


## RESEARCH ARTICLE OPEN ACCESS

# Does Sustainable Performance Matter for Nonfinancial Disclosure Readability? A Fog Index Analysis on Italian-Listed Companies

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## ABSTRACT

This study aims to shed light on how corporate sustainable performance can influence the degree of nonfinancial disclosure (NFD) readability, determining which pillar of environmental, social and governance (ESG) performance has the most significant impact. To address these research questions, the study was conducted on a sample of Italian companies listed between 2017 and 2022, following the introduction of Directive 2014/95/EU. Using a panel regression, we aimed to examine the presence of a correlation between ESG performance and the readability of the reports (measured by the Gunning Fog index) employed by companies to disclose nonfinancial information. We successively conducted several robustness tests and verified the absence of multicollinearity and endogeneity. The results show that there is a positive and significant relationship between environmental performance and NFD readability, suggesting that companies with better environmental performance tend to make their disclosures more understandable and transparent. This result supports the signalling theory, according to which companies with good sustainability results try to distinguish themselves from others through clear and readable information. In contrast, no significant relationships are found for the social and governance dimensions, indicating that these variables may be less relevant in determining NFD readability. Practical implications highlight the importance of promoting accountability and transparency in sustainability reporting. Regulators, on the other hand, could use these findings to refine existing regulations and introduce more stringent standards in terms of transparency and readability, to reduce the risk of greenwashing and improve the overall quality of information provided to stakeholders.

## 1 | Introduction

In recent years, there has been a growing interest in corporate nonfinancial disclosure (nonfinancial statement or NFD), particularly concerning environmental, social and governance (ESG) pillars, especially because NFD is pivotal for stakeholders seeking to evaluate a company's sustainability performance

(Jackson et al. 2020; García-Sánchez and García-Sánchez 2020; Nicolò and Andrades-Peña 2024).

Although scholars widely regarded the European context as a key area for sustainability research (Zahid et al. 2023), Italy was selected for this study because it was the first of the four major EU countries (France, Germany, Italy and Spain) to

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implement Directive 2014/95/EU through Legislative Decree 254/2016. Furthermore, Italy exhibits a corporate social responsibility (CSR) reporting rate that exceeds the global average (KPMG 2020), and previous studies highlighted a significant reporting gap among Italian firms, as they have been generally reluctant to voluntarily disclose social and environmental information (Costa and Agostini 2016; Doni et al. 2020). As a result, Italy had limited experience in this area and, with the implementation of the nonfinancial reporting directive, took the opportunity to advance reporting on ESG aspects. Some scholars examined the quality of NFD in the context of Directive 2014/95/EU, with a particular focus on Italian companies as mandated by Legislative Decree 254/2016, finding that the shift from voluntary to mandatory reporting has not led to an improvement in the quality of NFD, particularly for 25% of firms that continue to publish additional sustainability reports and/or plans (Carungu et al. 2021). In a similar vein, Doni et al. 2020 analysed whether the amount and quality of nonfinancial information voluntarily disclosed in the years preceding the directive were associated with the level of compliance and found that prior experience and expertise in nonfinancial reporting played a significant role, particularly with regard to the inclusion of a business model. However, the authors concluded that additional efforts are needed to enhance the overall quality of nonfinancial reports (Doni et al. 2020). Other studies in the Italian context explored the value relevance of nonfinancial information in a mandatory setting (Cordazzo et al. 2020) and examined how Directive 2014/95/EU has affected both the quantity and the quality of NFD and the relation between NFD and corporate financial performance (Agostini et al. 2022).

Within this framework, manipulation or distortion of corporate disclosure poses a significant challenge to the credibility and reliability of NFD (Laufer 2003), and this takes on even greater value given that companies can also use sustainability reporting as a useful tool to legitimize their work (Nicolò and Andrades-Pena 2024). Addressing this issue requires concerted efforts by companies, regulators, investors and other stakeholders to promote transparency, accountability and integrity in NFD and in general in sustainability reporting which encompasses all the various frameworks employed worldwide (Kurpierz and Smith 2020). An example of these efforts is recognizable in the Commission Delegated Regulation (EU) 2023/2772 (31 July), which aims to reduce the manipulation of NFD and the consequent distortion of the messages addressed to the stakeholders; according to the literature, this manipulation is one of the key factors of greenwashing, as it is intended as an attempt to mislead stakeholders by ‘manipulating information disclosure’ (Lyon and Maxwell 2011).

Several studies also emphasize the importance of readability as a critical aspect of disclosure quality. In this regard, the relationship between ESG performance and the quality and quantity of nonfinancial information in voluntary and mandatory settings can be analysed from two theoretical perspectives, the signalling theory and the legitimacy theory (Hamza and Jarboui 2024; Lu and Wang 2021; Druz et al. 2020; Hummel et al. 2019, Arena et al. 2015). From the economic-based perspective, aligned with the signalling theory, there is a positive relationship between ESG performance and CSR disclosure. Indeed, this perspective suggests that increased disclosure reduces information asymmetry between managers and stakeholders, enhancing

transparency (Hamza and Jarboui 2024). Additionally, aside from legitimacy considerations, managers often view their reporting strategy as a reflection of a company's ESG performance (Rajesh and Rajendran 2020). Conversely, the socio-political perspective, rooted in legitimacy theory, views disclosure as a tool to demonstrate that companies meet societal expectations and predicts a negative relationship between ESG performance and CSR disclosure. Therefore, managers may use disclosure strategically to cover negative news and present their activities as legitimate when performance is weak. Legitimacy theory emphasizes that sustainability disclosure is primarily employed for impression management, helping firms navigate social and political pressures and reduce external scrutiny (Lu and Wang 2021). In this regard, the findings produce mixed and controversial results; hence, no unanimous consensus exists on which theoretical perspective accurately depicts the link between sustainable performance and the extent and quality of NFD (Calabrese et al. 2020; Melloni et al. 2017; Beretta et al. 2019; Meng et al. 2014). Furthermore, despite originating from different ontological and epistemological viewpoints, both the signalling and legitimacy perspectives suggest that managers of poorly performing companies tend to use less-readable narrative disclosures to obscure their true performance (Nazari et al. 2017). Indeed, some scholars suggest that the signalling and legitimacy theories can be reconciled by distinguishing between high-quality and low-quality disclosures (Hummel et al. 2019; Ben-Amar et al. 2022). High-quality disclosure allows firms to signal their superior performance, helping them stand out from others (Lu and Wang 2021), whereas firms with low-quality disclosure seem to demonstrate a negative relationship between ESG performance and disclosure, suggesting that companies providing more extensive information tend to exhibit poorer performance (Cho et al. 2012).

This ongoing debate and mixed results underline the need for further research to investigate the role of readability in the ESG disclosure context. Based on the previous considerations, this research is grounded on both legitimacy theory (Hopwood 2009; Hooghiemstra 2000; Merkl-Davies and Brennan 2007) and signalling theory (Connelly et al. 2011) and adds to the literature on ESG disclosure by providing an empirical analysis in a mandatory context, focusing the attention on the relationship between corporate sustainable performance and NFD readability.

Therefore, this study answers the following research questions: ‘Does the sustainable performance measured through ESG pillars affect the degree of NFD readability in a mandatory setting?’ ‘Which pillar of ESG performance has the most significant impact on NFD readability?’ To answer these research questions, the analysis was carried out on a sample of Italian companies listed between 2017 and 2022, after Directive 2014/95/EU. First, the Gunning Fog index as a proxy of the degree of readability was calculated on corporate NFD, and second, a panel regression model was carried out.

To the best of our knowledge, because only a few studies analysed the Italian NFD after the provision of mandatory requirements (Caputo et al. 2019; Cordazzo et al. 2020; Doni et al. 2020; Mazzotta et al. 2020; Beretta et al. 2023; Agostini et al. 2022), there is a gap in the literature regarding this topic. Moreover, prior studies have highlighted a need for literature

examining the influence of the individual ‘E’, ‘S’ and ‘G’ pillars of ESG performance on the quality of NFD (Beretta et al. 2020); the three ESG pillars thus deserve further and separate investigation. Indeed, some scholars considered the environmental pillar as the most prevalent type of ESG disclosure manipulation, particularly concerning environmental initiatives and practices (Sterbenk et al. 2022). This trend has notably surged recently, primarily due to growing climate change concerns (Mateo-Márquez et al. 2022). Moreover, as an emerging field within corporate social responsibility washing, additional research is focusing on gender equality and ‘femvertisements’, investigating whether companies awarded for promoting gender equality, also support initiatives for this cause and for women (Sterbenk et al. 2022). Scholars have highlighted that research on CSR washing related to social issues, such as support for LGBTQ+ communities (rainbow washing) and addressing racial inequities, is scarce, and they call for more research in this field, extending beyond environmental contexts (Sobande 2019). Regarding the corporate governance dimension, scholars argue that the influence of board size on corporate disclosure manipulation remains uncertain, and they advocate for further research in this area (Ghitti et al. 2023).

The practical implications of our research can contribute to fostering a more sustainable and responsible business environment by promoting integrity, accountability and trust among stakeholders. Insights from this study can inform policymakers and regulatory bodies about the effectiveness of existing regulations, such as Directive 2014/95/EU, in countering NFD manipulation practices; this could lead to revisions or updates of regulatory frameworks to address the issue more effectively and more targeted. Furthermore, a clearer understanding of the relationship between sustainable performance and NFD readability can enhance investor trust in those companies that demonstrate a genuine commitment to ESG factors; this may also lead to increased investments in sustainable activities (Folqué et al. 2021).

The remainder of this paper is organized as follows: Section 2 discusses the literature review on greenwashing and disclosure readability and develops the research hypotheses; Section 3 presents the research methodology, sample selection and data collection; Section 4 discusses empirical results; Sections 5 and 6 discuss theoretical and practical implications, limitations and future research avenues.

## 2 | Literature Review and Research Development

### 2.1 | Greenwashing

Greenwashing poses a significant challenge to the credibility and reliability of nonfinancial disclosures (Laufer 2003). Addressing this issue demands collaborative efforts from companies, regulators, investors and other stakeholders to enhance transparency, accountability and integrity in sustainability reporting (Kurpierz and Smith 2020).

Concerns about greenwashing in accountability have intensified over the past decades, and there is growing scepticism regarding the authenticity and credibility of NFD (Laufer 2003). Indeed, the term ‘greenwashing’, coined by New York environmental

activist Jay Westervelt in 1986 (Ruiz-Blanco et al. 2022), has gained prominence in recent years as a critical concept in environmental academic debate (Yang et al. 2020). Greenwashing encompasses various definitions across academic literature. Among the several definitions, Lyon and Maxwell (2011) defined greenwashing as the corporate behaviour through which the firm discloses favourable information concerning social or environmental initiatives, while omitting any negative aspects, aiming to create an excessively positive corporate image (Lyon and Maxwell 2011); Delmas and Burbano (2011, 65) defined greenwashing as ‘poor environmental performance and positive communication about environmental performance’, whereas Bowen and Aragon-Correa (2014, 3) defined greenwashing as ‘a specific subset of symbolic corporate environmentalism in which the changes are both “merely symbolic” and deliberately so’. Firms have two reasons for carrying out greenwashing practices; the first is to achieve legitimacy, as proposed by institutional theory (Oliver 1991). The second, according to the signalling theory (Connelly et al. 2011), involves projecting adherence to green standards effectively signalling to external stakeholders the firm’s commitment to environmental issues (Ramus and Montiel 2005). The effects of greenwashing on stakeholders are twofold; they can be both positive and negative depending on the type of stakeholder involved. Indeed, existing stakeholders may perceive greenwashing positively due to potential additional profits, as suggested by Solomon et al. (2013). However, in this case, from a societal perspective, greenwashing can have negative consequences, leading to a deadweight loss in welfare economics. On the other hand, potential stakeholders, such as investors interested in supporting genuine environmentally friendly products and CSR initiatives, may be deterred by greenwashing. This can result in a loss of trust between green brands and stakeholders, as noted by Guo et al. (2018).

Within this field, some authors carried out textual analysis and word frequency analysis on a sample of ESG reports to measure the risk of greenwashing; in this regard, B. W. Lee and Lee (2023) found a negative relationship between ESG performance and greenwashing, suggesting that companies with lower ESG scores are more inclined to engage in greenwashing compared to those with higher ESG scores. They argue that firms with low ESG scores are facing growing pressure to demonstrate their performance regarding their ESG practices, whereas companies with high ESG scores perform well across ESG dimensions. Consequently, the latter do not feel the need to deceive stakeholders or counter scepticism about their ESG performance in communications, thereby reducing the likelihood of greenwashing. In contrast, firms with low ESG scores may resort to greenwashing to compensate for their deficiencies (B. W. Lee and Lee 2023). Zhang et al. (2023) analysed the relationship between environmental performance and greenwashing in China, finding a negative correlation between them, thus supporting the signalling theory. Torelli et al. (2020) found that different degrees of greenwashing have different impacts on stakeholders’ perceptions of corporate environmental responsibility and on their responses to environmental controversies. Finally, some authors linked corporate greenwashing with ESG disclosure readability, finding an inverse relationship between greenwashing and readability, indicating that companies with more readable ESG reports are less likely to engage in greenwashing (Hu et al. 2024).

## 2.2 | Literature Review on Readability in Financial and Nonfinancial Disclosure

The readability of disclosure has been deeply examined in accounting research, both in financial and in nonfinancial disclosure (Pombinho et al. 2023). Readability refers to the syntactic complexity of a document (Clatworthy and Jones 2001) and the readability of accounting reports is related to how well the reader's ability matches the complexity of the text being read (Nilipour et al. 2020). Therefore, readability indexes calculate the estimated difficulty of a text by analysing the frequency of specific language elements within the document (Madasu 2020).

Regarding the readability in financial disclosure, Li (2008) found that the financial statements of firms with lower earnings have a lower level of readability, whereas companies with more persistent positive earnings have financial reports easier to read. Similarly, other researchers have documented lower abnormal trading volume around the release of less readable 10-Ks or analyst reports (Miller 2010; De Franco et al. 2015) and identified a relationship between the readability of annual financial reports and the efficiency of information as well as stock liquidity (Aldoseri and Melegy 2023). An empirical study by Ben-Amar and Belgacem (2018) examines whether CSR-oriented firms fulfill the stakeholders' demand for higher readable financial disclosure, finding that these companies provide complex and difficult-to-read disclosure. The relationship between financial performance and readability has been investigated by several other studies, most of them suggesting that readability is higher when companies have good performance (Courtis 1998, 2004; Smith and Taffler 1992; Smith et al. 2006; Abu Bakar and Ameer 2011). Moreover, some scholars assess whether the changes to the International Accounting Standard (IAS) 39 and the introduction of the International Financial Reporting Standard (IFRS) 9 improved the readability, quality and usefulness of risk disclosure information and they found that risk disclosures for companies listed on the Johannesburg Stock Exchange (JSE) remain complex and challenging to comprehend (Toerien and Du Toit 2024). Maroun and Ecim (2024) investigated biodiversity reporting by companies listed in the United Kingdom and analysed the scope of reporting, the content of the information and the readability of these disclosures to offer a comprehensive view of how companies incorporate biodiversity into their practices.

Recent studies questioned whether sustainable information is disclosed in a readable way (Pombinho et al. 2023) and examined the disclosure readability concerning ESG information, which is much more based on qualitative and textual descriptions, compared with financial disclosure (Du and Yu 2021; Uddin and Chakraborty 2022; Zhang et al. 2021), and thus more suitable for textual analysis focused on content and readability. Indeed, sustainability reports need to be easily readable to enhance communication effectiveness, ensuring that users can comprehend the meaning behind the accounting narratives (Al-Shaer et al. 2022). Investors may rely more on CSR performance information in their trading decisions if CSR reports are more readable and contain transparent information. Based on these considerations, Du and Yu (2021) found that CSR disclosure reduces information asymmetry between firms and investors,

especially for companies with lower analyst following and higher financial opacity. They observed a significant market reaction to CSR report readability, suggesting that firms with superior CSR performance can maximize the benefits of CSR disclosure by improving the readability of CSR reports (Du and Yu 2021).

Within this framework, some scholars examined the readability of sustainability reporting in the annual and stand-alone reports of New Zealand-listed companies over a decade, finding a modest 6.5% improvement in readability over 10 years, despite increased reporting volume and a negative correlation between report length and readability, with longer reports being harder to read. Furthermore, the authors found that companies in environmentally sensitive industries provided more readable sustainability reports than those in less sensitive sectors (Nilipour et al. 2020). Others found that CSR reports often lack reliability, and companies may use these reports to influence or manipulate users' perceptions (Gosselin and Berthelot 2023).

However, the studies on the readability of ESG disclosure have increased not only due to the descriptive nature of NFD but also for other reasons: first, because of the important role played by ESG disclosure in the capital market, as it provides information on company's policies, statements and performance about the ESG pillars (Dhaliwal et al. 2011; Du et al. 2017); second, because of the ESG scepticism fostered by the rise of greenwashing (Hu et al. 2024), which has deepened the attention on the ESG information content; third, because the ESG disclosure quality is fundamental for companies to benefit from their ESG practices (Wen et al. 2022; Rezaee and Tuo 2019); fourth, because high-quality ESG disclosures can strengthen the positive relationship between a company's innate earnings quality and the quantity of ESG disclosures while also mitigating the negative relationship between discretionary earnings quality and the quantity of ESG disclosures (Rezaee and Tuo 2019); and fifth, because most of the sustainability disclosures are not externally audited, and the disclosed information is provided voluntarily, allowing managers to manipulate it more easily (Merkl-Davies and Brennan 2007).

## 2.3 | The Development of the Research Hypotheses

This research exploits a broader theoretical approach to explore the connection between ESG performance and NFD disclosure. Indeed, the study is drawn on signalling theory and legitimacy theory, which suggest the occurrence of greenwashing behaviors (Clarkson et al. 2008; Hummel et al. 2019; Li et al. 2023). These theories emphasize voluntary disclosure practices and operate on the premise that disclosure incurs costs, with stakeholders penalizing 'bad' corporate citizens and rewarding 'good' ones (Mahoney et al. 2013). However, they produce conflicting predictions due to companies' varying motivations for providing voluntary NFD.

In Section 2.3.1, it is explained that the domain in which signalling theory prevails is the positive relationship between ESG performance and NFD readability; this relationship can be

observed in both companies with good ESG performance, which aim to signal information to stakeholders (e.g., Hummel et al. 2019), and in companies with poor ESG performance, which seek to avoid negative reactions from stakeholders (Li et al. 2023; Nazari et al. 2017). As discussed in the section below, the literature provides various examples of a positive relationship in both aforementioned cases, although examples of the application of signalling theory to companies with positive ESG performance are more prevalent (Wang et al. 2018).

On the other side, the domain in which legitimacy theory prevails is the negative relationship between ESG performance and NFD readability (e.g., Milne and Patten 2002). This relationship is generally observed in companies with poor ESG performance, which consequently attempt to manipulate information to appear in a better situation than they actually are (Nicolò, Zamponi, et al. 2024). The literature provides several examples of a negative relationship, as explained in Section 2.3.2.

### 2.3.1 | The Positive Relationship Between ESG Performance and NFD Readability Through the Lenses of the Signalling Theory

The signalling theory suggests that providing information helps reduce the information asymmetry between corporate insiders and external stakeholders (Verrecchia 1983; Spence 1973); this theory thus implies a positive relationship between ESG performance and CSR disclosures as supported by several studies (e.g., Lu and Wang 2021; Clarkson et al. 2008; Cho et al. 2012; Mahoney et al. 2013; Papoutsis and Sodhi 2020). Indeed, according to signalling theory, it would be expected that when a company demonstrates strong sustainability performance, there will be a greater alignment between voluntary ESG disclosure and its performance (Li et al. 2023; Uyar et al. 2020); so higher levels of ESG disclosure will serve as a signal to investors and stakeholders, indicating that the company is genuinely fulfilling its sustainability commitment (Nicolò, Zamponi, et al. 2024).

On the other hand, companies with weaker sustainability performance may be reluctant to provide voluntary sustainability disclosures, to prevent potential negative impacts on their reputation, market performance or possible stakeholder boycotts (Mahoney et al. 2013; Li et al. 2023).

In line with this view, a recent study found a positive relationship between Sustainable Development Goals (SDG) disclosure in the Communication on Progress (CoP) and corporate sustainability performance (Nicolò, Zamponi, et al. 2024). This positive relationship implies that the SDG information provided in the CoPs more accurately reflects the sustainability initiatives implemented by companies, reducing the risk of greenwashing (Nicolò, Zamponi, et al. 2024). Furthermore, Uyar et al. (2020), using a sample of logistic firms, found that companies with stronger CSR performance are more likely to produce a greater number of CSR reports, suggesting that logistics firms use CSR reporting to convey a positive signal to their stakeholders and that these reports accurately represent the firms' actual CSR performance (Uyar et al. 2020).

Similarly, Nazari et al. (2017) found that greater CSR disclosure and improved readability of CSR reports are linked to enhanced CSR performance, highlighting that expanding CSR disclosure enhances transparency about firms' social and environmental performance, whereas less-readable CSR reports tend to obscure information (Nazari et al. 2017). In addition, Wang et al. (2018) found a significant positive correlation between CSR performance and the readability of CSR reports in US public companies; these findings suggest that companies with better CSR performance tend to produce more readable CSR reports. The authors also found that the link between social performance and the readability of CSR reports is more pronounced than that with environmental performance (Wang et al. 2018).

Within this framework, previous studies examining individual ESG pillars have supported the signalling theory, as explained below.

With specific regard to the environmental pillar, some studies observed that firms that announced environmental initiatives beyond regulatory requirements decreased their overall chemical emissions, indicating an enhancement in their environmental performance compared to firms that did not make such announcements (Hora and Subramanian 2019). Moreover, Zhuo et al. (2024) found a strong positive correlation between corporate environmental performance and the readability of corporate environmental disclosures on a sample of Chinese listed firms; this relationship is more pronounced in firms with poorer earnings performance, stricter regional environmental regulations or greater media attention (Zhuo et al. 2024). About the social pillar, some scholars have identified a positive link between social performance and ESG disclosure, highlighting that companies demonstrating more robust social performance tend to provide more extensive disclosure on ESG topics (Beretta et al. 2020; Melloni et al. 2017). Regarding the corporate governance pillar, scholars investigated whether the quality of corporate governance can mitigate firms' tendencies towards manipulation of corporate disclosure. For instance, Yu et al. (2020) found that a higher count of independent board directors directly decreases greenwashing behaviour by diminishing agency costs and intensifying scrutiny, and Cuadrado-Ballesteros et al. (2015) demonstrated that a more significant proportion of independent directors positively impacts the extent of CSR disclosure. Moreover, Di Miceli and Donaggio (2018) found that the presence of women on the board positively influences ESG performance.

However, most of the previous literature pertains to voluntary contexts in which ESG reports are often unaudited (Muslu et al. 2019); only a limited number of studies have examined the relevance of narrative aspects of NFD within mandatory frameworks, focusing in particular on the connection between ESG performance and NFD readability (Agostini et al. 2022; Setia et al. 2015; Haji et al. 2023; Islam et al. 2021). Furthermore, very few studies focused on the separate pillar of ESG and some authors call for more research in this field (Zhuo et al. 2024; Beretta et al. 2019).

Based on the theoretical perspectives highlighted above and the examples emerging from the literature, we aim to further test

the positive relationship between ESG performance, and each separate pillar, and NFD readability in a mandatory context through the lenses of the signalling theory. Therefore, we pose the following research hypotheses:

**Hypothesis 1a.** *There is a positive relationship between better ESG performance and the degree of NFD readability (if signalling theory dominates).*

**Hypothesis 1b.** *There is a positive relationship between corporate environmental performance and the degree of NFD readability (if signalling theory dominates).*

**Hypothesis 1c.** *There is a positive relationship between corporate social performance and the degree of NFD readability (if signalling theory dominates).*

**Hypothesis 1d.** *There is a positive relationship between corporate governance performance and the degree of NFD readability (if signalling theory dominates).*

### 2.3.2 | The Negative Relationship Between ESG Performance and NFD Readability Through the Lenses of Legitimacy Theory

From the perspective of the legitimacy theory, management is often inclined to manipulate corporate disclosures for personal gain, using opportunistic language strategies to shape stakeholders' perceptions of the firm's accomplishments (Clarkson et al. 2008; Arena et al. 2015; Li et al. 2023). These strategies typically make the reports more complicated, thereby reducing the transparency of CSR disclosures (Hamza and Jarboui 2024); this approach configures a greenwashing behaviour (Nicolò, Zanellato, et al. 2024). Indeed, firms with poor sustainability performance often strategically use sustainability disclosure to conceal or mitigate negative information and present their activities as legitimate (Li et al. 2023; Zhang et al. 2021). As a result, these companies strategically increase the quality of their NFD to influence stakeholders' perceptions or divert attention away from their poor sustainability performance (Luo and Tang 2014). Therefore, according to the legitimacy theory, managers primarily employ sustainability reporting to shape external perceptions, particularly unfavourable ones, as a form of window dressing and impression management, while also reducing their exposure to social and political scrutiny (Hamza and Jarboui 2024).

Within this framework, previous studies examining individual ESG pillars have supported the legitimacy theory, as explained below.

For example, companies with poor environmental performance, such as those emitting large amounts of greenhouse gasses (GHGs), or those with poor social performance, failing to comply with human rights conventions or neglecting customer health and safety, are more motivated to alter negative public perceptions caused by their poor sustainability record. They may achieve this by manipulating the content of their disclosures (Park et al. 2023). In doing so, they acknowledge the

possibility of facing societal repercussions if their greenwashing strategy is discovered (Kim et al. 2017).

This perspective implies a negative relationship between ESG performance and CSR disclosure, as supported by several studies (e.g., Milne and Patten 2002; Cho et al. 2012; de Villiers and van Staden 2006; Hassan and Guo 2017). In this regard, Milne and Patten (2002) found a negative association between environmental performance and disclosure within US companies, and Hassan and Guo (2017) discovered that companies in carbon-intensive industries use separate environmental reports to create the appearance of being responsible corporate citizens, even when this is not the case. Furthermore, Pan et al. (2023) demonstrated that firms respond to the legitimacy and efficiency threats posed by negative and positive environmental performance feedback by producing CSR reports that are less readable. Furthermore, Ghitti et al. (2023) highlighted that companies with a higher number of independent directors tend to engage in more greenwashing, which is an apparent paradox, aligned with the notion that boards controlled by insiders may offer more significant benefits to companies' financial performance compared to boards comprising numerous independent directors (Harris and Raviv 2005).

With this regard, Gagné et al. (2022) highlight an important trend of impression management in CSR reporting; indeed, when disclosure is about environmental and social information, impression management and greenwashing are common (Du et al. 2010; Kanbaty et al. 2020).

However, to the best of our knowledge, most of the studies within this field focused on the voluntary setting, where ESG disclosures are unaudited and this implies that the challenge of evaluating corporate commitment to and its effects on the SDGs has provided a wide opportunity for managers to manipulate sustainable disclosures and use greenwashing practices (García-Meca et al. 2021; Silva 2021). Therefore, very few studies tested the legitimacy theory on the relationship between ESG performance and textual features of sustainability disclosure such as its readability in a mandatory setting and some authors call for more research in this field, especially analysing the separate ESG pillars (Zhuo et al. 2024).

Based on the theoretical perspectives highlighted above and the examples emerging from the literature, we aim to examine the negative relationship between ESG performance and NFD readability in light of legitimacy theory. Therefore, we pose the following research hypotheses:

**Hypothesis 2a.** *There is a negative relationship between ESG performance and the degree of NFD readability (if legitimacy theory dominates).*

**Hypothesis 2b.** *There is a negative relationship between corporate environmental performance and the degree of NFD readability (if legitimacy theory dominates).*

**Hypothesis 2c.** *There is a negative relationship between corporate social performance and the degree of NFD readability (if legitimacy theory dominates).*

**Hypothesis 2d.** *There is a negative relationship between corporate governance performance and the degree of NFD readability (if legitimacy theory dominates).*

### 3 | Research Methodology

#### 3.1 | Sample Selection and Data Collection

To test the hypotheses developed earlier, it is considered a context in which enough companies were required to issue NFD. The regulatory effort of the European Commission (European Directive 2014/95/EU; Corporate Sustainability Reporting Directive 2022/2464/EU) has fostered the emergence of an economic environment highly attentive to sustainability, even in the corporate sphere (Perrini et al. 2007). Despite the European context, which is considered by many scholars as one of the main areas of investigation in the field of sustainability (Zahid et al. 2023), offering various options, Italy was chosen, as it was the first among the four major European Union nations (France,<sup>1</sup> Germany,<sup>2</sup> Italy and Spain<sup>3</sup>) to have implemented the directive 95/2014 (through the Legislative Decree 254/2016). Moreover, Italy's CSR reporting rate surpasses the global average (KPMG, 2020) and prior research identified a significant gap in nonfinancial disclosure practices among Italian companies (Costa and Agostini 2016; Doni et al. 2020). Therefore, the present analysis considered the period 2017–2022, examining the years after the introduction of the Non-Financial Reporting Directive (NFRD) in the Italian context from its inception (2017) to the latest available accounting data (2022).

For the selection of companies, it is considered the list of firms obligated to issue nonfinancial statements published by CONSOB (the public authority responsible for regulating the Italian financial markets). This list includes approximately 200 companies operating in various sectors annually (e.g., healthcare and pharma, manufacturing, services, electronics, construction and engineering, textile, banks and financial services). Excluding companies operating in the financial sector (Nobes and Stadler 2015) and considering only those listed and present in the list throughout the analysis period, the final sample consisted of 83 companies. This approach also helped mitigate the problem of omitted variables by considering a single geographical area (DeJong et al. 2008).

Table 1 presents a schematic evolution of the final sample analysed.

**TABLE 1** | Sample selection.

Sample selection	
Original sample	200
Exclusion criteria	
Financial sector	55
Nonlisted company	50
Missing data	2
Final sample	93

As shown in Table 1, companies operating in the financial sector are excluded from the sample to avoid distortions due to the capital structure and sector-specific regulations (Maaloul et al. 2023; Duque-Grisales and Aguilera-Caracuel 2021; Nicolò, Zanellato, et al. 2024); in this way, it is possible to analyse companies that were more similar to each other, although operating in different product sectors.

Table 2, according to the information provided by the original database from which we selected the companies under investigation (Banca d'Italia), specifies the sectors in which the companies, present in our sample, operate.

The dependent variable (readability index) is obtained through textual analysis of the NFD published by companies in the sample. In contrast, independent and control variables are extracted from Refinitiv, one of the leading and most comprehensive databases currently available (Dorfleitner et al. 2020), and Aida (a database containing accounting and governance information of Italian companies).

#### 3.2 | Selected Variables

The variables (dependent, independent and control) used for our multivariate regression analyses are shown below (Table 3).

**TABLE 2** | Sample composition.

Sector (Banca d'Italia)	Number of firms
Energy	6
Textile	5
Healthcare and pharma	3
Services	8
Media and publishing	4
Food and beverage	2
Aerospace	2
Electronics	9
Machine and plant	5
Automotive	6
Construction and engineering	3
Logistics and transport	3
Oil and gas	2
Retailers	3
Manufacturing	13
Steel	1
Utilities	5
Technology	1
Chemicals	1
Telecommunications	1

**TABLE 3** | Variables.

Type of variable	Variable	Description
Dependent variable	Readability index	The degree of complexity of an NFD's text; measures between 0 and 20
Independent variable	ESG score (ESG)	Nonfinancial performance trend; measures between 0 and 100
	E pillar score (E)	Environmental performance trend; measures between 0 and 100
	S pillar score (S)	Social performance trend; measures between 0 and 100
	G pillar score (E)	Governance performance trend; measures between 0 and 100
Control variable	Total asset (ln)	Total of the assets reported in the balance sheet expressed in logarithmic form
	Numbers of employees (ln)	Number of employees expressed in logarithmic form
	D/E ratio	Measurement of financial structure
	Revenues (ln)	Reported revenues expressed in logarithmic form

(Continues)

**TABLE 3** | (Continued)

Type of variable	Variable	Description
	Earnings per share (ln)	The statistical average of all broker estimates
	EBIT (ln)	Difference between revenues and operating costs expressed in logarithmic form
	Return on equity (ROE)	The profitability ratio expresses the remuneration of the shareholders
	Tobin's Q	Economic ratio comparing company value to its book or replacement value
	Difficult words (DW)	Number of words with more than three syllables
	Family firms (FF)	The dummy variable equals 1 for family firms and 0 otherwise.
	Nonfinancial disclosure (NFD)	The dummy variable equals 1 if the DNF is a separate document and 0 otherwise.

### 3.2.1 | Dependent Variable

The readability index is estimated through textual analysis of the nonfinancial statements of the analysed companies. The underlying assumption is that companies instrumentally may use text readability to try to 'obscure' any negative news that would not be favoured by stakeholders and could, therefore, damage the company's image, generating negative consequences on its value. Several studies have indeed highlighted how companies use more precise language when intending to communicate positive information, whereas when the concept to be expressed exposes the company to criticism, the language becomes more complex (Sinnewe et al. 2021). This trend is also observed when the focus of the information

concerns sustainable performance, particularly environmental performance (Du and Yu 2021). Therefore, in the case of positive information, which emphasizes ethics and sustainable approaches, companies tend to provide more readable information (Bacha and Ajina 2019).

To estimate the readability index, it is implemented the Gunning Fog index (Gunning 1968), an index that measures the complexity of the text, used in various accounting studies to measure the degree of complexity of corporate disclosure (Kravet and Muslu 2013; Loughran and McDonald 2016; Ajina et al. 2016). The Gunning Fog index is considered an appropriate tool in order to estimate the readability of technical and highly specialized texts, such as reports (Toerien and Du Toit 2024). The Gunning index estimates the complexity of a text using the number of words in a sentence and the number of complex words (i.e., those composed of more than three syllables).

Below is the formula for the Gunning Fog index:

$$\text{Gunning Fog index} = 0.4 * \left( \frac{\text{Total words}}{\text{Total sentences}} + 100 * \frac{\text{Complex words}}{\text{Total words}} \right).$$

The result of the equation is a number between 0 and 20 and expresses the number of years of education required to understand the analysed text (Li 2008). Therefore, the higher the index, the more difficult it will be to understand the text and its message (Lang and Stice-Lawrence 2015). Using Python, analysing the nonfinancial statements of the companies in the panel, the Gunning Fog index, which measures the companies' readability for the present study, is calculated. Using a specific Python library called 'textstat', we applied the formula for calculating the readability index, according to the Gunning Fog index equation, to quantify the years of education needed (in the range of 1–20) to understand the information reported in the NFDs of the analysed companies.

### 3.2.2 | Independent Variables

The present study initially adopts Gallo and Christensen's multidimensional approach (2011), utilizing a single measure for companies' sustainable performance. This measure corresponds to the ESG score, which incorporates the performance of the three pillars: environment, social and governance. This score, ranging from 0 to 100, is extracted from the Refinitiv database and is calculated using 120 qualitative and quantitative measures derived from publicly available information (Eccles et al. 2014).

The environmental pillar score (E pillar score) measures companies' efforts to reduce the environmental impact of their operational activities. It assesses the effect of companies' production activities on air, water and land. This score, ranging from 0 to 100, is extracted from the Refinitiv database. The social pillar score (S pillar score), ranging from 0 to 100, is extracted from the Refinitiv database and is a proxy for a company's reputation. It measures a company's ability to generate trust and loyalty among its stakeholders (employees, customers and suppliers). Finally, the corporate governance pillar

score (G pillar score) evaluates the existing conditions within a company that ensure the proper functioning of its administrative body. It reflects the company's ability to establish governance and management mechanisms to create sustainable value for its stakeholders. This score, ranging from 0 to 100, is extracted from the Refinitiv database.

### 3.2.3 | Control Variables

To enhance the robustness and validity of the conducted analyses and obtain more accurate estimates of the effects of the variables of interest on the phenomenon under examination, various control variables are considered (Cooper et al. 1989; Biddle et al. 2009; Chen et al. 2011). To account for the size of the companies in the panel, the natural logarithm of total assets and the number of employees (Murphy et al. 1996) is performed. Additionally, to consider economic performance, it is included in our model the natural logarithm of revenues, EBIT and ROE (Drempetic et al. 2020). Stock performance is controlled using Earnings Per Share and Tobin's Q (market capitalization divided by total assets). The debt-to-equity ratio is added to consider the financial structure of the companies. The use of such variables is essential, as they take into account aspects related to the size and performance of companies. In a sample as extensive as the Italian stock market, there may occasionally be differences between companies regarding these profiles, which in turn have a direct impact on the ability to invest in sustainable activities and, consequently, on the final sustainable performance. Introducing these control variables into the econometric analysis allows the model to be 'refined', thereby producing more accurate and precise results. All those control variables are extracted from the Refinitiv database.

To improve the model's robustness, a control variable for the readability of the NFDs is also used: the number of complex words (i.e., those composed of more than three syllables) (De Souza et al. 2019). This variable was estimated by analysing the company's nonfinancial statements through Python. This approach made it possible to include a control metric for the dependent variable as well, which could indeed be influenced by the number of complex words present in the text of the NFDs. Finally, two dummy variables were included to consider whether the company drafts the nonfinancial statement in a separate document or within the annual report and whether it is a family firm. The inclusion of this additional control variable is directly linked to the characteristic presence of numerous family-owned businesses within the Italian economic landscape. The model is implemented with this last dummy variable because family firms in Italy represent 63.4% of the listed companies (CONSOB 2023; Bifulco and Tiscini 2024).

Using Aida, it is possible to identify family-controlled firms as those in which (i) the same family owns at least 30% of the shares (Minichilli et al. 2010) and (ii) one or more members of the family are involved in the top management team (Cirillo et al. 2017). This definition aligns with the Italian context, as family businesses are defined as companies in which one or more families linked by kinship, close affinities or solid alliances hold a sufficiently large share of capital to enable

them to make decisions in the field of strategic management (Corbetta 1998).

### 3.3 | Data Analysis

The hypotheses developed in this study are based on the exploration of a potential correlation between the degree of readability and sustainable performance, examined both through the ESG score (multidimensional approach) and the individual pillars composing it (unidimensional approach): E, S and G pillar scores.

Therefore, the regressions used to test the hypotheses are as follows:

$$\text{(Hypotheses 1a and 2a)} \quad RI = \alpha_0 + \alpha_1 ESG_i + \alpha_2 X_i + \varepsilon_i.$$

$$\text{(Hypotheses 1b, 1c, 1d and 2b)} \quad RI = \alpha_0 + \alpha_1 E_i + \alpha_2 S_i + \alpha_3 G_i + \alpha_4 X_i + \varepsilon_i.$$

RI indicates the level of text readability measured using the Gunning Fog index (dependent variable). In the first equation, ESG represents the companies' sustainable performance. In the second equation, the three pillars are indicated with the letters *E*, *S* and *G*. Finally, in both equations, the letter *X* represents the vector of control variables, whereas  $\varepsilon$  is the error term.

A unique database of observations across multiple periods (cross-sectional time-series data) is created to test our hypotheses. These data are analysed using the ordinary least squares technique (panel data OLS), which could result in distorted and

inaccurate estimates of the analysed phenomenon due to issues related to the heterogeneity of variables. This issue is addressed by conducting the Hausman test (1978). The result of this test showed that the best model for the available data is a fixed effects model (as the chi-square of the Hausman test's regression is significant). Regression analysis is performed using the 'strong' command in Stata with the 'fe r' option, which helps estimate fixed effects models (Afuah 2002). Fixed effects are applied when the scope analyses the impact of independent variables, which vary within an entity (e.g., country or continent), on the dependent variable, which changes over time. Fixed effects work well with data with high temporal variability of the dependent variable within an entity/unit (e.g., state/country). By applying fixed effects, it is possible to neutralize the effect of those time-invariant characteristics to evaluate the net effect of predictors on the outcome variable (Blackwell et al. 2009). To preempt heteroscedasticity issues, the Breusch–Pagan test is conducted. Because the *p* value (Prob > chi<sup>2</sup>) is much more significant than an ordinary significance level (such as 0.05), for this reason, it is not possible to reject the null hypothesis (Pagan and Pak 1993). This means that, based on the data and the specified significance level, there is not enough evidence to reject the null hypothesis (Hypothesis 0) of constant variance in the residuals of the regression model. In other words, the test does not find significant evidence of heteroscedasticity in the model residuals. Therefore, the assumption of constant variance of the residuals is satisfied.

## 4 | Empirical Results

First, we carried out descriptive statistics (Table 3) and correlation matrix (Table 4). Observing the data of the descriptive

**TABLE 4** | Descriptive statistics.

Variable	Obs.	Mean	Std. dev.	Min.	Max.
Readability index	490	12.86147	1.698492	8.0000	18.0900
ESG score	319	62.21548	15.57332	17.4395	94.27324
Environment pillar score	319	57.68077	21.74816	3.503919	98.24559
Social pillar score	319	67.83798	17.13162	24.69392	96.46284
Governance pillar score	319	57.4734	19.12966	9.085738	97.11579
Total asset	496	21.31279	1.685035	18.00093	26.53029
Numbers of employees (ln)	318	8.620892	1.266874	5.869297	11.75536
D/E ratio	494	1.157093	1.26522	0.0037897	11.21083
Revenues (ln)	496	20.86446	1.532364	17.41516	25.29668
Earnings per share (ln)	440	0.6756661	0.9269421	-3.71224	6.166225
EBIT (ln)	404	18.56986	1.723472	13.05993	23.36192
Return on equity	416	0.1188718	0.1589522	-1.17819	0.749
Tobin's Q	488	1.739248	8.659611	0.0017245	121.9968
Difficult words	498	2689.1	1317.982	1	7833
Family firms	498	0.3493976	0.4772592	0	1
Nonfinancial disclosure	498	0.12249	0.3281805	0	1

statistics, we note that for the readability index, there are 490 observations, with an average value of 12.86 between a maximum of 18.09 and a minimum of 8.00 (the maximum theoretical value of this index is 20). The standard deviation is very low (1.70) and indicates little difference between the NFD of the analysed firms in terms of readability. For the ESG score, there are 319 observations with an average of 62.22 and a standard deviation of 15.57. The maximum value of this index is 94.27, whereas the minimum is 17.44. From these data, the ESG performance of the companies analysed is heterogeneous. Breaking down the ESG into the individual pillars, it can be seen as follows: The average value of the E pillar is equal to 57.58 (with a standard deviation of 21.75), the average value of the S pillar is equal to 67.84 (with a standard deviation of 17.13), and the average value of the G pillar is equal to 57.47 (with a standard deviation of 19.13).

Table 4 reports the descriptive statistics, whereas Table 5 provides an overview of bivariate associations.

Second, a regression is conducted using the Panel technique to test Hypotheses 1a and 2a. Table 6 illustrates the results of the analysis.

As indicated in Table 5, there is no significant correlation between readability and the sustainable performance of companies expressed by the ESG score (the coefficient associated with the relationship is equal to  $-0.0256$ , with a nonsignificance level of  $p$  value). This result does not allow us to confirm the Hypotheses 1a and 2a.

Third, another Panel regression is performed to test the other research hypotheses (1b, 1c, 1d, 2b, 2c and 2d), considering the three pillars of sustainable performance as dependent variables (Table 7).

From the results presented in Table 6, there is a significant and positive relationship between the NFD readability and the environmental performance of companies (the coefficient associated with the relationship is equal to  $-0.0385$ , with a significance level of  $p < 0.001^{***}$ ). Even if the result of the econometric regression highlights a negative sign between the readability index and pillar E, it is worth remembering that the readability index expresses the number of years of study necessary to understand the text under analysis. Therefore, the lower this index, the greater the readability of the text being read. This allows us to conclude that there is a positive and significant relationship between corporate environmental performance and the readability of NFD (Hypothesis 1b is verified). However, it is not possible to confirm the same for comprehensive ESG performance (Hypothesis 1a/Hypothesis 2a) or social (Hypothesis 1c/Hypothesis 2c) and governance (Hypothesis 1d/Hypothesis 2d) performance. Therefore, no significant results exist regarding the relationships between readability and social and governance performance. In conclusion, it is possible to observe how companies tend to complicate text readability when environmental performance is not favourable. The results of the research hypotheses are summarized in Table 8.

## 4.1 | Robustness Checks

To corroborate the results obtained from the second regression, various robustness checks are implemented: (i) performing the regression considering the logarithmic version of the readability index, (ii) implementing observation censoring and (iii) systematically removing one control variable at a time. The previously discussed results remain unchanged even when considering a standardized value (the logarithmic version of the readability index as the dependent variable).

Subsequently, a censoring of 5% is applied to the observations used in the study. In this way, a sample reduction was performed according to different upper limits (right censoring) and lower limits (left censoring) (Dong et al. 2021). Once again, the results confirm the existence of a significant and negative relationship between the Readability index and environmental performance. Because the regression results may be influenced by one (or more) control variable(s), the regression is repeated, systematically removing one control variable at a time. Again, the results of the robustness check do not contradict the findings described earlier.

To identify the net relationship between ESG performance and readability, we run the regression without the inclusion of a control variable, considering at first only the three pillars together and then one pillar at a time. In both robustness tests, the relationship highlighted above does not change, finding a significant and negative correlation between the E pillar and the NFD readability index.

Considering that the Gunning Fog index has also been criticized in previous literature (Loughran and Mcdonald), we conducted a new robustness analysis by replacing the readability index with the SMOG index, an acronym for ‘Simple Measure of Gobbledygook’, supported by many scholars to be an excellent tool for measuring the readability of texts (B. W. Lee and Lee, 2023). Again, a significant and negative relationship emerges between the E pillar and the new readability index, both when using only the E pillar as a regression parameter and when also introducing the control variables. In the first case, the coefficient associated with the relationship is equal to  $-0.0103$ , with a significance level ( $p < 0.05^{**}$ ), whereas in the second case, the coefficient associated with the relationship is equal to  $-0.0122$ , with a significance level ( $p < 0.05^{**}$ ). In any case, it should be highlighted that several contributions tend to indicate the Gunning Fog index as one of the best readability indices, especially for technical texts, such as technical reports (Toerien and Du Toit 2024). Indeed, unlike the Gunning Fog index, which accounts for both sentence length and lexical complexity, the SMOG index focuses exclusively on counting complex words. These differences make the SMOG index less effective at capturing syntactic complexity and stylistic variations in more sophisticated texts. Furthermore, the Gunning Fog index can be applied to a wide range of documents, such as academic articles and journalistic texts, whereas the SMOG index is better suited for shorter and more informational texts, such as brochures or educational materials.

**TABLE 5** | Correlation matrix.

	Readability index	ESG	E score	S score	G score	Total asset (ln)	Number of employees	D/E	Revenues (ln)	EPS	EBIT (ln)	ROE	Tobin's Q	Difficult words	Family firms	Nonfinancial disclosure
Readability index	1.0000															
ESG	-0.1831	1.0000														
E score	-0.1140	0.8327	1.0000													
S score	-0.1340	0.8887	0.6696	1.0000												
G score	-0.2226	0.7066	0.3348	0.4911	1.0000											
Total asset (ln)	-0.1313	0.6213	0.6072	0.5460	0.3965	1.0000										
Number of employees	-0.1973	0.5062	0.4642	0.4798	0.3040	0.7699	1.0000									
D/E	-0.0560	0.2213	0.2667	0.2245	0.0521	0.3503	0.3338	1.0000								
Revenues (ln)	-0.0988	0.5700	0.5270	0.5079	0.3778	0.9273	0.8136	0.2456	1.0000							
EPS	-0.0479	-0.0191	-0.1655	-0.0380	0.1787	0.0431	0.0027	-0.1535	0.0767	1.0000						
EBIT (ln)	-0.1243	0.6303	0.5522	0.5172	0.5039	0.8838	0.6700	0.2592	0.8365	0.2065	1.0000					
ROE	0.0297	-0.1398	-0.1763	-0.1613	-0.0160	-0.0192	-0.2221	-0.2890	0.0009	0.3161	0.1744	1.0000				
Tobin's Q	0.0697	-0.0920	-0.1180	-0.0362	-0.1044	-0.1074	-0.1425	-0.1074	-0.0899	0.0323	-0.0620	0.0376	1.0000			
Difficult words	-0.1092	0.3743	0.4367	0.2432	0.2021	0.4121	0.2813	0.0261	0.3768	-0.1706	0.4365	-0.0448	-0.0923	1.0000		
Family firms	0.1090	-0.3144	-0.2806	-0.3636	-0.1585	-0.2962	-0.2306	-0.1394	-0.2038	0.0345	-0.2589	0.0448	-0.0403	-0.1233	1.0000	
Nonfinancial disclosure	-0.0167	0.0620	0.0643	0.0270	-0.0031	-0.0027	0.1142	0.1410	-0.0317	0.0126	-0.0019	0.0429	-0.0314	-0.1813	0.0217	1.0000

**TABLE 6** | Regressions 1a and 2a.

	Readability index
ESGScore	-0.0256 (0.0242)
TotalAssets (ln)	-0.885 (0.885)
NumberOfEmployees (ln)	0.0416 (1.377)
TotalDebtPercentageofTotalE	0.0387 (0.301)
RevenuefromBusinessActivities (ln)	-0.0637 (0.508)
EarningsPerShareMean	-0.0405 (0.136)
EBITActual (ln)	0.341* (0.187)
ReturnOnEquityActual	-0.121 (1.409)
TobinsQ	0.00717 (0.00587)
DifficultWords	-0.000130 (0.000159)
FamilyFirm	0 (.)
NonfinancialDisclosure	-0.470 (0.553)
_cons	28.82* (16.88)
<i>R</i> <sup>2</sup> Within	0.0790
<i>R</i> <sup>2</sup> Between	0.0769
<i>R</i> <sup>2</sup> Overall	0.0651
<i>N</i>	275

Note: Robust standard errors in brackets.

\*\*\**p* < 0.01,

\*\**p* < 0.05,

\**p* < 0.1.

To prevent multicollinearity issues, particularly between the independent variable and the control variables, we calculated the VIFs of the Panel regressions (Table 9).

The analysis revealed that no VIF exceeds the value of 5, which, according to the reference literature (Hair et al. 1998; Ringle et al. 2015), indicates the absence of multicollinearity among the variables considered.

**TABLE 7** | Regressions 1b, 1c, 1d, 2b, 2c and 2d.

	Readability index
EnvironmentalPillarScore	-0.0385*** (0.0129)
SocialPillarScore	0.0246 (0.0201)
GovernancePillarScore	-0.00815 (0.00945)
TotalAssets (ln)	-0.752 (0.882)
NumberOfEmployees (ln)	-0.238 (1.338)
TotalDebtPercentageofTotalE	0.0472 (0.294)
RevenuefromBusinessActivities (ln)	-0.162 (0.563)
EarningsPerShareMean	0.0195 (0.137)
EBITActual (ln)	0.288 (0.191)
ReturnOnEquityActual	-0.237 (1.468)
TobinsQ	0.00313 (0.00506)
DifficultWords	-0.000147 (0.000150)
FamilyFirm	0 (.)
NonfinancialDisclosure	-0.448 (0.549)
_cons	30.89* (16.64)
<i>R</i> <sup>2</sup> Within	0.0977
<i>R</i> <sup>2</sup> Between	0.0435
<i>R</i> <sup>2</sup> Overall	0.0518
<i>N</i>	275

Note: Robust standard errors in brackets.

\*\*\**p* < 0.01,

\*\**p* < 0.05,

\**p* < 0.1.

Finally, in analysing the relationship between the readability of NFD and ESG variables, we address potential endogeneity issues through two-stage least squares (2SLS) regressions

**TABLE 8** | Summary results of the research hypotheses.

Hypotheses (signalling theory)	Status
Hypothesis 1a <i>There is a positive relationship between better ESG performance and the degree of NFD readability (if signalling theory dominates).</i>	Not verified
Hypothesis 1b <i>There is a positive relationship between corporate environmental performance and the degree of NFD readability (if signaling theory dominates).</i>	Verified
Hypothesis 1c <i>There is a positive relationship between corporate social performance and the degree of NFD readability (if signalling theory dominates).</i>	Not verified
Hypothesis 1d <i>There is a positive relationship between corporate governance performance and the degree of NFD readability (if signalling theory dominates).</i>	Not verified
Hypotheses (legitimacy theory)	Status
Hypothesis 2a <i>There is a negative relationship between better ESG performance and the degree of NFD readability (if legitimacy theory dominates).</i>	Not verified
Hypothesis 2b <i>There is a negative relationship between corporate environmental performance and the degree of NFD readability (if legitimacy theory dominates).</i>	Not verified
Hypothesis 2c <i>There is a negative relationship between corporate social performance and the degree of NFD readability (if legitimacy theory dominates).</i>	Not verified
Hypothesis 2d <i>There is a negative relationship between corporate governance performance and the degree of NFD readability (if legitimacy theory dominates).</i>	Not verified

(Nicolò, Zamponi, et al. 2024; Argentiero et al. 2020), utilizing the industry average ESG score as an instrumental variable (Wu et al. 2024). To further validate our choice of instruments, we conduct two tests within the 2SLS regression: (1) the Cragg and Donald (1993) test to confirm the relevance of the instrumental variable and (2) the Sargan (1958) overidentification test to evaluate the exogeneity of the instrumental variable (i.e., ensuring no significant correlation exists between the instrumental variable and the error term in the merger performance regressions). The Cragg–Donald Wald F statistic is 223.536, higher than all the critical values identified by Stock and Yogo (2002). This result (Table 10) means that the instrumental variable used is powerful, and there is no risk of weak identification. Consequently, the estimates obtained are reliable concerning the weak instruments problem.

About the Sargan text, the test output is ‘equation exactly identified’. This result (Table 11) means that the number of

**TABLE 9** | VIFs of the Panel regressions.

Variable	VIF	Sqrt VIF	Tolerance	R <sup>2</sup>
Readability index	1.13	1.06	0.8836	0.1164
Environment pillar score	2.64	1.62	0.3795	0.6205
Social pillar score	2.56	1.60	0.3903	0.6097
Governance pillar score	1.71	1.31	0.5854	0.4146
Total asset	17.63	4.20	0.0567	0.9433
Numbers of employees (ln)	3.82	1.96	0.2615	0.7385
D/E ratio	2.13	1.46	0.4705	0.5295
Revenues (ln)	10.45	3.32	0.0957	0.9043
Earnings per share (ln)	1.44	1.20	0.6962	0.3038
EBIT (ln)	9.37	3.06	0.1067	0.8933
Return on equity	1.89	1.38	0.5289	0.4711
Tobin’s Q	1.08	1.04	0.9222	0.0778
Difficult words	1.54	1.24	0.6478	0.3522
Family firms	1.44	1.20	0.6945	0.3055
Nonfinancial disclosure	1.18	1.09	0.8473	0.1527
Mean VIF	4.00			

**TABLE 10** | Cragg–Donald Wald F statistic.

Cragg–Donald Wald F statistic	
Weak identification test (Cragg–Donald Wald F statistic):	223.536
Stock–Yogo weak ID test critical values	
10% Maximal IV size	16.38
15% Maximal IV size	8.96
20% Maximal IV size	6.66
25% Maximal IV size	5.53

**TABLE 11** | Sargan test.

Sargan test	
Sargan statistic (overidentification test of all instruments):	0.000 (equation exactly identified)

instrumental variables equals the number of endogenous variables. Under these conditions, the Sargan test is not applicable because the model is precisely identified (no overidentification of the instruments).

**TABLE 12** | Endogeneity test.

<b>Endogeneity test</b>	
Endog option:	
Endogeneity test of endogenous regressors:	0.426
Chi <sup>2</sup> (1) <i>p</i> value	0.5139
Regressors tested: ESGScore	

Finally, the endogeneity test checks whether the endogenous variable (ESGScore) is endogenous or if it can be treated as exogenous. The test value is 0.426 with a *p* value of 0.5139, which is higher than 0.05. A *p* value higher than 0.05 indicates no significant evidence of endogeneity. This result (Table 12) corroborates the results obtained using an OLS approach without instrumental variables.

To better perform this robustness test, we conducted it twice: first, considering the average of the sectors following the sector categories proposed by Refinitiv Workspace (the database from which we extracted the variables regarding nonfinancial performance and all the economic data) and then using those proposed by Banca d'Italia (the original database from which we selected the companies under investigation).

All the tests' results highlight the absence of endogeneity problems in the model used, confirming the validity of the results obtained.

## 5 | Discussion

The increasing attention from stakeholders and institutions has led to new regulatory interventions and disclosure requirements (Tang and Demeritt 2018); consequently, in response to these new demands, all companies subject to the new mandate must disclose information about ESG dimensions, as required by the European Directives (2014/95/EU and 2022/2464/EU), regardless of their ESG performance. However, many companies tend to selectively disclose information about ESG, highlighting their commitment to certain aspects of ESG while downplaying or concealing the negative impacts they have on others (Ferrón Vilchez et al. 2022). Consequently, the risk of greenwashing has been extensively debated as a discrepancy between what companies publicly communicate about their ESG efforts and their actual sustainability performance (Garcia-Sanchez et al. 2021). In this context, the relationship between ESG performance and the quality and quantity of NFDs, especially in a voluntary setting, has been examined through two theoretical frameworks: the signalling theory and the legitimacy theory (Hamza and Jarboi 2024; Lu and Wang 2021; Druz et al. 2020; Hummel et al. 2019, Arena et al. 2015).

In response to recent calls for research exploring the effectiveness of using computational linguistics to analyse managerial intentions or behaviour through corporate disclosure documents, our study offers several key contributions to the existing literature on sustainability disclosure (Nazari et al. 2017). Therefore, this study aims to investigate the corporate behaviour of 83 Italian-listed companies in the period 2017–2022 answering the following research questions: ‘Does

the sustainable performance measured through ESG pillars affect the degree of NFD readability in a mandatory setting?’ ‘Which pillar of ESG performance has the most significant impact on NFD readability?’ given the lack of literature on the influence of the individual ESG pillar performance on the quality of NFD, especially in the mandatory setting (Beretta et al. 2020).

Our empirical findings suggest that corporate environmental performance affects the degree of NFD readability, whereas no relationships are found between ESG performance as a whole and NFD readability or between the other two ESG pillar performances (social performance and governance performance) and NFD readability. In particular, the positive relationship between corporate environmental performance and NFD readability suggests that companies with better environmental outcomes are more inclined to disclose more readable ESG-related information and tend to be more transparent in their sustainability disclosures to distinguish themselves from less responsible firms. These less virtuous companies are less likely to imitate such behaviours due to the higher costs of disclosure and potential litigation risks (Li et al. 2023; Luo and Tang 2014; Papoutsis and Sodhi 2020). This means that companies actively engaged in environmentally responsible practices are more likely to integrate environmental concerns into their sustainable NFD properly (e.g., Nicolò, Zampone, et al. 2024; Melloni et al. 2017; Wang et al. 2018; Uyar et al. 2020). As a result, they may be less inclined to engage in greenwashing behaviours, as in doing so, they would contradict their core values and commitments to CSR (M. T. Lee and Raschke 2023). This result confirms the principles of signalling theory: Companies with good environmental performance tend to communicate credible, authentic and transparent information to stakeholders, thus enhancing their trust, improving communication and promoting a more effective stakeholders' engagement (Ramus and Montiel 2005; Mahoney et al. 2013; Li et al. 2023). Conversely, companies with poorer environmental performance may hesitate to offer sustainability disclosures to avoid potential adverse effects on their reputation, market performance or the risk of stakeholder boycotts (Mahoney et al. 2013; Li et al. 2023). Therefore, these results also support the conclusions of Hummel et al. (2019), who found that companies with better sustainability performance opt for high-quality sustainability reporting to showcase their achievements, whereas those with poorer performance tend to provide lower quality disclosures to obscure their actual results and preserve legitimacy. Because our study focused on the mandatory setting and on audited NFD, firms tend not to take on the reputational risk associated with greenwashing practices when they are discovered, concluding that the cost of engaging in greenwashing is higher than the cost of being transparent when reporting properly their sustainability impacts. This behaviour may differ when sustainability disclosures are not audited by an external party (Ruiz-Blanco et al. 2022; Walker and Wan 2012). Indeed, researchers have observed that in cases where ESG performance is easily monitored by stakeholders and can be verified through objective data, attempts at greenwashing may be less effective and could even damage a company's reputation (Kim et al. 2017).

Therefore, our results contrast with studies highlighting the risk of greenwashing for legitimacy purposes, which, vice

versa, implies a negative relationship between ESG performance and NFD readability (Milne and Patten 2002; Cho et al. 2012). However, even if the signalling theory and the legitimacy pose their basis on different ontological and epistemological perspectives, both theories indicate that managers of underperforming companies are likely to employ less readable narrative disclosures to conceal their actual performance (Nazari et al. 2017).

The lack of connections between ESG performance as a whole and NFD readability, as well as between corporate social performance, corporate governance performance and NFD readability, implies an intricate interplay between sustainability reporting and ethical, sustainable behaviours (Boiral et al. 2019). The absence of correlations in the other types of performance is in line with prior literature, which neither definitively confirms nor rejects the impression management approach; indeed some authors tested the ‘management obfuscation hypothesis’ in the relationship between nonfinancial performance and the tone of corporate disclosure and they provided mixed results (Melloni et al. 2017; Li 2008; Beretta et al. 2019). Furthermore, our findings align with those studies indicating that the impact of corporate governance on corporate disclosure manipulation is still uncertain, suggesting that further research is needed on this topic (Ghitti et al. 2023).

One potential reason for the differing effects of environmental, social and corporate performance could be the strict environmental standards introduced in recent years (e.g., ISO 9000 and ISO 14000), which regulate environmental performance reporting by enforcing standardized formats and content (De Jong et al. 2014). This regulation may limit the extent to which managers can manipulate the readability of environmental reports. Furthermore, in recent years, especially due to growing concerns about climate change, there has been increasing interest in environmental performance and related disclosures (Mateo-Márquez et al. 2022).

Conversely, standards for corporate social performance (e.g., ISO 26000 and SA8000) and the academic debate surrounding social topics are relatively recent developments (Boiral et al. 2017). This might result in a less mature or established framework, limiting the potential relationship between readability and social performance. Additionally, social performance encompasses a diverse set of themes—such as labor rights, diversity and community engagement—which may dilute its direct impact on NFD readability.

The low significance between the readability of NFDs and the governance pillar can be explained by the degree of influence of governance systems on the dynamics regarding the sustainable performance of companies (Alareeni and Hamdan 2020); the lack of significance may be attributed to the limited impact of governance systems on the immediate presentation and clarity of sustainability reports. Although governance boards shape strategic decision-making and influence sustainability outcomes, they may not directly affect the clarity or comprehensibility of the language used in NFD.

Another reason for the lack of significant relationships between the social and governance dimensions and NFD readability could be that stakeholders’ growing focus on environmental

issues pushes companies to prioritize the readability of environmental disclosures. As a result, social and governance factors may receive less attention in terms of clarity and transparency compared to environmental issues, which are increasingly recognized and understood by the general public, potentially making them a collective concern that encourages companies to offer clearer information on this topic.

However, critical issues remain despite the progress made in recent years regarding NFD promoted by European institutions. European regulations, resulting from legislative efforts, serve as a point of reference for companies on their path towards greater transparency and accountability. For instance, the CSRD introduces more rigorous obligations that will further shape reporting and governance standards. Yet, governance boards often prioritize financial over nonfinancial performance (Albitar et al. 2020), and this may undermine their direct impact on the clarity and readability of nonfinancial disclosures.

## 6 | Conclusion, Limitations and Future Development

Empirical findings from this study sought to shed some light on the role of sustainable performance in discovering NFD readability in a national context. More specifically, considering that Italy was the pioneer among the four key European Union countries (France, Germany, Italy and Spain) to enact Directive 95/2014 (via Legislative Decree 254/2016), and given that the European context is widely regarded by scholars as a primary focus of sustainability research (Zahid et al. 2023), this study is conducted in the Italian context among firms which are mandated to disclose NFD. Results contribute to several streams of literature about sustainable disclosure and readability of NFD. An improvement of the readability is a possible solution for reducing greenwashing risk. By implementing harmonized reporting standards, enhancing stakeholder engagement, increasing the quality of assurance on NFD and fostering a culture of transparency, firms can mitigate the risks associated with greenwashing and other forms of corporate disclosure manipulation and build trust in their sustainability initiatives (Sierra García et al. 2022). Furthermore, companies face increasing pressure as stakeholders demand higher levels of accountability and transparency (Tang and Demeritt 2018). Firms with high legitimacy on ESG typically experience stronger trade partnerships, attract better job candidates, enjoy greater resource access and achieve improved financial performance (Deephouse et al. 2017).

First, this study extends prior literature in the field of sustainable disclosure quality (Barth et al. 2017; Clatworthy and Jones 2001; Hooghiemstra 2000), mainly analysed the relationship between sustainable performance and the readability of sustainability disclosure through the lenses of the legitimacy theory (Gray et al. 1995) and the signalling theory (Connelly et al. 2011; Ramus and Montiel 2005). Indeed, empirical findings from this study extend prior research on the sustainable disclosure quality in a mandatory setting (Barth et al. 2017; Wang et al. 2018) by focusing on the emerging practices of corporate disclosure manipulation among companies (Laufer 2003; Yang et al. 2020; Mahoney et al. 2013; M. T. Lee and Raschke 2023). Moreover,

this study contributes to the literature stream that analyses managers' ethical or unethical behaviour in disclosing corporate reporting (Ruland and Lindblom 1992; Khairredine et al. 2020).

Second, the results of this study contribute to the literature regarding the development of theoretical and practical tools useful for measuring the readability of NFD (Kravet and Muslu 2013; Loughran and McDonald 2016; Ajina et al. 2016; Sinnewe et al. 2021) and, in general, for conducting textual analysis on corporate reporting (Beattie et al. 2004; De Franco et al. 2015). Indeed, to estimate the NFD readability, we use the Gunning Fog index (Gunning 1968), which is an index that measures the complexity of the text, used in prior accounting studies to measure the degree of complexity of corporate disclosure (Kravet and Muslu 2013; Loughran and McDonald 2016; Ajina et al. 2016). Therefore, our study contributes methodologically to the NFD literature by utilizing computational linguistics techniques to assess text complexity, specifically focusing on readability, within the context of sustainability disclosures.

Third, the results of this research contribute to the stream of literature that examines the relationship between environmental performance and the phenomenon of corporate disclosure manipulation (Sterbenk et al. 2022; Mateo-Márquez et al. 2022; Ingram and Frazier 1980). Indeed, our findings reinforce the evidence that there is a positive relationship between environmental performance and corporate ESG disclosure, supporting the idea that ethical companies do not need to manipulate sustainability information to make it more positive than it already is, unlike unethical companies, which, instead, tend to make such information 'foggy' (Zhang et al. 2023). Furthermore, the positive relationship between CSR performance and reporting plays a key role in addressing societal legitimacy concerns about corporate activities, especially given the increasing scepticism surrounding the credibility of CSR reports (Sethi et al. 2017). The positive connection between these two complementary aspects of CSR reduces the risk of greenwashing and supports the credibility of the signalling theory.

About the practical contributions, we believe that this research, at first, makes stakeholders aware of corporate disclosure manipulation practices and provides tools for stakeholders to recognize this practice and make unbiased economic decisions (Humphrey et al. 2012). Second, the findings from this research offer valuable insights for policymakers and regulatory authorities, shedding light on the efficacy of current regulations like Directive 2014/95/EU and in counteracting greenwashing practices; therefore, regulators may enhance recommendations to promote readability in NFD (Mazzotta et al. 2020) to increase the trust of stakeholders on corporate reporting. Moreover, the standardization process of sustainability reporting in Europe (e.g., CSRD and ESRS) has introduced clearer standards and transparency in sustainability disclosures, thereby potentially reducing greenwashing practices. In doing so, the assurance of NFD is gaining growing relevance (Farooq et al. 2024). Third, a more transparent comprehension of the connection between sustainable performance and NFD readability can bolster investor confidence in companies that genuinely prioritize ESG factors, potentially resulting in more significant investment in sustainable initiatives (Folqué et al. 2021). Fourth, the results show the potentialities of readability tools, such as the Gunning Fog index, as estimations of the greenwashing risk due to the degree of understandability of

NFD. Considering that these tools are standard, they could be quickly adopted by investors, regulators or companies themselves to obtain additional elements to assess (or self-assess) the quality of the disclosure (Kravet and Muslu 2013).

All these aspects highlight potential improvements that the company can implement starting from the readability of its non-financial disclosure. In fact, if a better readability of the NFD is able to improve the relationship with stakeholders, offering a 'cleaner' image of the company towards investors, it will be in the interests of managers to work so that the language used in non-financial reporting can be easy and immediate to understand. In this way, companies would avoid providing information and reports with complex language that could confuse stakeholders to the point of achieving an objective opposite to that for which the documentation fundamentally exists, that is, to convey a clear and understandable message, be it of a financial and non-financial nature. Finally, those responsible for nonfinancial reporting could strive, in conjunction with expert and qualified linguists, to produce a clear, complete and easy-to-understand document, especially with reference to environmental data.

From the regulators' point of view, this aim could be encouraged by also imposing linguistic reporting standards such as, for example, a maximum number of words to be used and a glossary to be suggested to companies when drafting nonfinancial disclosures.

One of the limitations of this study regards the Fog index, calculated on NFD without distinguishing the nature of the information; therefore, further research could be conducted to examine the specific Fog index of each section of the sustainable disclosure. Moreover, the study context is limited to Italy; thus, future research could extend the sample and the number of observations, also comparing disclosure among companies in different countries. In addition, examining the relationship between corporate ESG performance and NFD readability both before and after the implementation of Directive 2014/95/EU (and the new normative regulation Corporate Sustainability Reporting Directive—2022/2464/EU) could furtherly contribute to the literature in this field. Therefore, it could be interesting to test the impact of EU regulation by comparing the relationship before and after the implementation of Directive 2014/95/EU using a difference-in-differences (diff-in-diff) approach while also considering the differences between mandatory and voluntary reporting (Bischof and Daske 2013). However, the NFD analysed in this study are all in English; the use of different languages could potentially influence the readability of the text in varying ways (Wang et al. 2018). Therefore, future studies should try to compare sustainability reports across different language systems to help global investors interpret sustainability disclosures. Furthermore, the results of our study support the signalling theory, but by replicating the same analysis and dividing the sample according to ESG performance, it would be possible to have more information on the validity of the legitimacy theory. In fact, by splitting the sample into companies with a good ESG performance from those with a bad one, a different relationship could occur between the readability of the NFD and the ESG performance, offering more results to be interpreted also in light of the legitimacy theory. Finally, given that the results of this research demonstrate a significant (positive) relationship solely between environmental performance and NFD readability,

further studies are warranted to investigate the role of the other ESG pillar performance (social and governance performance) in influencing the risk of corporate disclosure manipulation, as previously suggested by other scholars referring to the influence of board size on greenwashing (Ghitti et al. 2023).

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## Endnotes

- <sup>1</sup>In France, the European Regulation 95/2014 was implemented in 2017 with the ‘Loi n° 2017-399 du 27 mars 2017 relative au devoir de vigilance des sociétés mères et des entreprises donneuses d’ordre’.
- <sup>2</sup>In Germany, the European Regulation 95/2014 was implemented in 2017 with the ‘Gesetz zur Stärkung der nichtfinanziellen Berichterstattung der Unternehmen in ihren Lage- und Konzernlageberichten’.
- <sup>3</sup>In Spain, the European Regulation 95/2014 was implemented in 2017 with the ‘Real Decreto-ley 18/2017’.

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