

From sustainability to financial performance: the role of SDG disclosure

Valentina Beretta, Maria Chiara Demartini and Sara Trucco

Abstract

Purpose – Despite the rising trend of sustainable developmental goals (SDGs) incorporation into sustainability reporting, there remains a gap in understanding the role of SDG disclosure (SDGD) in the relationship between sustainability and financial performance. Thus, this study aims to investigate the relationship between sustainability performance and the level of SDGD; the relationship between sustainability performance and financial performance; and the link between the level of SDGD and financial performance.

Design/methodology/approach – Conducted in Italy, the analysis involves manual collection of sustainability reports from company websites for the fiscal years from 2019 to 2022, followed by textual analysis to identify SDG-related content disclosed in nonfinancial reports. Financial and nonfinancial data from Orbis and LSEG databases are used for regression analysis on panel data.

Findings – Findings align with existing literature, emphasizing the partial mediator role played by the level of SDGD in the relationship between sustainability performance and financial performance, measured by return on equity. In addition, the study suggests that there is a positive relationship between sustainability performance and the level of SDGD and a positive relationship between the level of SDGD and financial performance.

Originality/value – This study contributes to a deeper understanding of how SDG disclosures function within the broader nexus of sustainability performance and financial outcomes. Findings from this study provide empirical support for the argument that SDGD is not merely a regulatory compliance tool but also a strategic asset that can enhance a firm's financial performance.

Keywords Sustainability reporting, Financial performance, Sustainability performance, SDG disclosure

Paper type Research paper

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1. Introduction

Sustainability reporting has gained prominence as a tool for organizations to communicate their sustainability (also known as environmental, social and governance – ESG) performance (Camilleri, 2015; Arvidsson and Dumay, 2022). This also helps companies align corporate performance with the United Nations sustainable development goals (SDGs) (Martínez-Córdoba *et al.*, 2020; Tsalis *et al.*, 2020; Hummel and Szekely, 2022; Benito *et al.*, 2023). Literature suggests that companies adhering to these standards often demonstrate a higher level of transparency and disclosure, contributing to improved sustainability practices (Vigneau *et al.*, 2015; Erin *et al.*, 2022). This is particularly relevant especially in light of the current normative evolution, specifically regarding the corporate sustainability reporting directive and the European Sustainability Reporting Standards, which require an ever larger set of companies to report on their sustainability actions. These standards are intended to support companies in enhancing transparency, compliance and the strategic integration of sustainability, thereby contributing to broader SDGs (Hummel and Jobst, 2024).

Various studies have examined the integration of SDG disclosure (SDGD) into corporate reporting (Costanza *et al.*, 2016; Hummel and Szekely, 2022). For instance, Donoher (2017) suggested that multinational corporations are more likely to adopt a sustainability agenda

when their stakeholder network encompasses diverse interests and beliefs. Research has explored various factors motivating firms to address and report specific SDGs (Rosati and Faria, 2019a, 2019b; Martínez-Ferrero *et al.*, 2020). However, according to previous studies, only a minority of companies currently reference the SDGs in their reports and have adopted specific SDGs strategies (Schramade, 2017; Rosati and Faria, 2019a; García-Meca and Martínez-Ferrero, 2021; Low *et al.*, 2023), even though the number of companies referencing SDGs in their annual reports is increasing (Hummel and Szekely, 2022).

Other studies have suggested that a method for evaluating firms' advancement in accomplishing the SDGs involves gauging the relationship between SDGD and corporate performance (Khaled *et al.*, 2021; Nicolo' *et al.*, 2024; Zampone *et al.*, 2024). This entails evaluating how firms' sustainable practices and initiatives contribute to the achievement of the SDGs. In empirical studies, firms' performance has often been assessed using ESG scores for sustainability performance (Tamimi and Sebastianelli, 2017) and return on equity (ROE) for financial performance (Alareeni and Hamdan, 2020). However, financial and sustainability performance have been studied differently in relation to SDGD. On one hand, some studies have analyzed the impact of sustainability performance on SDGD (Nicolo' *et al.*, 2024). These studies typically investigate the extent to which a firm's sustainable practices align with and contribute to SDGs, highlighting the direct correlation between robust sustainability performance and comprehensive SDGD (Dinçer *et al.*, 2024; Nicolo' *et al.*, 2024; Thammaraksa *et al.*, 2024). On the other hand, other studies have investigated the impact of SDGD on financial performance (García-Meca and Martínez-Ferrero, 2021). This research examines how effectively communicating a firm's commitment to the SDGs influences its financial metrics (García-Meca and Martínez-Ferrero, 2021; Muhmad and Muhamad, 2021; Husnah and Fahlevi, 2023; Galeazzo *et al.*, 2024).

However, the role of SDGD remains unclear. Despite advancements in understanding the factors driving firms' engagement with the SDG framework, to the best of our knowledge, there is a lack of studies investigating the interaction between SDGs and companies' overall performance, namely, both sustainability and financial performance (García-Meca and Martínez-Ferrero, 2021; Low *et al.*, 2023). Extant research regarding the correlation between SDG-related reporting and company performance lacks definitive conclusions (Ramos *et al.*, 2022). In particular, there is a call for research investigating the role of SDGD in the relationship between sustainability and financial performance (García-Meca and Martínez-Ferrero, 2021; Low *et al.*, 2023; Galeazzo *et al.*, 2024). Thus, this study aims to reply to the following research question:

RQ1. What is the role of SDG disclosure in the relationship between sustainability and financial performance?

Conducted in Italy, this study investigate this relationship by manually collecting sustainability reports from company websites for the fiscal years from 2019 to 2022 and by performing textual analysis to identify SDG-related content contained herein. Data derived from the content analysis are complemented by financial and nonfinancial data downloaded from Orbis and LSEG databases and which are used for panel data regression analysis. Three models with panel data were proposed to test the research hypotheses.

This study contributes to the literature related to the sustainability disclosure by investigating the role of SDGD in the relationship between sustainability and financial performance. In particular, this study contributes to extant literature suggesting that the sustainability performance of a company has a positive impact on the level of SDGD and that the SDGD positively affects the financial performance of a company. Furthermore, this study provides evidence for an indirect partial mediating effect of SDGD on the relationship between sustainability and financial performance.

The remainder of the paper is structured as follows: Section 2 reviews the literature on SDGD, Section 3 develops the research hypothesis, Section 4 presents sample selection,

data collection and data analysis, Section 5 presents results, Section 6 discusses results and Section 7 presents theoretical and practical implications, limitations and future developments of the research.

2. Literature review

The SDGD have been largely examined within the corporate sustainability literature (Schramade, 2017; Schönherr *et al.*, 2017; Topple *et al.*, 2017; Rosati and Faria, 2019b; Martínez-Córdoba *et al.*, 2020; Benito *et al.*, 2023; Nicolo' *et al.*, 2024; Raimo *et al.*, 2024). Previous studies investigated how companies report their commitment toward achieving the SDGs in their reports and found that many companies do not provide much detail on how they address SDGs (Boiral *et al.*, 2021; Heras-Saizarbitoria *et al.*, 2022), lacking specific plans or results. Indeed, although many companies mention SDGs in their sustainability reports, they lack to provide details on how they are actually working toward them (Lodhia *et al.*, 2023). Although current regulations require companies to report some nonfinancial information, they do not mandate reporting of SDGs (Nicolo' *et al.*, 2024). Thus, companies mostly rely on generic reporting frameworks instead of developing specific plans for each SDG (Lodhia *et al.*, 2023). For this reason, companies' strategies and actions toward SDGs are assessed in other reporting frameworks, such as, for example, in the integrated or sustainability report (Abeysekera, 2022; Nicolò *et al.*, 2022).

This lack of detail suggests that companies might be using SDGs for public image without real commitment (Heras-Saizarbitoria *et al.*, 2022). Previous studies suggest that, while some companies are making internal changes to address SDGs, others appear to be using it merely for enhancing public image (Nicolò *et al.*, 2022). Thus, there is a debate in the literature on whether references to SDGs in company reports represent true efforts toward sustainable development or are simply attempts to enhance their image (Nicolò *et al.*, 2022). Silva argues that companies' SDGD may not reflect real change but instead focus on achievements or minor modifications rather than fundamental shifts in business practices (Silva, 2021). This suggests that companies are more concerned with their image than with making substantial changes to support sustainable development and might be using SDGs, or corporate social responsibility (CSR) disclosure in general, for legitimization without real changes in their practices (Raimo *et al.*, 2021; Lodhia *et al.*, 2023). Some authors suggest that firms engage in environmental and social activities merely to fulfill stakeholders' expectations rather than to effect real change in business strategies, representing the symbolic approach of legitimation theory (Arenas *et al.*, 2023, p. 202). This behavior is referred to in the literature as "SDG-washing" and is compared to "greenwashing", in which companies make misleading claims about their environmental practices (Heras-Saizarbitoria *et al.*, 2022). Overall, sustainability reporting can be a valuable tool for holding companies accountable for their progress on SDGs, but more work is needed to ensure companies use it transparently (Nicolò *et al.*, 2022).

Furthermore, previous studies have argued that reconciling SDGs concerns with shareholder value creation poses challenges, as the expected win-win situation is not always evident for companies (Van der Waal and Thijssens, 2020). As stated by Van der Waal and Thijssens, "the overall lack of meaningful SDG disclosures implies that stakeholders with an SDG interest, such as institutional investors, cannot rely on sustainability reports for their decisions" (Van der Waal and Thijssens, 2020, p. 10). It is widely recognized that reporting on SDG contributions can lead to potential benefits, such as mobilizing responsible investment in the SDGs (Gugler, 2015; Rasche, 2020), facilitating the integration of SDGs into business practices (Adams, 2017) and increasing company transparency, the lack of which can impede progress toward the SDGs (Agarchand and Laishram, 2017; Anasi *et al.*, 2018). Furthermore, SDGD can contribute to "creating or increasing value for shareholders, society, and the environment" (Low *et al.*, 2023, p. 111660). At this purpose, Nicolò *et al.* (2024) investigate how analysts react to voluntary

sustainability reporting by Italian companies. Companies that disclose information on SDGs receive better reviews from analysts, suggesting that sustainability reports referring to SDGs help analysts predict company performance (Nicolò *et al.*, 2024). This practice is becoming more common and valued by financial markets. However, other studies call for further research to investigate how stakeholders in general, and shareholders in particular, react to SDGD (Silva, 2021).

Indeed, although the literature provides abundant evidence on the link between sustainability reporting and financial value (Muhmad and Muhamad, 2021; Nicolò *et al.*, 2024), this “limited” notion contradicts the perspectives of researchers who contend that the value generated should extend to a wider group of stakeholders (Low *et al.*, 2023), and results in this regard are controversial (Lopez, 2020; Van der Waal and Thijssens, 2020; García-Meca and Martínez-Ferrero, 2021). As argued by Haywood and Boihang, “the SDGs will need to be at the heart of value creation for business. This value creation would not only be measured in terms of profitability but also in terms of societal and environmental value. Companies that are able to show this in their business models and measure their contribution toward achieving the SDGs will be positive agents of change, driving the future of sustainable business” (Haywood and Boihang, 2021, p. 185). Stakeholders may perceive SDGD as signaling a shift in business strategy, potentially increasing companies’ (non) financial values. In this regard, Nicolò *et al.* (2024) found a positive association between sustainability performance and SDGD. Indeed, organizations demonstrate their economic, social and environmental value annually, benefiting various stakeholders by integrating SDGs into their operations (López and Monfort, 2017; Lopez, 2020).

3. Hypothesis development

There is a growing body of literature examining the link between sustainability performance and different types of nonfinancial disclosure (NFD), such as environmental disclosure, CSR disclosure and sustainability disclosure in terms of both quality and quantity (Melloni, 2015; Lai *et al.*, 2016; Beck *et al.*, 2017; Dumay and Dai, 2017; Melloni *et al.*, 2017; Beretta *et al.*, 2019; Lodhia and Mitchell, 2022; Beretta *et al.*, 2023). Herbohn *et al.* (2014) highlighted a strong correlation between corporate sustainability performance and disclosure; companies with an active communication strategy, evident through press release activity, tend to have higher levels of sustainability disclosure. Hummel and Schlick (2016) discovered that, in line with voluntary disclosure theory, companies with superior sustainability performance opt for high-quality sustainability disclosures to signal their strong performance to the market (Hummel and Schlick, 2016). In a similar vein, Luo and Tang (2014) found a significant positive correlation between carbon disclosure and performance, indicating that companies’ carbon disclosures in the Carbon Disclosure Project accurately reflect their actual carbon performance (Luo and Tang, 2014).

Furthermore, Li *et al.* (2023) discovered a positive correlation between sustainability performance and the attributes of sustainability disclosure (Li *et al.*, 2023). Specifically, they examined tone of optimism, tone of certainty, tone of clarity and readability and they found that companies with superior performance tend to communicate in an optimistic, confident, clear and more readable manner (Li *et al.*, 2023). Uyar *et al.* (2020) found that companies with better CSR performance are more inclined to publish CSR reports and tend to disseminate more sustainability-related information through the production of a higher number of such reports (Uyar *et al.*, 2020), thus supporting the signaling theory. Clarkson *et al.* (2008) observed a positive relationship between environmental performance and the extent of discretionary environmental disclosures (Clarkson *et al.*, 2008), whereas Melloni *et al.* (2017) found that when a firm has weak financial performance, its integrated reports tend to be significantly longer, less readable (i.e. less concise) and more optimistic (Melloni *et al.*, 2017).

Conversely, based on legitimacy theory, companies with poor sustainability performance tend to produce low-quality disclosures to conceal their actual performance while attempting to maintain their legitimacy (Hummel and Schlick, 2016).

With specific regard to SDGD, Nicolò *et al.* (2024) found strong empirical evidence that sustainability performance has a positive impact on SDGD, particularly via environmental and social pathways (Nicolò *et al.*, 2024), within the voluntary disclosure theory. However, they highlighted a lack of empirical evidence on the relationship between sustainability performance and the disclosure of information adopting the SDG framework and called for further research in this field especially in a mandatory context (Nicolò *et al.*, 2024). Hence, to further test the relationship between Sustainability performance and SDGD in a mandatory setting, we pose the following research hypothesis:

H1. There is a positive relationship between sustainability performance and the level of SDG disclosure.

Regarding the relationship between sustainability and financial performance, some scholars observed that investing in sustainability leads to improved accounting performance (Flammer, 2015; Marti *et al.*, 2015). In a similar vein, Al-Tuwaijri *et al.* (2004) found that good environmental performance is significantly linked to robust economic performance, as well as to more comprehensive and measurable environmental disclosures detailing specific pollution metrics and incidents. Furthermore, King and Lenox (2002) and Ducassy (2013) found a positive correlation between environmental performance and financial performance, whereas Hussain *et al.* (2018) highlight that the measurement of sustainability performance is crucial and can yield clearer and more definitive results regarding the relationship between sustainability engagement and a firm's performance. Jyoti and Khanna (2021) found a mixed results, indicating a notable negative correlation between the Environment score and both return on assets (ROA) and return on capital employed (ROCE) for the companies included in the sample. Conversely, the social score is significantly negatively associated only with ROE. In addition, the combined ESG Score, which "provides a rounded and comprehensive evaluation of a company's ESG performance based on the reported information in the ESG pillars, with ESG controversies overlay captured from global media sources" (LSEG, p. 2), is significantly negatively correlated with both ROA and ROCE (Jyoti and Khanna, 2021). Conversely, other scholars argue that sustainability engagement is detrimental for financial performance (Cordeiro and Sarkis, 1997; Preston and O'bannon, 1997). Therefore, there is no unanimous consensus about the direction of the relationship between sustainability performance and financial performance in a mandatory context. Hence, to further test this relationship, we pose the following research hypothesis:

H2. There is a positive relationship between sustainability performance and financial performance.

A stream of literature focused on the relationship between NFD and financial performance, with most evidence supporting the belief that engaging in sustainable activities leads to sustainable outcomes (Oh *et al.*, 2017; García-Meca and Martínez-Ferrero, 2021; Mengistu and Panizzolo, 2022). Muhmad and Muhamad's study (2021) reviews previous research on the link between sustainability practices and financial performance, highlighting that around 96% of the publications found a positive relationship between sustainability practices and corporate financial performance, especially following the reference to SDGs in their disclosure (Muhmad and Muhamad, 2021). In line with this view, some scholars found a positive relationship between ESG disclosure and financial performance (Pasquini-Descomps and Sahut, 2013; Tarmuji *et al.*, 2016; Alareeni and Hamdan, 2020). Specifically, Alareeni and Hamdan (2020) found that ESG disclosure positively influences a firm's performance measures. However, when examining ESG subcomponents separately, environmental and corporate social responsibility disclosures were found to be negatively

associated with ROA and ROE but positively related to Tobin's *Q*. They also discovered that corporate governance disclosure was positively associated with ROA and Tobin's *Q* but negatively associated with ROE (Alareeni and Hamdan, 2020).

Although most previous studies advocate for the business benefits of sustainability reporting, a critical perspective views sustainability strategies as efforts to shape perceptions rather than reducing environmental or social harm (Brammer and Pavelin, 2006, 2008) and some authors suggest that there is a negative or mixed relationship between ESG disclosure and financial performance, indicating that high ESG practices may have a detrimental impact on financial performance (Han *et al.*, 2016).

Cho *et al.* (2015) noted that contemporary sustainability reporting often fails to provide information relevant to company valuation, primarily driven by concerns regarding corporate legitimacy. Scalet and Kelly (2010) observed that companies tend to highlight positive initiatives while omitting negative events. Some authors found that most companies either do not explain how SDGs are implemented or fail to focus on key SDGs, instead using them to label various existing activities. As a result, investors may view SDGD as trivial or irrelevant, perceiving it as merely symbolic and having no effect on firm performance (Van der Waal and Thijssens, 2020). According to this view, previous studies found that reporting on SDGs does not affect firm performance, suggesting that this information holds mainly symbolic value for stakeholders (García-Meca and Martínez-Ferrero, 2021). However, scholars have demonstrated that this reporting affects performance in controversial sectors like alcohol, gambling, tobacco and firearms, as well as in environmentally sensitive industries (García-Meca and Martínez-Ferrero, 2021). Therefore, to the best of our knowledge, there is no unanimous consensus about the direction of the relationship between SDGD and financial performance.

Hence, to further test the relationship between SDGD and financial performance in a mandatory setting, we pose the following research hypothesis:

H3. There is a positive relationship between the level of SDG disclosure and financial performance.

Some scholars have analyzed SDGD as a mediating variable in various types of relationships. In this regard, Alodat *et al.* (2023a) found a strong positive correlation between the accounting expertise, tenure and monitoring expertise of audit committee chairs and the firm's performance metrics, specifically ROA and ROE (Alodat *et al.*, 2023b). In addition, they found that sustainability disclosure partially mediates the relationship between audit committee chair effectiveness and ROE (Alodat *et al.*, 2023b). Alodat *et al.* (2023b) showed that gender diversity on the board positively and significantly influences firm performance. Moreover, sustainability disclosure completely mediates the relationship between board gender diversity and firm performance (Alodat *et al.*, 2023a). Faisal *et al.* (2023) found that sustainability disclosures mediate the relationship between political connections and firm performance from the resource-based view (Faisal *et al.*, 2023). Other studies found that green accounting indicators play a mediating role in the relationship between sustainability performance and financial performance as measured by ROA (Srouji *et al.*, 2023). Similarly, Wagner and Schaltegger (2004) examined how the choice of corporate environmental strategy moderates the relationship between environmental and economic performance in European industrial companies. They concluded that firms with shareholder value-oriented strategies exhibit a more positive association between environmental and economic performance compared to those without such a strategy. However, to the best of our knowledge, very few studies have analyzed the mediating role of SDGD in the relationship between sustainability performance as a whole and financial performance. Therefore, consistently with previous studies that analyzed the mediating role of a variable (Zampone *et al.*, 2024) to further test the role of sustainability disclosure in the relationship between sustainability performance and financial performance in a mandatory context, we pose the following hypothesis:

H4. The level of SDG disclosure acts as a mediating variable in the relationship between sustainability and financial performance.

The research framework adopted in this study is provided in [Figure 1](#).

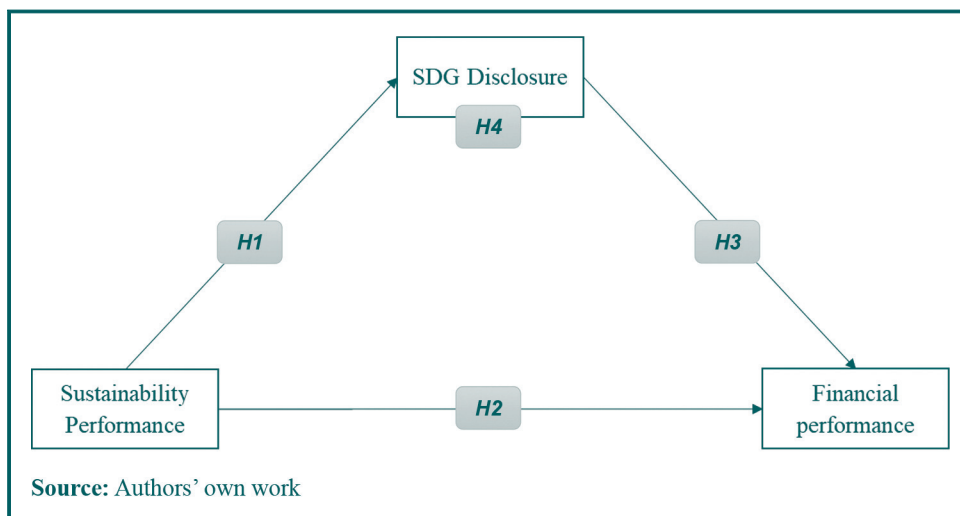
4. Methodology

4.1 Sample selection and data collection

To examine the research hypotheses, we obtained NFD for the past four available fiscal years (2019–2022) from all Italian companies. In particular, this timeframe was selected because it is subsequent the introduction of “The National Sustainable Development Strategy 2017–2030”. This analysis focuses on Italy because of its status as one of the largest industrial European countries compelled by Directive 2014 / 95/EU. With specific regard to the Italian context, [Pizzi et al. \(2021\)](#) observed a positive correlation between a firm’s SDGD and various factors in Italy. These factors include the type of report, the presence of independent directors on the board and the firm’s experience with nonfinancial reporting. [Bose and Khan \(2022\)](#) argued that among European nations, Italian companies exhibit the highest level of SDGD and have shown significant growth in SDG scores compared to previous years ([Bose and Khan, 2022](#)). In line with previous research, we excluded the financial institutions from the sample because of their regulatory and managerial differences, such as their complexity ([Nobes and Stadler, 2015](#)). We manually acquired all reports from the remaining companies’ websites.

First, in line with prior research ([Melloni, 2015](#); [Abhayawansa and Guthrie, 2016](#); [Beretta et al., 2019](#); [Hummel and Szekely, 2022](#); [Raimo et al., 2022](#); [Beretta et al., 2023](#)), we adopted textual analysis to manually investigate each report included in the sample if it contains information related to the SDGs. In particular, each report in the sample was manually investigated by the authors to check for the presence of references to one or more SDGs. If a reference to a specific SDG was available, it was coded as 1; otherwise, it was coded as 0. Consistently with previous studies ([Demartini and Beretta, 2020](#)), the coding of the first 10 reports was carried out independently by each author to ensure consistency and resolve any doubts. During this process, all decisions were agreed upon by all the authors.

Figure 1 Research framework



Second, financial and nonfinancial data for the same period were gathered from the Orbis and LSEG Database. Our database comprises 180 NFD entries related to 45 Italian companies.

4.2 Data analysis

The hypotheses were tested using the three-step procedure to determine whether an independent variable (ESG_Score) impacts a dependent variable (ROE) through a mediating variable (SDG_Disclosure). This approach is commonly used in sustainability disclosure research (García-Sánchez *et al.*, 2019; Orazalin and Mahmood, 2021; Zampone *et al.*, 2024). Three models with panel data were proposed to test the aforementioned hypotheses.

$$\begin{aligned} \text{SDG_Disclosure} = & \beta_1 \text{ESG_Combined_Score} + \beta_2 \text{Size} + \beta_3 \text{SIZE} + \beta_4 \text{ENV_SENSITIVE} \\ & + \beta_5 \text{Market_Cap} + \beta_6 \text{Leverage} + \beta_7 \text{Assets_Turnover} + \beta_8 \text{FTSE_MIB} \\ & + \varepsilon \end{aligned} \quad (\text{Model 1})$$

$$\begin{aligned} \text{ROE} = & \beta_1 \text{ESG_Combined_Score} + \beta_2 \text{Size} + \beta_3 \text{SIZE} + \beta_4 \text{ENV_SENSITIVE} \\ & + \beta_5 \text{Market_Cap} + \beta_6 \text{Leverage} + \beta_7 \text{Assets_Turnover} + \beta_8 \text{FTSE_MIB} + \varepsilon \end{aligned} \quad (\text{Model 2})$$

$$\begin{aligned} \text{ROE} = & \beta_1 \text{SDG_Disclosure} + \beta_2 \text{Size} + \beta_3 \text{SIZE} + \beta_4 \text{ENV_SENSITIVE} + \beta_5 \text{Market_Cap} \\ & + \beta_6 \text{Leverage} + \beta_7 \text{Assets_Turnover} + \beta_8 \text{FTSE_MIB} + \varepsilon \end{aligned} \quad (\text{Model 3})$$

$$\begin{aligned} \text{ROE} = & \beta_1 \text{SDG_Disclosure} + \beta_2 \text{ESG_Combined_Score} + \beta_3 \text{Size} + \beta_4 \text{SIZE} \\ & + \beta_5 \text{ENV_SENSITIVE} + \beta_6 \text{Market_Cap} + \beta_7 \text{Leverage} + \beta_8 \text{Assets_Turnover} \\ & + \beta_9 \text{FTSE_MIB} + \varepsilon \end{aligned} \quad (\text{Model 4})$$

Table 1 presents the variables adopted in the analysis.

The linear models are based on panel data. Thus, Hausman test statistics for each panel data regression enabled us to rely on either the fixed-effects or the random-effects results (Hausman and Taylor, 1981). Results of the Hausman test suggest the adoption of the random effects model.

Furthermore, the Sobel test is used to determine the significance of a mediating effect (Sobel, 1982). In mediation analysis, it is proposed that the relationship between the independent variable and the dependent variable is indirect, occurring through the influence of a third variable, known as the mediator. Consequently, when the mediator is included in a regression model alongside the independent variable, the impact of the independent variable diminishes while the effect of the mediator remains significant. The Sobel test assesses whether the decrease in the independent variable's effect, following the inclusion of the mediator, is significant, thereby confirming the statistical significance of the mediation effect.

According to the literature, we performed the following tests to verify the robustness of each model. First, the Breusch and Pagan Lagrangian multiplier test has been conducted to check the appropriateness of the adoption of the random effects and the presence of heteroscedasticity (Halunga *et al.*, 2017). Results confirmed the absence of heteroscedasticity (Wooldridge, 2015). Second, the variance inflation factor (VIF) has been conducted with the ordinary least squares to check the presence of multicollinearity (Daoud, 2017). As all the VIF factors are well below 10 (the highest VIF is 2.08), we can conclude that there is no multicollinearity.

Table 1 Variable definition and measurement

Variable acronym	Variable definition	Variable measurement
ROE	Return on equity	ROE is added to control the company's financial performance. It is one year lagged compared to the fiscal year of the nonfinancial disclosure analyzed Source: LSEG
SDG_Disclosure	SDGs disclosure	Consistent with previous studies (Hamad <i>et al.</i> , 2023; Zampone et al., 2024), the extent to which a company is reporting information related to its contribution toward the SDGs is captured by the variable SDG_Disclosure. SDG_Disclosure is calculated by computing the average score based on the number of SDGs a company is reporting out of the total 17 SDGs, as outlined below: $\text{SDG_Disclosure} = (\text{Number of SDGs disclosed by firm}) / (\text{Total of 17 SDGs})$ Each company receives a score of "1" for each SDG it reports in its report; otherwise, it receives a score of "0". Consequently, the lowest possible score for a company is 0 points (if it does not support any of the 17 SDGs), while the highest attainable score is 17 points (representing full reporting for all SDGs). Thus, the SDG_Disclosure ranges from 0% to 100% (Izzo <i>et al.</i> , 2020)
ESG_Combined_Score	ESG combined score	Consistent with previous research (Beretta et al., 2019 ; Buallay <i>et al.</i> , 2020; Beretta et al., 2023), the ESG Performance is captured by the ESG Combined Score, measured as a continuous variable as provided in the LSEG Database (known previously as Refinitiv, Thomson Reuters, 2018) Source: LSEG
Size	Size	The logarithm of the balance sheet total assets is used as a proxy for firm size Source: LSEG
ENV_SENSITIVE	Environmental sensitive industry	The extant literature also suggests that firms' ESG performance varies across different sectors of operation (Lourenço and Branco, 2013; Garcia <i>et al.</i> , 2017; Izzo <i>et al.</i> , 2020; Curtó-Pagès <i>et al.</i> , 2021; Calvo-Centeno <i>et al.</i> , 2022; Datta and Goyal, 2022; Low et al., 2023). Thus, the ENV_SENS_IND variable distinguishes between companies operating in environmentally sensitive industries (oil and gas, basic materials, industrials or utilities) and nonenvironmentally sensitive industries
Market_Cap	Market capitalization	The variable represents a market indicator of the value of shares and the value of companies in general (Toramane <i>et al.</i> , 2009; Dias 2013) Source: Orbis
Leverage	Firm leverage	The variable is measured by total debt to total assets of the firm (i), in the period (t) (Alareeni and Hamdan, 2020) Source: Orbis
Assets_Turnover	Assets turnover	The variable is measured by net sales as a percentage of total assets (Alareeni and Hamdan, 2020) Source: Orbis
FTSE_MIB	FTSE MIB	Dummy variable equal to 1 if the company is listed in the FTSE MIB Index, 0 otherwise

Source: Authors' own work

5. Results

[Table 2](#) provides information on the number of observations, mean, standard deviation and minimum and maximum values of the variables included in the statistical analysis.

[Table 3](#) presents the correlation matrix for the research variables.

The regression results are presented in [Table 4](#).

Regarding the performance of the models with respect to the coefficients, the results reveal:

- a statistically significant relationship between ESG_Combined_Score and SDG_Disclosure, thus supporting "*H1*";
- no statistically significant relationship between ESG_Combined_Score and ROE, thus rejecting "*H2*";
- a statistically significant relationship between SDG_Disclosure and ROE, thus supporting "*H3*"; and

Table 2 Descriptive statistics

Variable	Obs	Mean	SD	Min	Max
ROE	178	9.7824	21.3935	-151.8600	77.4200
SDG_Disclosure	180	0.4788	0.3156	0.0000	1.0000
ESG_Combined_Score	180	62.3368	12.2736	27.8363	92.3198
Size	180	9.4733	0.6433	8.4298	11.3417
ENV_SENSITIVE	180	0.5778	0.4953	0.0000	1.0000
Market_Cap	180	0.0000	1.0000	-0.1943	6.3123
Leverage	174	0.0001	0.0001	0.0000	0.0005
Assets_Turnover	176	0.0008	0.0005	0.0001	0.0037
FTSE_MIB	180	0.3111	0.4642	0.0000	1.0000

Source: Authors' own work

- finally, a statistically significant relationship between SDG_Disclosure and ROE in Model 4.

In addition, *H4* has been investigated using the Sobel test.

According to the findings of the Sobel test in [Table 5](#), the indirect effect of SDGD on ROE is statistically significant ($Z = 1.912$, p -value = 0.056). This demonstrates that SDGD significantly mediates the relationship between sustainability performance and ROE ([Khurram et al., 2024](#)), thus supporting “*H4*”. Furthermore, the coefficients for Paths A and B do not point in the same direction, indicating that the negative effect of sustainability performance on ROE is reduced partially by the positive mediation effect provided by SDGD, which can also reduce and make weaker the relationship between sustainability performance and ROE. In addition, the Aroian and Goodman tests confirm the significant indirect effect.

Furthermore, results with respect to the control variables also yield interesting insights. First, there is a positive, statistically significant relationship between the size of the company and the SDGD, and a negative relationship with ROE. Thus, the results show that larger firms provide a higher amount of SDGD while experiencing lower financial performance. Second, the results are industry-invariant. Third, financial performance is positively impacted by higher market capitalization and by the company being listed in the FTSE MIB. Finally, a positive, statistically significant relationship is observed between asset turnover and the level of SDGD.

6. Discussion

This study answers the following research question “What is the role of SDG Disclosure in the relationship between sustainability and financial performance?” In doing so, it analyzes the relationship between sustainability performance and the level of SDGD; the relationship between sustainability performance and financial performance and the link between the level of SDGD and financial performance.

First, the results of this study are in line with the stream of literature according to which there is a positive relationship between sustainability performance and the level of SDGD in various contexts ([Li et al., 2023](#); [Luo and Tang, 2014](#); [Nicolo' et al., 2024](#)). This study extends these findings by demonstrating that the positive relationship between sustainability performance and sustainability disclosure is not limited to voluntary contexts. Even when disclosure is mandated, firms with higher sustainability performance continue to provide more comprehensive SDG-related information, reinforcing the importance of regulatory frameworks in promoting transparency and accountability in corporate sustainability practices. Furthermore, the positive relationship between sustainability performance and sustainability disclosure holds true even for firms adopting SDGD ([Nicolo' et al., 2024](#)). Therefore, results provide support for the need of having a continuous update of sustainability reporting regulations to ensure that all firms, regardless of their inherent sustainability performance, provide detailed and accurate information on their sustainability initiatives to a broad set of stakeholders' categories.

Table 3 Correlation matrix

Variables	ROE	SDG_Disclosure	ESG_Combined_Score	Size	ENV_SENSITIVE	Market_Cap	Leverage	Assets_Turnover	FTSE_MIB
ROE	1.0000								
SDG_Disclosure	0.1216	1.0000							
p-value	0.4900								
ESG_Combined_Score	-0.0437	0.2232**	1.0000						
p-value	0.5628	0.0026							
Size	-0.1744**	0.3781***	0.2339***	1.0000					
p-value	0.0199	0.0000	0.0016						
ENV_SENSITIVE	-0.0346	0.1756**	-0.0708	0.2427***	1.0000				
p-value	0.6464	0.0184	0.3452	0.0010					
Market_Cap	-0.4024***	0.0044	-0.0793	0.1488**	0.1665**	1.0000			
p-value	0.0000	0.9531	0.2900	0.0461	0.0255				
Leverage	0.0659	-0.0327	-0.1636**	-0.1788**	0.1130	0.1028	1.0000		
p-value	0.3904	0.6684	0.0310	0.0182	0.1377	0.1773			
Assets_Turnover	-0.0279	0.0142	-0.2300***	-0.1319*	0.0145	0.1848**	0.3743***	1.0000	
p-value	0.7149	0.8520	0.0021	0.0809	0.8487	0.0141	0.0000		
FTSE_MIB	-0.0171	0.1597**	0.1692**	0.6418***	0.0885	0.1823**	-0.2514***	-0.2325***	1.0000
p-value	0.8208	0.0322	0.0231	0.0000	0.2372	0.0143	0.0008	0.0019	

Notes: ***, ** indicate a significance degree between 0.10 and 0.05, 0.05 and 0.01, and 0.01 and 0, respectively

Source: Author's own work

Table 4 Empirical results of the statistical models

Statistical model	Model 1 SDG_Disclosure	Model 2 ROE	Model 3 ROE	Model 4 ROE
<i>SDG_Disclosure</i>			15.9323***	16.9254***
Std. err.			5.0352	5.2045
p-values			0.0020	0.0010
<i>ESG_Combined_Score</i>	0.0072***	0.0031		-0.1099
Std. err.	0.0021	0.1439		0.1457
p-values	0.0010	0.9830		0.4510
<i>Size</i>	0.1678***	-6.9969*	-9.9676**	-9.6364**
Std. err.	0.0616	4.0699	4.1070	4.1461
p-values	0.0060	0.0860	0.0150	0.0200
<i>ENV_SENSITIVE</i>	0.0847	1.9853	0.9313	0.4834
Std. err.	0.0606	4.0264	3.9658	4.0241
p-values	0.1620	0.6220	0.8140	0.9040
<i>Market_Cap</i>	0.0000	0.000***	0.000***	0.000***
Std. err.	0.0000	0.0000	0.0000	0.0000
p-values	0.4440	0.0000	0.0000	0.0000
<i>Leverage</i>	62.7918	37,349.6900	37,590.1900	37,007.7700
Std. err.	353.7792	24,130.9200	23,587.0400	23,664.6700
p-values	0.8590	0.1220	0.1110	0.1180
<i>Assets_Turnover</i>	116,1813*	-541.2935	-1,381.2690	-2126.8440
Std. err.	66.4075	5,050.5160	4,917.5250	5,026.7560
p-values	0.0800	0.9150	0.7790	0.6720
<i>FTSE_MIB</i>	-0.0110	9.8453*	9.8505*	9.8122*
Std. err.	0.0815	5.4416	5.3667	5.3884
p-values	0.8930	0.0700	0.0660	0.0690
<i>_cons</i>	-1.6939***	70.7770*	92.6062**	96.7682**
Std. err.	0.5628	37.3641	37.5729	38.2074
p-values	0.0030	0.0580	0.0140	0.0110
<i>R-sq:</i>				
Within	0.1514	0.0037	0.0722	0.0740
Between	0.2611	0.3982	0.3989	0.4040
Overall	0.1882	0.2145	0.2495	0.2530
p-value Wald chi ²	0.0000	0.0007	0.0000	0.0000

Notes: N. of obs = 172; N. of groups = 44; *, **, *** indicate a significance degree between 0.10 and 0.05; 0.05 and 0.01, and 0.01 and 0, respectively

Source: Author's own work

Table 5 Results of the Sobel test

Variable	Est	Std_err	Z score	p-value
Sobel	0.073	0.038	1.912	0.056
Aroian	0.073	0.039	1.852	0.064
Sobel	0.073	0.037	1.979	0.048
a_coefficient	0.005	0.002	2.499	0.012
b_coefficient	15.258	5.138	2.970	0.003
Indirect_effect_aXb	0.073	0.038	1.912	0.056
Direct_effect_c'	-0.120	0.128	-0.936	0.349
Total_effect_c	-0.047	0.129	-0.365	0.715

Source: Authors' own work

Second, the results of this study align with the literature which supports the positive relationship between the level of SDGD and financial performance (Pasquini-Descomps and Sahut, 2013; Tarmuji *et al.*, 2016; Alareeni and Hamdan, 2020). Consistent with previous research, findings from this study confirm the existence of positive relations

between SDGD and financial performance measured by ROE, even in a mandatory setting. This result suggests that firms engaging in comprehensive SDGD not only fulfill regulatory requirements but also potentially enhance their financial performance. This provides supports for the ability of transparency and accountability in sustainability practices to lead to better financial outcomes, thus encouraging firms to adopt more rigorous reporting standards related to SDGs (Al Lawati and Hussainey, 2022; Awuah *et al.*, 2023).

Third, the results demonstrates that the level of SDGD partially mediates the relationship between sustainability performance and financial performance measured by ROE (Khurram *et al.*, 2024), thus enriching the existing literature which examines SDGD as a mediating variable in various types of relationships (Wagner and Schaltegger, 2004; Alodat *et al.*, 2023a; Faisal *et al.*, 2023). Specifically, findings from this study show that sustainability performance does not have a direct influence on financial performance, whereas this relationship is strengthened through the level of SDGD. This partially mediation effect suggests that companies with strong sustainability performance can leverage their SDGD to achieve better financial outcomes. By disclosing their sustainability efforts more transparently and comprehensively, firms are able to enhance their credibility and trustworthiness among stakeholders, which in turn positively affects their financial performance (Wang and Tuttle, 2014). Furthermore, this partial mediating role of SDGD underscores the importance of accurate and detailed sustainability reporting. It highlights that, beyond merely engaging in sustainable practices, their communication choices are crucial. This is also reflected in the need from companies to have disclosure policies able to show their ability to generate value (Raimo *et al.*, 2020). At this purpose, effective SDGD serves as a signal to investors and other stakeholders about the firm's commitment to sustainability, which can lead to increased investor confidence and potentially better financial performance (García-Meca and Martínez-Ferrero, 2021).

These findings contribute to a deeper understanding of how SDGD function within the broader nexus of sustainability performance and financial outcomes. Findings from this study provide empirical support for the argument that SDGD are not just a regulatory compliance tool but also a strategic asset that can enhance a firm's financial performance (Al Lawati and Hussainey, 2022; Hussainey *et al.*, 2022).

7. Conclusion

7.1 Implications

Theoretical and practical implications can be derived from this study.

First, concerning the theoretical implications, this study enriches extant literature on the role of SDGD in bridging sustainability performance and financial performance. It extends previous knowledge on providing insights on the role of reporting frameworks (i.e. SDGs) in ensuring consistent and comprehensive sustainability reporting. This theoretical implication underscores the need for ongoing development and enforcement of such regulations to maintain high standards in sustainability reporting. Furthermore, it contributes to the theoretical understanding of SDGD as a mediating variable. It demonstrates that the level of SDGD partially mediates the relationship between sustainability performance and financial performance. In particular, results of this study provide evidence on the benefits of sustainability practices on financial outcomes be significantly enhanced through effective SDGD.

Second, concerning the practical implications, results of this study emphasizes the practical benefits of comprehensive SDGD. Indeed, in line with previous research, companies with strong sustainability performance are encouraged to maintain detailed and transparent reporting, which, in turn, could also potentially enhance financial performance. Furthermore, the positive relationship between SDGD and financial performance suggests that companies can perceive SDGD as a strategic, rather than a merely compliance tool. Thus, results of this study suggest that the effective adoption of SDGD can enhance firm's

credibility and trustworthiness among different categories of stakeholders. Thus, preparers should ensure that the company's sustainability efforts are clearly and accurately conveyed to investors and other stakeholders by means of SDGD. Finally, companies are encouraged to adopt a broader perspective on value creation that goes beyond the merely financial performance but which includes also societal and environmental value. By integrating SDGD in their sustainability disclosure, firms can drive toward a more sustainable business, which is also reflected in better financial performance.

7.2 Limitations directions for further research

In line with previous empirical research, this study is not without limitations, which opens avenues for future research. First, this study analyzes all SDGs at the same time. However, different companies may behave differently in different ESG areas. Therefore, future research could further investigate this relationship separately for each ESG pillar and related SDGs in that specific area (Khaled *et al.*, 2021). Furthermore, even though this study collects data from different years, it lacks an investigation on the long term. Therefore, future research could analyze the effect of implementing SDG strategies eventually by considering a longer period. Finally, this study investigate the relationship between sustainability and only financial performance. However, future research could be conducted to investigate other types of performance, such as the operational and market ones (Alareeni and Hamdan, 2020).

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Further reading

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