variable that takes the value 1 if the company uses an ESG KPI in their IMS and 0 otherwise	Hand-collected
<i>E-KPI</i>	Dummy variable that takes the value 1 if the company uses an environmental-related KPI in their IMS and 0 otherwise	Hand-collected
<i>S-KPI</i>	Dummy variable that takes the value 1 if the company uses a social-related KPI in their IMS and 0 otherwise	Hand-collected
<i>ESG-Comp</i>	Dummy variable that takes the value 1 if at least one ESG KPI used in the IMS is also used as part of the MCS and 0 otherwise	Hand-collected
Control variables		
<i>FirmSize</i>	The natural logarithm of total assets	Refinitiv
<i>Leverage</i>	Leverage—ratio of total debt to total capital	Refinitiv
<i>RoA</i>	Return on assets	Refinitiv
<i>TobinsQ</i>	Tobin's Q—calculated as the ratio of market value of equity and liabilities to book value of equity and liabilities	Refinitiv
<i>SustCom</i>	Dummy variable, which takes the value 1 if the company has a CSR committee or team and 0 otherwise	Refinitiv
<i>BoardSize</i>	The total number of board members at the end of the fiscal year	Refinitiv
<i>BoardDiversity</i>	Percentage of female members on the board	Refinitiv
<i>FreeFloat</i>	Free float number of shares	Refinitiv

sample of this study's cross-sectional analysis comprises 139 company observations.

4.2 | Variable definitions

4.2.1 | Dependent variables

The dependent variable in this study is ESG performance. Following Baralbar-Diez et al. (2019), ESG performance is measured as the ESG-Score from the Refinitiv ESG database. The variable is called *ESG-Score*. To further differentiate ESG performance, the sub-dimensions in the Refinitiv ESG database are used to measure the environmental and social performance separately. Consequently, *E-Score* measures the environmental, *S-Score* the social and *G-Score* the corporate governance score. Table 1 provides an overview of all variables used.

4.2.2 | Independent variables

The independent variables are hand-collected and separately classified as ESG KPI or non-ESG KPI to separate these from other non-financial KPIs like sales volumes that are not used to control

TABLE 2 Identified ESG KPIs used

Environmental	Social	Governance
(Sales) share of sustainable products	Accident frequency	Anti-corruption
CO ₂ emissions	Customer satisfaction	Leadership trust score
CO ₂ -neutral growth	Employee engagement	Proportion of women in management positions
Energy consumption/efficiency	Employee health	
Share of CO ₂ -neutral activities	Employee satisfaction	
Sustainability of buildings	Employee training	
Sustainable supply chains	Lost Time Incident Rate (LTI-Rate)	
Water consumption	Number of fatalities	
Water waste	Social responsibility (spending for the public welfare)	

environmental, social or corporate governance aspects. As each ESG KPI is mapped as either an environmental, social or governance KPI, three dummy variables are generated to measure the use of these KPIs in the IMS. The variable *ESG-KPI* is defined as a dummy variable that takes the value 1 if the company uses at least one ESG KPI in its IMS and 0 otherwise. *E-KPI* takes the value 1 if at least one environmental-related KPI is used in the IMS and 0 otherwise. Accordingly, the same classification applies to *S-KPI* for social-related KPIs. The variable for governance-related KPIs (*G-KPIs*) is not considered in the statistical analysis because there are only four observations, which are insufficient to provide statistically reliable results. This approach is comparable to studies with hand-collected ESG KPIs and categorising them into different sub-dimensions (Bayne & Wee, 2019; She & Michelon, 2019; Zarzycka & Krasodomska, 2022). Table 2 shows the identified and aggregated ESG-KPIs used by German-listed companies in the sample and the classification into the dimensions of environment, social and governance. Aggregated means that KPIs like 'Specific CO₂ emissions' or 'CO₂ emissions per vehicle produced' are clustered into 'CO₂ emissions'.⁴

To measure the consistent use of ESG KPIs, *ESG-Comp* is designed as a dummy variable that takes the value 1 if at least one ESG KPI used in the IMS is also used as part of the MCS and 0 otherwise. All other non-financial KPIs in the MCS, including other ESG KPIs, are not considered.

Table 2 shows that ESG KPIs are used as a specific performance measure (e.g., CO₂ emissions). Therefore, it cannot be automatically assumed that using specific KPIs in the IMS will positively impact a general ESG performance measure like *ESG-Score* from Refinitiv ESG.

4.2.3 | Control variables

Prior literature found several factors influencing ESG performance. To control for these factors, we add the most prevalent variables as control variables in our analysis. Artiach et al. (2010) find that larger companies have a higher corporate social responsibility performance. Drepetic et al. (2020) show a high relationship between company size measured in different ways and ESG performance. Therefore, Company size (*FirmSize*) is included and measured as the natural logarithm of total assets.

García Martín and Herrero (2020) show a negative impact of leverage on environmental performance. We follow the approach of García Martín and Herrero (2020) and measure leverage (*Leverage*) as the ratio of total liabilities to total assets.

Biswas et al. (2018) show a negative relationship between profitability and environmental performance, while theory suggests that more profitable companies should be more likely to engage in sustainable activities and have a higher environmental and social performance (Orazalin, 2020). Return on assets (*RoA*) is used to measure profitability. Tobin's Q (*TobinsQ*) measures growth opportunities.

Enriching literature is analysing how a sustainability committee affects ESG performance. Most of these studies find a positive impact of a sustainability committee (Velte & Stawinoga, 2020). Therefore, *SustCom* (sustainability committee) is added, taking the value 1 if the company has a sustainability committee and 0 otherwise.

Birindelli et al. (2018) find a positive influence of board size on ESG performance for European companies, and García Martín and Herrero (2020) corroborate the impact of environmental performance in a European sample. We include board size (*BoardSize*) as a control variable to account for this influence. The percentage of women on board (*BoardDiversity*) is added to control for the positive impact of more diverse boards on social performance (Hussain et al., 2018) and environmental performance (García Martín & Herrero, 2020). These results are confirmed by Biswas et al. (2018).

Lastly, the percentage of free float shareholders (*FreeFloat*) is included to control for ownership dispersion. Due to higher investor pressure, listed companies are more likely to engage in sustainability activities (Govindan et al., 2021).

4.3 | Research approach

First, *t* tests are performed for mean differences assuming equal variance. The results provide a first indication of whether companies that use ESG KPIs in their IMS perform better in terms of ESG performance and the performance of the three sub-dimensions than companies that do not use ESG KPIs.

In a second step, OLS regression is used to test the formulated hypothesis. The regression model is as follows:

$$\begin{aligned} ESG - Score_i = & \alpha_0 + \beta_1 ESG - KPI_i + \beta_2 FirmSize_i + \beta_3 Leverage_i + \beta_4 RoA_i \\ & + \beta_5 TobinsQ_i + \beta_6 SustCom_i + \beta_7 BoardSize_i \\ & + \beta_8 BoardDiversity_i + \beta_9 FreeFloat_i + \varepsilon_i \end{aligned} \quad (1)$$

where *i* stands for company *i*. *E-Score*, *S-Score* and *G-Score* are analysed as dependent variables in addition to *ESG-Score*. This setup enables testing hypotheses H1–H1c. To test hypotheses H2a and H2b, *ESG-KPI* is divided into *E-KPI* and *S-KPI*. For hypothesis H3, *ESG-Comp* is added as a further independent variable. All regressions are run with industry-fixed effects and employ robust standard errors.

5 | RESULTS

5.1 | Descriptive analysis

Table 3 presents descriptive statistics of the dependent and independent variables used in this study. More than 20% of the companies in this sample use ESG KPIs (*ESG-KPI*) in their IMS. Most of these companies use at least one social KPI (*S-KPI*), which is, in most cases, a customer satisfaction measurement. Also, environmental KPIs (*E-KPI*) are frequently used within these companies. The amount of CO₂

⁴The list with each identified ESG KPIs is available upon request.

TABLE 3 Descriptive statistics

Variables	Observations	Mean	Standard deviation	Min	Q1	Median	Q3	Max
ESG-KPI	139	0.22	0.41	0.00	0.00	0.00	0.00	1.00
E-KPI	139	0.11	0.31	0.00	0.00	0.00	0.00	1.00
S-KPI	139	0.17	0.38	0.00	0.00	0.00	0.00	1.00
ESG-Comp	139	0.10	0.30	0.00	0.00	0.00	0.00	1.00
ESG-Score	139	63.00	17.68	20.21	49.21	64.89	76.19	93.19
E-Score	139	55.46	23.65	0.00	38.63	56.95	73.51	97.34
S-Score	139	68.78	18.23	19.90	56.94	71.51	82.41	96.99
G-Score	139	64.13	18.96	20.00	51.75	64.63	79.68	95.77
FirmSize	139	15.55	1.90	11.69	14.18	15.30	16.63	21.00
Leverage	139	61.47	18.28	10.71	51.62	61.77	72.44	96.00
RoA	139	3.57	9.59	-31.44	0.48	3.35	6.09	80.13
TobinsQ	139	2.11	1.85	0.80	1.07	1.35	2.61	13.34
SustCom	139	0.78	0.42	0.00	1.00	1.00	1.00	1.00
BoardSize	139	11.13	5.64	3.00	6.00	12.00	16.00	23.00
BoardDiversity	139	28.69	13.34	0.00	21.05	33.33	36.36	60.00
FreeFloat	139	66.47	23.63	10.00	48.00	70	86	100

Dependent variable	Mean		Difference	p value
	ESG-KPI = 0	ESG-KPI = 1		
ESG-Score	60.586	72.293	11.708***	.001
E-Score	52.990	65.391	12.401**	.010
S-Score	66.152	78.513	12.361***	.001
G-Score	62.451	70.412	7.961**	.043

***Indicates a significance level of 1%.

**Indicates a significance level of 5%.

emissions or other kinds of emission measurement (e.g., greenhouse gas emissions) is the most used KPI in this dimension. Governance KPIs (G-KPI), like the percentage of women in top management positions, are barely used (4 observations) and are therefore not considered in the regression models. Half of the companies with ESG KPIs in their IMS also use them as part of their MCS. The average *ESG-Score* is 63.00, so there is some improvement to be made by German companies. With 55.46, the average environmental score is the lowest of the three dimensions, and the average social score of 68.78 has the highest value. Table A1 shows the correlation for all variables.

First, *t* tests are performed for the difference in means of ESG performance with *ESG KPI* as a grouping variable. This analysis allows a first evaluation of the impact of ESG KPIs on ESG performance. Table 4 presents the results of the *t* tests. The results indicate that companies using an ESG KPI in their IMS show higher ESG performance and higher performance in the three sub-dimensions. Companies with at least one ESG KPI in their IMS have an average *ESG-Score* of 72.293 and a social score of 78.513.

In contrast, companies without an ESG KPI only have average scores of 60.586 and 66.152, respectively. Both differences are significant at the 1% level. For environmental and governance performance,

companies with ESG KPIs have an average score of 65.391 and 70.412, while companies without ESG KPIs only show an average score of 52.990 and 62.451. Both differences are significant at the 5% level. The results indicate that companies using ESG KPIs in their IMS have higher ESG performance than companies that do not use ESG KPIs.

5.2 | Effects of ESG KPIs on ESG Performance

Table 5 shows the regression results for the influence of *ESG-KPI* on *ESG-Score* and the scores of the three sub-dimensions, *E-Score*, *S-Score* and *G-Score*. Model 1 shows regression coefficients with *ESG-Score* as the dependent variable. Models 2–4 show the coefficients on the respective sub-dimensions of *ESG-Score*. *ESG-KPI* is highly significant and positively associated with *ESG-Score* ($\beta = 6.423$, $p = .003$) and *S-Score* ($\beta = 7.341$, $p = .004$). Furthermore, *ESG-KPI* positively correlates with *E-Score* ($\beta = 5.776$, $p = .076$). The results show that companies using ESG KPIs in their IMS have higher sustainability, environmental and social performance. Therefore, the findings support hypotheses H1, H1a and H1b.

TABLE 4 *t* test for difference in means

TABLE 5 Regression results

Dependent variable Model	ESG-Score 1	E-Score 2	S-Score 3	G-Score 4
ESG-KPI	6.423*** (0.003)	5.776* (0.076)	7.341*** (0.004)	4.738 (0.123)
FirmSize	5.073*** (0.000)	5.746*** (0.000)	3.577*** (0.001)	4.709*** (0.000)
Leverage	0.005 (0.950)	-0.016 (0.867)	0.025 (0.735)	0.028 (0.739)
RoA	0.038 (0.752)	0.152 (0.218)	-0.050 (0.672)	0.207 (0.199)
TobinsQ	0.672 (0.360)	-0.058 (0.936)	0.903 (0.273)	0.539 (0.494)
SustCom	13.917*** (0.000)	15.031*** (0.001)	15.514*** (0.000)	11.134*** (0.000)
BoardSize	-0.169 (0.557)	0.353 (0.411)	0.139 (0.683)	-0.956*** (0.008)
BoardDiversity	0.201** (0.027)	0.193 (0.188)	0.142 (0.204)	0.377*** (0.001)
FreeFloat	0.078 (0.110)	-0.006 (0.935)	0.083 (0.115)	0.171*** (0.003)
Intercept	-40.463***	-64.701***	-15.927	-26.432*
N	139	139	139	139
Adj. R ²	.616	.537	.509	.455

***Indicates a significance level of 1%.

**Indicates a significance level of 5%.

*Indicates a significance level of 10%.

The results of Model 4 cannot corroborate the findings for the *G-Score* of the *t* test; *ESG-KPI* does not show a significant association with *G-Score*. Accordingly, hypothesis H1c is rejected.

We can confirm our hypotheses regarding the positive effect of ESG KPIs on ESG, environmental and social performance. However, we observe no significant effects on governance performance. On the one hand, this could be due to the companies' low use of governance-related KPIs, which leads to a not pronounced governance performance. Although research is scarce on the drivers of governance performance, Baraibar-Diez et al. (2019) show that the structure of corporate governance influences governance performance. Several corporate governance variables are added as control variables in the analyses to control for this issue. On the other hand, the results may be due to the design of the *G-Score*. *G-Score* also assesses some corporate governance aspects that the management can only influence to a limited extent (e.g., the background or the experience of the board members or if the company is state-owned).

Regarding the control variables, we find that *FirmSize* is positively associated with ESG performance and all three sub-dimensions. These findings align with results in existing literature (Baraibar-Diez & Odriozola, 2019; Dremptec et al., 2020; Orazalin, 2020). Furthermore, a strong positive and significant association of a sustainability committee with all ESG performance measures is revealed. These findings are

consistent with existing research (Baraibar-Diez & Odriozola, 2019; Biswas et al., 2018; Orazalin, 2020). While board size impacts the *G-Score* negatively, board diversity and ownership dispersion show a positive influence. Board diversity is also positively associated with *ESG-Score*.

To further inspect the influence of ESG KPIs on ESG performance, *ESG-KPI* is separated into *E-KPI*, *S-KPI* and *G-KPI*, and the regressions on the performance measures are rerun. Table 6 shows the regression results for the separation of *ESG-KPI*. Model 5 indicates a positive relationship of *E-KPI* ($\beta = 5.250$, $p = .078$) and *S-KPI* ($\beta = 4.703$, $p = .054$) on ESG performance. Further, Model 6 provides evidence that environmental-related KPIs improve environmental performance ($\beta = 8.924$, $p = .025$), while social-related KPIs do not influence environmental performance. For social performance, the results are similar. *S-KPI* is positively associated with *S-Score* ($\beta = 8.481$, $p = .001$), while *E-KPI* does not show a significant influence. These findings support hypotheses H2a and H2b. The results corroborate those of comparable research that demonstrate a positive impact of using eco-control as a more pronounced way of integrating environmental management on environmental performance (Henri & Journeault, 2010) and social performance measurement system on social performance (Lisi, 2018). Our results suggest that environmental and social KPIs should be integrated into the corresponding management systems.

TABLE 6 Regression results ESG-KPI separation

Dependent variable Model	ESG-Score 5	E-Score 6	S-Score 7	G-Score 8
E-KPI	5.250* (0.078)	8.924** (0.025)	2.178 (0.540)	-1.224 (0.734)
S-KPI	4.703* (0.054)	0.560 (0.889)	8.481*** (0.001)	6.185 (0.100)
FirmSize	5.108*** (0.000)	5.733*** (0.000)	3.664*** (0.000)	4.836*** (0.000)
Leverage	0.012 (0.873)	-0.015 (0.876)	0.038 (0.619)	0.031 (0.714)
RoA	0.042 (0.719)	0.162 (0.199)	-0.050 (0.679)	0.197 (0.223)
TobinsQ	0.730 (0.305)	0.133 (0.854)	0.850 (0.303)	0.477 (0.548)
SustCom	14.064*** (0.000)	15.840*** (0.000)	15.098*** (0.000)	10.644*** (0.001)
BoardSize	-0.212 (0.457)	0.335 (0.440)	0.074 (0.827)	-0.988*** (0.006)
BoardDiversity	0.204** (0.026)	0.188 (0.198)	0.152 (0.174)	0.384*** (0.001)
FreeFloat	0.073 (0.140)	-0.011 (0.886)	0.077 (0.138)	0.169*** (0.003)
Intercept	-41.318***	-64.445***	-17.820	-28.187*
N	139	139	139	139
Adj. R ²	.616	.537	.514	.454

***Indicates a significance level of 1%.

**Indicates a significance level of 5%.

*Indicates a significance level of 10%.

G-Score is positively affected by *BoardDiversity* and *FreeFloat*, whereas *BoardSize* is negatively associated. *BoardDiversity* also shows a positive association with *ESG-Score*. *FirmSize* and *SustCom* are positively related to the *ESG-Score* and the three sub-scores in all models. Therefore, a positive influence of company size and the existence of a sustainability committee on ESG performance can be subsumed.

Comparing the effect of *E-KPI* and *S-KPI* on ESG performance, *E-KPI* shows a larger effect on *ESG-Score* ($\beta = 5.250$) than *S-KPI* ($\beta = 4.703$). Further, the impact of *E-KPI* on environmental performance ($\beta = 8.924$) is larger than the impact of *S-KPI* on social performance ($\beta = 8.481$). This comparison indicates that environmental-related KPIs have a higher impact on ESG and environmental performance than social-related KPIs on ESG performance and social performance. We attribute this to the fact that environmental activities have a more aligned effect. For example, more efficient use of materials through lifetime expansion reduces waste and CO₂ emissions (Hertwich et al., 2019). Therefore, environmental activities have a more concurrent effect on the overall performance objective 'environment' than social activities on 'social'. There might even be a conflict of interest in social activities. For instance, focusing on customer

satisfaction does not always imply that employee satisfaction rises simultaneously (Jeon & Choi, 2012).

Since ESG KPIs used in the IMS are voluntary, our results of the analysis are subject to a self-selection bias. Therefore, a two-step Heckman correction is performed to corroborate the results and ensure the analysis's robustness (Heckman, 1979). In the first stage, the use of ESG KPIs in the IMS is modelled. In the second stage, we add the calculated inverse mills ratio (*IMR*) to the previously performed Models 9–16. The second stage results for the two-step Heckman correction are shown in Table A2. The findings support the previously shown results of Models 9–12 and 14–16. The finding in Model 13 that environmental-related KPIs positively impact ESG performance cannot be confirmed. Significant results on *IMR* in the regression models on *ESG-Score* and *G-Score* support the assumption that self-selection is present. The results are also robust when using *E-KPI* and *S-KPI* individually instead of all three sub-dimensions KPIs and including the variable *G-KPI* in the regressions.

The results of our analysis support hypotheses H1 and H1b that ESG KPIs used in the IMS positively affect ESG and social-related performance. Further, we find indications for hypothesis H1a that ESG KPIs positively impact environmental-related performance. If the ESG

KPIs are assigned to the individual sub-dimensions, it cannot automatically be assumed that the use of environmental- and social-related KPIs positively influences ESG performance. However, both sub-KPIs show a positive influence on their respective sub-dimension and therefore support H2a and H2b. The results are robust to self-selection bias checked with the two-step Heckman correction. Only a little evidence supports hypothesis H1c that ESG KPIs used in the IMS positively influence governance performance. Therefore, we reject view H1c.

Furthermore, the results indicate that an investor can assume a company has a higher ESG and social performance if he only knows the company uses an ESG KPI in their IMS. However, the investor cannot automatically assume that the company has a higher environmental performance by knowing ESG KPIs are used in the IMS. On the other hand, an investor cannot automatically assume that the company has a higher overall ESG performance only because an environmental or a social KPI

is used. However, he can assume a higher environmental or social performance with the knowledge that an environmental or social KPI is used. This finding is notable as it may have implications on the choice of transparency of companies. Concerning the stakeholder and neo-institutional theories, the results support the argumentation of Drempevic et al. (2020) that companies could contribute to their 'license to operate' with transparent communication.

5.3 | Consistency of the IMS and the MCS

The following section analyses the effect of the consistent use of ESG KPIs in the IMS and the MCS. Therefore, the variable *ESG-Comp* is added in all models. Table 7 shows the results of the additional analysis.

TABLE 7 Regression results consistency with management compensation

Dependent variable Model	ESG-Score 9	E-Score 10	S-Score 11	G-Score 12	ESG-Score 13	E-Score 14	S-Score 15	G-Score 16
ESG-KPI	7.245*** (0.007)	5.103 (0.201)	6.816* (0.053)	9.008** (0.010)				
E-KPI					7.028* (0.056)	9.266* (0.053)	1.455 (0.754)	3.361 (0.482)
S-KPI					5.339** (0.032)	0.683 (0.869)	8.222*** (0.004)	7.827** (0.027)
ESG-Comp	-1.912 (0.621)	1.566 (0.772)	1.220 (0.769)	-9.929* (0.064)	-3.456 (0.395)	-0.664 (0.902)	1.406 (0.761)	-8.913 (0.157)
FirmSize	5.162*** (0.000)	5.673*** (0.000)	3.520*** (0.001)	5.173*** (0.000)	5.271*** (0.000)	5.764*** (0.000)	3.598*** (0.001)	5.256*** (0.000)
Leverage	-0.001 (0.992)	-0.012 (0.906)	0.029 (0.706)	-0.000 (0.997)	0.003 (0.965)	-0.017 (0.865)	0.042 (0.594)	0.009 (0.920)
RoA	0.030 (0.802)	0.158 (0.195)	-0.045 (0.709)	0.169 (0.295)	0.031 (0.794)	0.160 (0.201)	-0.045 (0.714)	0.168 (0.302)
TobinsQ	0.659 (0.375)	-0.048 (0.947)	0.911 (0.268)	0.471 (0.565)	0.737 (0.307)	0.135 (0.853)	0.848 (0.306)	0.495 (0.542)
SustCom	13.882*** (0.000)	15.060*** (0.001)	15.536*** (0.000)	10.953*** (0.001)	14.121*** (0.000)	15.851*** (0.000)	15.075*** (0.000)	10.790*** (0.001)
BoardSize	-0.179 (0.540)	0.360 (0.408)	0.145 (0.672)	-1.003*** (0.005)	-0.237 (0.420)	0.330 (0.457)	0.084 (0.807)	-1.050*** (0.004)
BoardDiversity	0.201** (0.027)	0.193 (0.192)	0.142 (0.207)	0.378*** (0.001)	0.204** (0.025)	0.188 (0.200)	0.152 (0.175)	0.385*** (0.001)
FreeFloat	0.082* (0.097)	-0.009 (0.903)	0.081 (0.125)	0.191*** (0.001)	0.078 (0.118)	-0.010 (0.899)	0.075 (0.149)	0.184*** (0.002)
Intercept	-41.507***	-63.846***	-15.261	-31.854**	-43.269***	-64.820***	-17.027	-33.217**
N	139	139	139	139	139	139	139	139
Adj. R ²	.614	.533	.505	.465	.614	.534	.510	.459

***Indicates a significance level of 1%.

**Indicates a significance level of 5%.

*Indicates a significance level of 10%.

The results show that *ESG-Comp* does not influence ESG performance or the performance of one of the sub-dimensions. Only in Model 12, *ESG-Comp* shows a significant relationship on *G-Score* ($\beta = -9.929$, $p = .064$). This finding contrasts with our expectations and hypotheses H3. In conclusion, the results lead to the rejection of hypothesis H3. Therefore, findings in the existing literature that show a positive impact of sustainable compensation on ESG performance cannot be corroborated (Baraibar-Diez et al., 2019; Hong et al., 2016).

When adding *ESG-Comp*, the relationship between *ESG-KPI* and *G-Score* gets significant at the 5% level ($\beta = 9.008$, $p = .010$). Furthermore, the significance level for *ESG-KPI* on *ESG-Score* stays at the 1% level ($\beta = 7.245$, $p = .007$). The influence of *ESG-KPI* on *S-Score* is now significant at the 10% level ($\beta = 6.816$, $p = .053$), and the impact on *E-Score* becomes insignificant ($\beta = 5.103$, $p = .201$). The results corroborate the effect of *E-KPI* on *ESG-Score* ($\beta = 7.028$, $p = .056$) and on *E-Score* ($\beta = 9.266$, $p = .053$). *S-KPI* again shows a positive relation with *ESG-Score* ($\beta = 5.339$, $p = .032$) and *S-Score* ($\beta = 8.222$, $p = .004$). *G-Score* is positively influenced by *S-KPI* ($\beta = 7.827$, $p = .027$). The results are robust when adding *IMR* and controlling for potential self-selection.

The reason for the insignificant results of *ESG-Comp* might be that the consistent use of ESG KPIs in the IMS and the MCS changes the manager's incentive structure. Suppose the same KPIs are used for managing the company's ESG performance in the IMS and at the same time for the manager's compensation. In this case, the manager will focus on the KPIs relevant to the compensation. As a result, the manager will reduce the engagement to improve the KPIs once a specific target level given in the manager's contract is reached (Matějka, 2018). Therefore, the KPIs only provide a limited incentive and do not help push managers to improve ESG performance.

Consequently, the results extend existing literature showing positive effects (e.g., Hong et al., 2016) and mixed effects (e.g., Baraibar-Diez et al., 2019) of sustainability aspects in the MCS. The KPIs used in the previous literature are not explicitly linked to the IMS, so the setting of this study fills a research gap in the literature. In addition, the measurement of ESG KPIs used in the MCS could explain the difference in results. While this study focuses on ESG KPIs in the IMS, other studies that analyse the impact of sustainable corporate governance also accept a broader definition of the integration of sustainability (Baraibar-Diez et al., 2019; Hong et al., 2016). While a broader definition of integration in the MCS positively impacts ESG performance, narrow definitions have no incentive effect. The reason is that the ESG target component's incentive effect in the MCS is not reduced when one target is met (Matějka, 2018). Another reason might be that even though ESG KPIs used in the IMS are incorporated into the MCS, there is no clear target set, and, therefore, the integration does not affect ESG performance (Maas, 2018).

The results of the additional analysis support the findings of our primary analysis regarding the control variables. *FirmSize* and *SustCom* again show a positive influence on ESG performance and the three sub-dimensions. Further, *BoardDiversity* and *FreeFloat* positively impact governance performance while *BoardSize* has a negative impact. *BoardDiversity* also positively influences ESG performance.

6 | CONCLUSIONS

Realising the changing investor needs and providing companies with more clarity in a volatile environment, our study addresses the impact of ESG KPIs on ESG performance. More precisely, we examined the influence of ESG KPIs in the IMS and their consistent use in the MCS. We collected information on KPIs of publicly listed German companies in the DAX, MDAX and SDAX. Although we could not find any effects of consistent use in the MCS on ESG performance (H3), our results support the hypothesis (H1) that implementing ESG KPIs in the IMS positively impacts ESG performance. Also, the sub-dimensions of social performance (H1b) are positively affected. However, contrary to our expectations, we find inconclusive results on the influence of ESG KPIs in the IMS on the sub-dimension environmental performance (H1a) and no results for the sub-dimension governance performance (H1c). Further, the findings indicate that environmental-related KPIs in the IMS positively affect environmental performance (H2a). A similar relationship is also observed between social-related KPIs and social performance (H2b). Therefore, our research question RQ 1 can be answered with yes; for RQ2, we could not find any supporting evidence.

6.1 | Limitations and future research

Our paper is not free from limitations. First, our findings are restricted to the German capital market in 2020 and its jurisdiction. To extend this study, a multi-country analysis considering different jurisdictions would be interesting for future research. Moreover, the SEC published interpretative guidance on KPIs in the Management Discussion and Analysis (MD&A) section (SEC, 2020). For further research and contributing to the existing literature on ESG KPIs, an event study of the effects of the new guideline would be interesting.

Second, according to the results of our paper, environmental-related KPIs in the IMS increase environmental performance (H2a), and social-related KPIs increase social performance (H2b). However, we were not able to analyse the influence of governance-related KPIs on ESG and governance performance due to an insufficient number of KPIs used. Investigating this relationship would be an addition to our study.

Third, to take up current discussions on circular economy business models (Barreiro-Gen & Lozano, 2020; Opferkuch et al., 2021; Reike et al., 2022; Suchek et al., 2021) and promote the integration of sustainability into companies, it is interesting for future research to investigate the integration of ESG KPIs to support circular economy business models.

6.2 | Practical and theoretical implications

This paper contributes to the management literature in general, especially the literature on sustainability management, and our findings have several implications. Concerning companies, the findings provide

evidence that managing the company using ESG KPIs in the IMS can be beneficial and positively impact ESG performance. Further, the results suggest that implementing a specific KPI in the IMS could help to improve the performance of the respective sub-dimension. For instance, implementing an environmental KPI like CO₂ emissions in the IMS could be considered if a company wants to improve its environmental performance. Thus, the investigation contributes to the ongoing discussion on managing ESG performance and highlights the role of ESG KPIs in this context.

Considering investors' concerns about the reliability of sustainability data provided by companies, the integration into the IMS and the resulting audit requirement increases the reliability of the data. Moreover, disclosing management-relevant ESG KPIs allows investors to better distinguish between companies that may be practising greenwashing and companies trying to implement sustainability in their internal management practice. Especially in countries with no specific sustainability regulations, a company's external sustainability commitment may often be detached from internal practices (Boiral et al., 2012). Thus, the information on whether ESG KPIs are used in the IMS may also be relevant for investors' decisions.

From a theoretical perspective, this means that a comprehensive management approach is essential for companies. In this sense, investors are provided with all relevant information management uses in its decision-making. Regarding the agency theory (Jensen & Meckling, 1976), information asymmetries between the management as an agent and investors as principal can be reduced. Moreover, from the perspective of the stakeholder and neo-institutional theories, companies could ensure their 'license to operate' with transparent communication (Drempetic et al., 2020). The study also has practical implications for researchers. Based on the regulatory setting of the German management report, our research approach provides opportunities for further research on the effects of the design of the IMS. Due to the mandatory disclosure, researchers can investigate the internal management perspective without resorting to the companies' internal information.

For regulators or capital market authorities, the results regarding the disclosure of the internal management practices provide new insights for developing future regulations regarding the management report. Thus, the results show that information on the IMS can contain valuable information for external readers. Further, the mandatory disclosure of relevant KPIs in the IMS leads to improved data availability, which is one of the investors' concerns when assessing the ESG performance of companies. Furthermore, our findings can help regulators with the future development of ESG reporting guidelines. Based on our results, regulators could consider mandatory disclosure of management-relevant ESG KPIs. With this transparency, investors could be enabled to identify companies that practise greenwashing.

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SUPPORTING INFORMATION

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APPENDIX A

TABLE A1 Correlation table

	ESG-KPI	E-KPI	S-KPI	ESG-Comp	ESG-Score	E-Score	S-Score	G-Score	Firm-Size	Leverage	RoA	TobinsQ	SustCom	Board-Size	Board-Diversity	FreeFloat
ESG-KPI	1	.663*	.871*	.638*	.271*	.216*	.287*	.185*	.146*	-.019	-.063	-.021	.155*	.172*	.008	.062
E-KPI	.663*	1	.393*	.654*	.240*	.245*	.202*	.086	.222*	.072	-.197*	-.139	.019	.218*	.081	.104
S-KPI	.879*	.411*	1	.480*	.231*	.139	.290*	.186*	.090	-.053	.041	.046	.199*	.133	-.042	.066
ESG-Comp	.615*	.631*	.457*	1	.260*	.240*	.263*	.142*	.222*	.023	-.091	-.104	.122	.169*	.140	.203*
ESG-Score	.273*	.236*	.234*	.250*	1	.844*	.890*	.773*	.634*	.260*	-.107	-.141*	.527*	.494*	.377*	.313*
E-Score	.216*	.238*	.140*	.225*	.834*	1	.702*	.485*	.597*	.238*	-.142*	-.197*	.462*	.565*	.355*	.197*
S-Score	.281*	.185*	.289*	.252*	.892*	.688*	1	.583*	.537*	.221*	-.076	-.008	.488*	.467*	.341*	.286*
G-Score	.171*	.097	.168*	.129	.779*	.486*	.572*	1	.443*	.141*	.032	-.080	.421*	.256*	.404*	.402*
FirmSize	.113	.168*	.051	.251*	.622*	.600*	.497*	.452*	1	.483*	-.266*	-.522*	.332*	.698*	.304*	.210*
Leverage	-.062	.021	-.107	.028	.248*	.245*	.216*	.145*	.539*	1	-.406*	-.285*	.119	.467*	.090	.088
RoA	-.088	-.160*	-.027	-.124	-.060	-.060	-.080	.053	-.142*	-.322*	1	.441*	.028	-.321*	-.019	-.076
TobinsQ	.054	-.139*	.112	-.089	-.152*	-.214*	-.071	-.129	-.414*	-.259*	.247*	1	-.018	-.417*	-.104	-.127
SustCom	.151*	.017	.195*	.119	.550*	.482*	.525*	.429*	.321*	.139	.015	.024	1	.259*	.130	.162*
BoardSize	.178*	.244*	.132	.192*	.478*	.545*	.426*	.241*	.689*	.484*	-.227*	-.361*	.246*	1	.389*	.142*
Board-Diversity	.008	.091	-.036	.118	.423*	.377*	.352*	.439*	.348*	.185*	-.102	-.324*	.178*	.423*	1	.301*
FreeFloat	.041	.091	.045	.198*	.288*	.164*	.254*	.390*	.222*	.107	.001	-.185*	.147*	.103	.312*	1

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

*Indicates a significance level of 10%.

TABLE A2 Regression results second stage of Heckman correction

Dependent variable Model	ESG-Score Heckman 1	E-Score Heckman 2	S-Score Heckman 3	G-Score Heckman 4	ESG-Score Heckman 5	E-Score Heckman 6	S-Score Heckman 7	G-Score Heckman 8
ESG-KPI	5.312** (0.018)	6.514** (0.046)	7.312*** (0.006)	1.771 (0.564)				
E-KPI					4.082 (0.163)	9.516** (0.023)	2.201 (0.543)	-4.363 (0.195)
S-KPI					4.197* (0.099)	1.108 (0.778)	8.437*** (0.001)	4.617 (0.194)
FirmSize	4.219*** (0.000)	5.743*** (0.000)	3.668*** (0.003)	2.826** (0.030)	4.271*** (0.000)	5.789*** (0.000)	3.749*** (0.002)	2.856** (0.027)
Leverage	0.082 (0.362)	-0.030 (0.794)	0.020 (0.831)	0.209** (0.045)	0.087 (0.342)	-0.033 (0.777)	0.033 (0.728)	0.218** (0.039)
RoA	0.132 (0.301)	0.138 (0.310)	-0.057 (0.673)	0.425*** (0.010)	0.134 (0.300)	0.142 (0.310)	-0.057 (0.682)	0.422** (0.010)
TobinsQ	0.745 (0.319)	0.038 (0.957)	0.876 (0.298)	0.634 (0.400)	0.781 (0.285)	0.233 (0.743)	0.825 (0.326)	0.524 (0.489)
SustCom	11.745*** (0.000)	14.824*** (0.001)	15.785*** (0.000)	6.481* (0.072)	11.867*** (0.000)	15.784*** (0.001)	15.360*** (0.000)	5.593 (0.128)
BoardSize	-0.142 (0.631)	0.378 (0.377)	0.131 (0.704)	-0.912** (0.013)	-0.180 (0.539)	0.354 (0.412)	0.066 (0.847)	-0.926** (0.012)
BoardDiversity	0.207** (0.024)	0.226 (0.126)	0.135 (0.240)	0.368*** (0.001)	0.210** (0.023)	0.220 (0.133)	0.145 (0.206)	0.375*** (0.001)
FreeFloat	0.060 (0.205)	0.002 (0.983)	0.084 (0.107)	0.126** (0.019)	0.056 (0.243)	-0.003 (0.972)	0.078 (0.129)	0.125** (0.019)
IMR	-4.740* (0.076)	1.865 (0.641)	0.131 (0.966)	-11.759*** (0.001)	-4.618* (0.089)	2.141 (0.600)	0.124 (0.968)	-12.248*** (0.001)
Intercept	-25.512* (0.076)	-67.213*** (0.641)	-17.011 (0.966)	8.328 (0.001)	-26.658* (0.089)	-67.960*** (0.600)	-18.833 (0.968)	8.319 (0.001)
N	136	136	136	136	136	136	136	136
Adj. R ²	.617	.526	.502	.491	.616	.527	.507	.494

Note: Three observations are dropped compared to the main analysis, because in the first stage, one industry does not have a company that uses ESG KPIs.

***Indicates a significance level of 1%.

**Indicates a significance level of 5%.

*Indicates a significance level of 10%.