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**Determinants and Contradictions of Non-Financial Disclosure: Opportunities and Risks of  
Green and Social Washing**

**Settore scientifico disciplinare ECON-06/A**

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# 1. Introduction

Nowadays, investors are not only interested in the financial and market performance of a firm, instead they also look at their environmental, social and governance (ESG) performance (Wei et al., 2023). Firms are required to focus on non-financial aspects of their activities not only by stakeholders but also by regulators (Latella & Veltri, 2024). For instance, the Paris agreement commit firms to cut their emissions, incentivizing them to achieve a better environmental performance. Nevertheless, regulation has been mainly focused on disclosure of non-financial information (NFI). The Directive 2014/95/EU (Non Financial Reporting Directive - NFRD) has introduced the obligation for large undertakings to disclose ESG information. It has been issued to increase transparency, credibility and comparability of NFI disclosed (Cicchello et al., 2022; La Torre et al., 2020). Recently, a new Directive, the Corporate Sustainability Reporting Directive (CSRD), has been issued with the purpose to overcome the main limitations of NFRD (Mazzotta & Veltri, 2022). The CSRD addressed previous shortcomings by extending reporting requirements to a broader scope of companies (including listed small and medium-sized companies - SMEs), emphasizing the double materiality principle, introducing more detailed sustainability reporting aligned with European Sustainability Reporting Standards (ESRS), integrating sustainability data into management reports and digital tagging of reported information, mandating external assurance (Hummel & Jobst, 2024).

While regulation affects mainly whether firms disclose or not, it is not clear if it influences how firms disclose non-financial information. Within this thesis, we investigate the mechanisms which affect how firms disclose. Specifically, the first chapter answers to an explorative question ‘What is the current state of the art related to the drivers of the non-financial disclosure quality?’. Drawing from the literature, it identifies the key factors that impact the quality of non-financial disclosures (NFDQ), highlighting that sustainable governance mechanisms positively influence it.

Starting from this finding, the second and the third chapters deepen the analysis investigating how sustainable governance mechanisms affect the positive (i.e., the quality) and negative (i.e., green and social washing) facets of non-financial disclosure. If mandating non-financial disclosure could be beneficial as it makes stakeholders aware of firms impacts on the environment which surrounds the firms, from another point of view it could incentivize firms to provide misleading disclosure. Within this work, it is posited that for small-cap firms, which typically have fewer resources, it is more crucial to identify mechanisms that enable them to disclose relevant and accurate information. In contrast, for large-cap firms, the priority lies in preventing the dissemination of misleading or false information about their sustainability commitments, given their greater visibility and influence on stakeholders. The distinction in priorities between small-cap and large-cap firms arises from their differing

capabilities and impacts. Small-cap firms often struggle with limited resources, which can obstruct their ability to gather and report sustainability-related data effectively. Thus, it becomes essential to establish clear mechanisms which facilitate accurate and transparent disclosure for these firms. On the other hand, large-cap firms, with greater resources and market presence, face heightened scrutiny from stakeholders and a higher risk of reputational damage. Their larger impact makes it imperative to ensure they do not exploit their sustainability reporting to mislead stakeholders or greenwash their practices. Thus, the second and the third chapter, respectively, answer to the following questions: ‘Do sustainable governance mechanisms affect sustainability materiality disclosure quality of listed SMEs?’ and ‘Which sustainable governance mechanism prevents non-financial disclosure contradictions in the context of big-cap firms?’. In the following, a brief summary of the three chapters is provided.

The first chapter aims to analyze the current state of research on the determinants of non-financial disclosure quality (NFDQ). The systematic literature review analysis (SLRA) applied in the study is based on the systematic literature review (SLR) principles, and on bibliographic analysis (BA) and manual content analysis (MCA) instruments to highlight the key factors that have been studied for their impact on NFDQ. These factors include firm-related drivers (i.e., ESG-related drivers and other firm-related drivers), the characteristics of non-financial reports (assurance, type of report and sustainability guidelines) and country level determinants (non-financial regulation). In addition to summarizing the current state of knowledge, the first essay identifies gaps in the existing literature and offers valuable suggestions for future research directions.

The second chapter aims to explore how sustainable governance variables, identified by the SLRA among the main determinants of NFDQ, influence sustainability materiality disclosure quality (MDQ) in the context of Italian listed small and medium-sized enterprises (SMEs). To construct the primary dependent variable, an index to assess MDQ is implemented based on a set of indicators suitable to our sample of Italian listed SMEs. The sustainability governance variables investigated are board gender diversity, measured either as proportion or a critical mass of women on board, along with the existence of a sustainability committee. Based on these two variables, in addition we construct a sustainable governance index. The empirical analysis is conducted by employing a beta regression model. The results indicate that the sustainable governance index, the board gender diversity (measured with the proportion of women on the board), and the presence of a sustainability committee have a positive effect on MDQ. However, no significant impact is observed for the board gender diversity measured with the critical mass of women on the board. The second essay enriches the existing literature on the quality of non-financial disclosure in a voluntary setting and furnishes valuable policy insights by investigating listed SMEs' readiness to disclose information under

mandatory regulations and identifying the factors that bolster their reporting capabilities, as well as the quality and relevance of their disclosures.

Finally, the third essay explores whether sustainable governance mechanisms mitigate the contradictions of non-financial disclosure, as represented by greenwashing and social washing. In particular, the analysis is based on a panel dataset ranging from 2013 to 2021 in the context of S&P US 500 firms. The sustainability governance variables considered in the study are tilted boards, the existence of a sustainability committee and an ESG-based executive compensation. Based on these variables, in addition we construct a sustainable governance index. We intend greenwashing and social washing when there is a mismatch between disclosed information and actual performance, characterized by greater disclosure than performance. Therefore, we calculate the scores as the difference between the normalized environmental and social disclosure scores and the normalized environmental and social performance scores and employ a Tobit model as we need our dependent variable to be left-censored taking into consideration only positive greenwashing and social washing values. The study shows that the governance bundle made up by tilted boards and sustainability committees, not paired with short-term ESG incentives supports the achievement of actual sustainability outcomes. By testing the combined impact of different sustainable governance mechanisms as well as the differentiation between mechanisms directly linked to sustainability outcomes and mechanisms which indirectly affects sustainability outcomes, the third chapter enriches the literature debate representing the best sustainable governance structure to foster actual sustainability commitment and offers a holistic view on how sustainable governance mechanisms should be shaped to ensure an actual commitment towards sustainability.

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## 2. The drivers of non-financial disclosure quality: a systematic literature review analysis

### 2.1 Introduction

Nowadays, companies are expected to prioritize sustainability, taking into account their impact on both people and the environment. Over years, stakeholders have increasingly requested companies to disclose non-financial information (NFI) in their sustainability reports (SRs) and a growing number of companies have voluntarily integrated social and environmental policies in their business model, disclosing their environmental and social performance in addition to their financial performance (Engle et al., 2021). The pressure from stakeholders for companies to integrate social issues in their strategic aims and activities led regulators to issue new mandatory legislative frameworks to foster the development of a responsible approach to business, with the ultimate aim to enhance transparency between companies and stakeholders, so improving the quality of NFI disclosed (La Torre et al., 2018). The European Union (EU) has been actively engaged in initiatives aimed at promoting sustainability. A significant focus of EU regulation has been on non-financial disclosure, transitioning from voluntary to mandatory reporting. In 2014, the EU introduced the 2014/95/EU Directive, commonly known as the Non-Financial Reporting Directive (NFRD), which required large firms to disclose non-financial and diversity information. By January 5, 2023, the EU implemented the 2022/2464/EU Directive, referred to as the Corporate Sustainability Reporting Directive (CSRD). The CSRD extends the scope of firms required to disclose their sustainability impacts, encompassing all large companies and listed companies (excluding micro-enterprises). This expansion significantly increases the number of companies obligated to disclose NFI to around 50,000 (Turzo et al., 2022). Furthermore, several initiatives have been launched (i.e. EFRAG and ISSB) to introduce sustainability standards, with the aim to enhance the transparency of disclosed information, based on different perspectives (Afolabi et al., 2022; Giner & Luque-Vílchez, 2022). In detail, the European Financial Reporting Advisory Group (EFRAG) adopts a stakeholder-oriented approach, considering the perspectives of all parties involved, whilst the International Sustainability Standards Board (ISSB), established by the IFRS Foundation to issue sustainability standards, prioritizes the financial materiality perspective, putting investors at the forefront (Organismo Italiano Business Reporting, 2022).

However, it is questionable whether the increased amount of sustainability information disclosed in the non-financial reports and the efforts addressed to enhance the comparability of this information have improved the quality of non-financial information. Among the literature reviews conducted on non-financial disclosure (NFD), aimed at systematizing the scientific knowledge in the research field

(Bilal et al., 2024; Turzo et al., 2022; Jain & Tripathi, 2023), only few focused on the quality of NFD (Afeltra et al., 2024; Minutiello & Tettamanzi, 2022) or on the drivers of NFD (Afeltra et al., 2022), but no study comes to systematically analyze the literature related to the drivers of non-financial disclosure quality (NFDQ)<sup>1</sup>. Our literature review seeks to fill this research gap by identifying the primary determinants of NFDQ, as explored in the existing literature. This aspect constitutes the primary novelty of our paper, alongside our chosen methodology.

We need to highlight that in our paper, consistently with a stream of literature (Beretta & Bozzolan, 2008; Mazzotta et al., 2020; Gao et al., 2016; Helfaya et al., 2019; Fiandrino et al., 2021; Carungu et al., 2021), we share a notion of quality as a complex one, that could not be proxied with the amount of disclosure, instead it relies on several dimensions, that authors have identified using different frameworks (Veltri et al., 2023).

Answering the call in the field to adopt novel methods to literature review (Massaro et al., 2016), we conducted a literature review in three phases, the first being a systematic literature review (SLR), with the aim to return a set of selected papers focused on the investigated issue, the second a bibliographic analysis (BA) and visualization of the selected papers, with the aim to find the existing research streams in the field, while the third involves a manual content analysis (MCA) to provide a deep examination of the main insights of the articles included in the SLR (Nicolò et al., 2024). The combination of these methods proves to be a fitting approach for delivering a thorough review of a scientific domain, enriches scholars' comprehension of the ongoing scientific discourse but also effectively identifies potential research gaps and provides future research directions (Afeltra et al., 2022, 2024; Bellucci et al., 2022; Pizzi et al., 2020, 2021; Turzo et al., 2022; Songini et al., 2023).

The paper contribution to the existing literature on NFDQ is manifold. First, we have systematically organized the existing research based on the factors that affect the quality of non-financial disclosure, which, as far as we know, has not been previously done. Secondly, our systematic review and analysis provides a better understanding of the existing research lines in the field. Additionally, we have utilized two bibliographic databases (Scopus and Web of Science) to expand our sample size, overcoming a limitation of previous studies that relied on only one database (e.g., Comerio & Strozzi, 2019; Galletta et al., 2022; Songini et al., 2023). Furthermore, the paper contributes to the body of knowledge regarding the drivers of quality of Environmental, Social and

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<sup>1</sup> In the text we will use as acronyms non-financial disclosure quality (NFDQ); non-financial disclosure (NFD); non-financial information (NFI); Environmental, Social and Governance (ESG); sustainability report/reports (SR); integrated report/reports (IR); systematic literature review analysis (SLRA); systematic literature review (SLR); bibliographic analysis (BA); manual content analysis (MCA).

Governance (ESG) reporting by adopting a novel method to literature, and by implementing different techniques for the analysis. Moreover, the combination of multiple analyses (i.e., the adoption of bibliometric tools integrated by MCA) permits a comprehensive research agenda that invites further contributions to different drivers of quality information in voluntary and mandatory NFD.

The remainder of the paper is structured as follows: Section 2.2 describes the research framework, Section 2.3 describes the methodology, Sections 2.4, 2.5 and 2.6 respectively present the results of the performance analysis, bibliographic analysis and manual content analysis. A discussion of the findings and avenues for future research are presented in Section 2.7, followed by the conclusions in Section 2.8.

## 2.2 Research framework

We formulated our own research framework to offer a structured examination of the literature concerning NFDQ drivers. This framework facilitates an integrative and critical appraisal of existing literature, enabling the synthesis of literature review findings and the identification of potential future research directions.

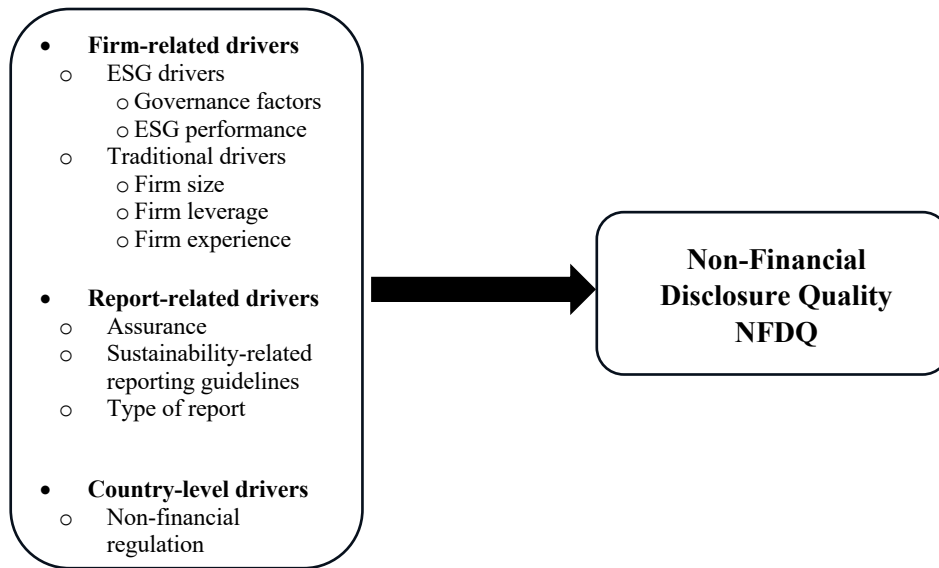
Within our framework, the "input" component encompasses first firm-related drivers, which can be further categorized into two main subgroups: ESG-related drivers, and firm drivers unrelated to ESG factors. ESG corporate inputs include ESG performance (e.g., environmental performance measured by carbon emissions) and governance aspects (e.g., board diversity, sustainability committee composition). Additionally, other firm-related drivers, such as firm size, leverage, and experience, can be examined as potential determinants of NFDQ.

The second set of NFDQ drivers pertains to the characteristics of non-financial reports. Specifically, considerations involve whether the report undergoes external assurance, the guidelines utilized (e.g., Global Reporting Initiatives guidelines), and the report type (e.g., Integrated or Sustainability report).

Lastly, a significant driver at the country level is non-financial regulation, which predominantly focuses on disclosure requirements (e.g., NFRD).

Figure 1 graphically illustrates the framework of our research.

**Figure 1.** Research framework



Source: our elaboration

## 2.3 Methodology

This paper adopts a methodology named Systematic Literature Review Analysis (SLRA). Differently from traditional literature reviews, the SLRA allows researchers to identify, critically evaluate and synthesize the existing literature in a transparent, rigorous and replicable method (Ammirato et al., 2023; Kraus et al., 2022). Our SLRA involves the technique of the SLR, which aims at selecting the sample to analyze, and the techniques of analysis of the sample, both a quantitative technique (BA) and a qualitative technique (MCA).

The SLR encompasses sequential steps, as delineated by Afeltra et al. (2024), Bellucci et al. (2022), and Pizzi et al. (2021), to return a final sample for analysis. Specifically, these steps involve: (1) Defining the scope of the analysis and research questions; (2) Searching for the literature, selecting the research database and keywords to use; (3) Applying filters to extract sample papers from the database (subject area; document type, publication stage; source type and language); (4) Screening to evaluate papers' inclusion or exclusion from the final sample.

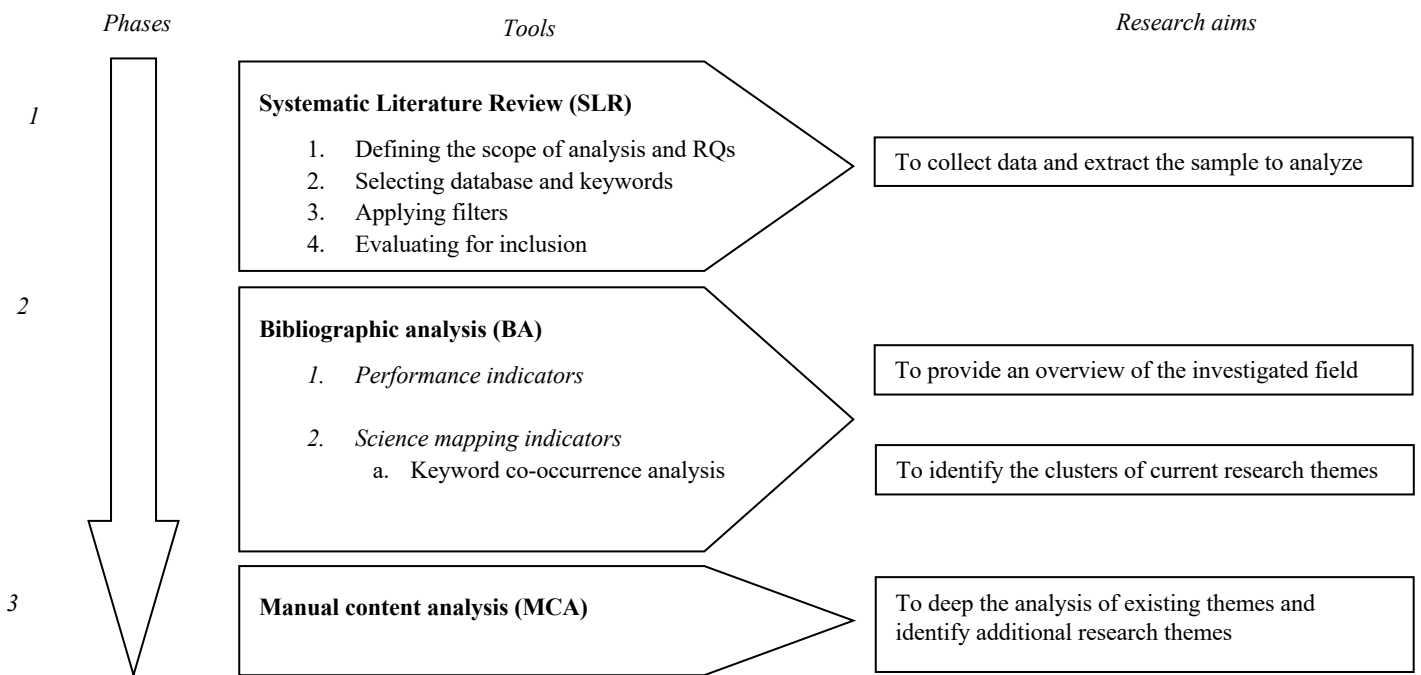
Subsequently, the identified sample undergoes quantitative (second phase) and qualitative (third phase) analysis to comprehensively describe, examine, and monitor the selected published research, aiming to provide an overview of the investigated field and identify research clusters. The second phase entails a bibliometric analysis (Öztürk et al., 2024; Donthu et al., 2021), involving the following steps as delineated by Bilal et al. (2024) and Lamboglia et al. (2021): (1) Descriptive statistics of the

sample based on performance indicators; (2) Identification of current research trends through science mapping indicators.

The third phase incorporates content analysis, conducted manually to deeply scrutinize the primary insights of the reviewed articles within the SLR, thereby mitigating bias and augmenting the scientific robustness of the review's outcomes and to identify additional research streams (Songini et al., 2023).

Figure 2 illustrates the methodology employed in our paper.

**Figure 2.** The SLRA methodology: phases, tools and research aims



Source: our elaboration

### 2.3.1 First phase of SLRA methodology: SLR

The first step of the SLR involved translating the scope of the analysis into following research questions (RQs):

*RQ1. What is the current state of the art of the NFDQ drivers literature?*

*RQ2. What are the current research themes in the NFDQ drivers literature?*

In the second step we searched for relevant keywords according to previous studies and consistently with the scope of the analysis and RQs. We selected the keywords to make sure the research was as specific as possible, thus to gather only contributions which analyzed the potential determinants of NFDQ. Therefore, final enquiry was made as follows: "determ\*" OR "driver" OR "factor\*" AND "quality" AND "non-financial disclosure" OR "non financial disclosure" OR "environmental disclosure" OR "social disclosure" OR "governance disclosure" OR "esg disclosure"

OR "sustainability disclosure" OR "sustainability reporting". We also added *sustainability reporting* after noticing that the number of papers would have increased considerably. Two bibliographic databases have been used, i.e., Web of Science (WoS) and Scopus, which according to previous studies, represent the two main bibliographic databases (Pranckutė, 2021).

Additional filters have been applied, such as document type, language, and subject area, to include only relevant studies (step 3). At the end of the third step, the analysis returned 372 articles, of which 159 from the Scopus database and 213 from the WOS database. Table 1 schematizes the search conducted on the databases.

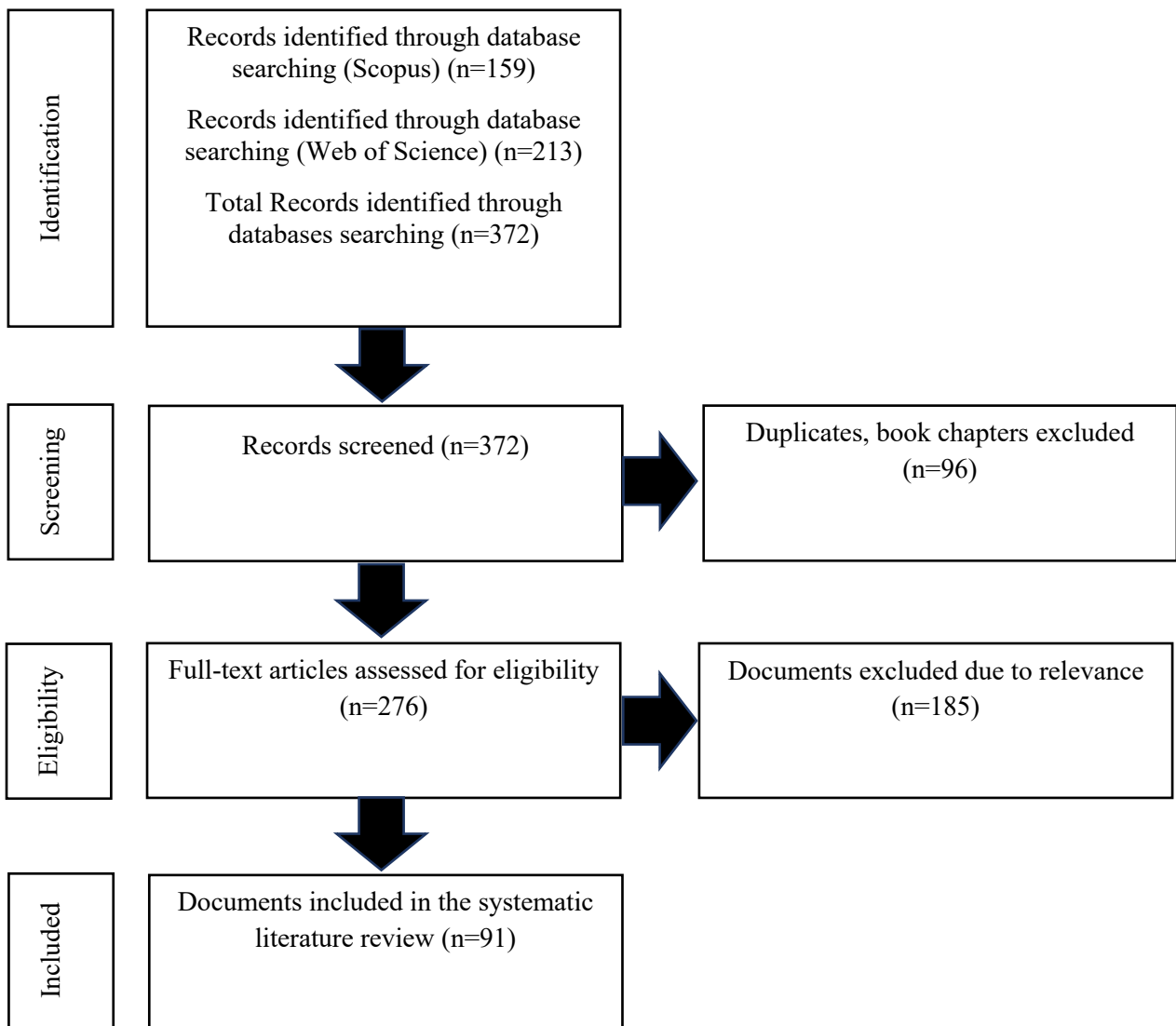
**Table 1.** Database search

<b>Query</b>	"determ*" OR "driver" OR "factor*" AND "quality" AND "non-financial disclosure" OR "non financial disclosure" OR "environmental disclosure" OR "social disclosure" OR "governance disclosure" OR "esg disclosure" OR "sustainability disclosure" OR "sustainability reporting"
<b>Filters on Scopus</b>	<b>Document type:</b> Article <b>Publication stage:</b> Final stage <b>Language:</b> English <b>Subject areas:</b> Business, Management and Accounting; Economics, Econometrics and Finance.
<b>Filters on WoS</b>	<b>Document type:</b> Published peer-reviewed article, excluding early access <b>Publication stage:</b> Final stage <b>Language:</b> English <b>WoS categories:</b> Business finance; economics; business; management.
<b>Results</b>	Scopus: 159 papers; WoS: 213 papers.

Source: our elaboration

Removing duplicates and book chapters, led us to assess 276 papers for eligibility. To obtain the final sample of 91 articles, papers were screened reading through abstracts, keywords and, in most of the cases, by reading the full papers. We selected only those contributions which studied factors associated with the quality of sustainability information disclosed in any type of report. In particular, we removed those articles which investigated NFDQ without entering into the debate of the factors affecting it. To eliminate the subjectivity as far as possible, we relied on authors' consideration of quality, regardless of how it was measured. When the inclusion of a paper was doubtful, we considered the cited literature, especially that related to the hypotheses formulated. Once we retrieved the papers from Scopus and WoS, the steps have been conducted on the basis of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher et al., 2009) graphically represented in figure 3.

**Figure 3.** PRISMA methodology



Source: our elaboration on Moher et al. (2009)

### 2.3.2 Second phase of SLRA methodology: BA

The first step of the BA is the performance analysis, that consists of generating descriptive statistics based on different indicators, outlining the performance of the different research constituents (Donthu et al., 2021). The performance analysis allowed us to answer the RQ1 by showing the main characteristics of the sampled papers and their performance in terms of distribution over time, journals, citations and countries. Bibliometrix (Aria & Cuccurullo, 2017) was used for performance analysis.

Subsequently, we transitioned to the core phase of BA, namely science mapping (Nicolò et al., 2024). Among the different tools pertaining to science mapping analysis, we decided to focus on the

keyword co-occurrence analysis as, differently from other science mapping tools that connect documents indirectly through citations or co-authorships, the keyword co-occurrence analysis uses the actual contents of papers to build a similarity measure and derive thematic clusters (Caputo et al., 2021; Župic & Čater, 2015). Keywords co-occur when they occur together in a paper. The primary underlying assumption of this method is that the higher the co-occurrence of specific keywords in articles (i.e. the extent to which two keywords are mentioned together within the same article), the stronger the connection of such articles and the probability of sharing the same research theme (Caputo et al., 2021; Lamboglia et al., 2021). In other words, the presence of many co-occurrences around the same word or pair of words may correspond to a research theme, so revealing patterns and trends in a specific discipline (Ding et al., 2001). In this work the co-occurrence keyword network was analyzed using VOSviewer software (Van Eck & Waltman, 2010) which employs the VOS (Visualisation Of Similarities) clustering technique (Agrawal et al., 2023). VOSviewer determines the locations of items in a map by minimizing a function depending on a similarity measure between items.

### 2.3.3 Third phase of SLRA methodology: Manual content analysis

Content analysis serves as a method for researchers to extract valuable insights from documents and draw accurate conclusions about their contextual usage (Krippendorff, 2004). Specifically, our study employed a manual, meaning-oriented content analysis approach, focusing on discerning the themes within the sampled articles (Beattie et al., 2004). This manual analysis was conducted to complement the automated categorization of articles into clusters provided by bibliometric tools, in accordance with Songini et al. (2023). To ensure rigor, we utilized a directed content analysis methodology, wherein key concepts or variables, derived from a theoretical framework, were identified as coding categories to validate our research framework (Hsieh & Shannon, 2005). Reliability was upheld by having two authors independently conduct the content analysis (Nicolò et al., 2024). Panel meetings among the authors were convened to confirm the articles' categorization into clusters identified by bibliometric tools and to identify any additional theme not emerged from the BA analysis. After this phase, papers were redistributed among the authors as an additional reliability measure, revealing no significant discrepancies. Finally, a conclusive meeting was held to validate the clusters derived from BA and the supplementary themes derived from MCA.

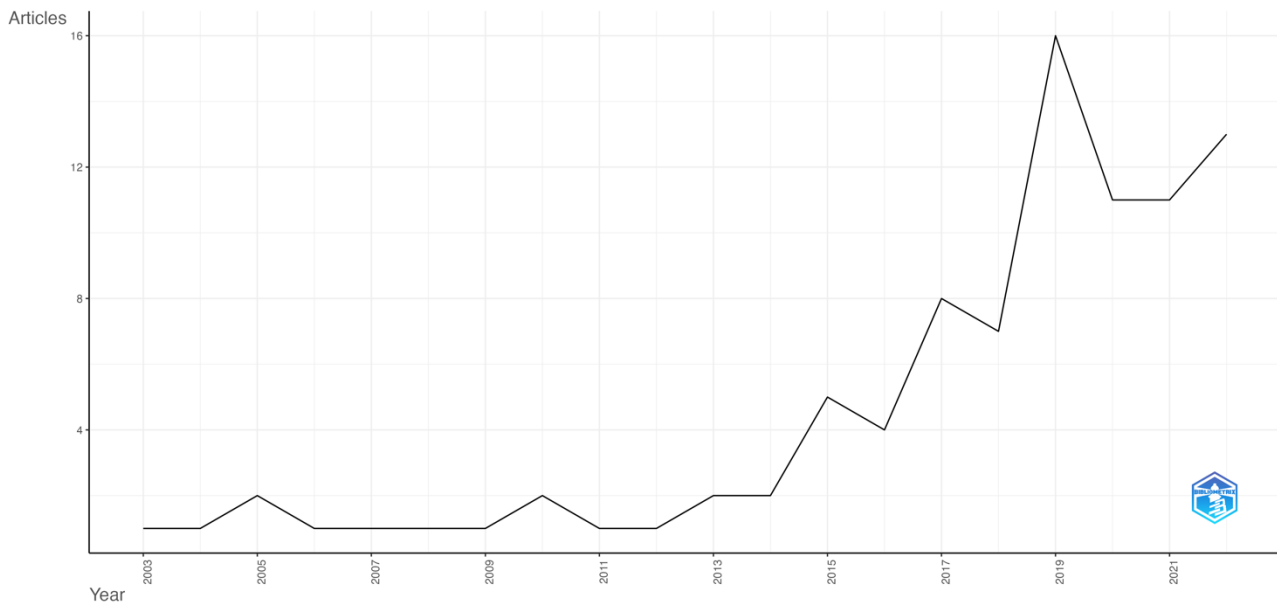
## 2.4 Performance analysis results

Section 4 illustrates the results of the performance analysis in terms of the research constituents articles, journals and countries.

### 2.4.1 Articles

Starting from the distribution of articles over time, it emerged that the investigated research field can be defined a rising one, as highlighted by Figure 4 which shows a peak of publications in 2019.

**Figure 4.** Paper publications over time



Source: Bibliometrix

Table 2 displays the top ten articles in terms of citations, noticing that all of them were published prior to the observed peak of publications in 2019. However, relying solely on total citation counts may lead to misinterpretation, as older articles tend to accumulate more citations over time compared to recently published ones (Manes-Rossi et al., 2020; Tranfield et al., 2003). To address this issue, we computed the average number of citations per year (CPY) and organized the articles accordingly in Table 3. Interestingly, despite changes in order, all but one article from Table 2 also appear in Table 3, thus affirming their relevance in the research field.

**Table 2.** Top ten cited articles

No	Reference	Articles	Citations
1	Cormier et al. (2005)	Environmental disclosure quality in large German companies: Economic incentives, public pressures or institutional conditions?	623
2	Brammer & Pavelin (2008)	Factors influencing the quality of corporate environmental disclosure	555
3	Michelon et al. (2015)	CSR reporting practices and the quality of disclosure: An empirical analysis	522
4	Brammer & Pavelin (2006)	Voluntary environmental disclosures by large UK companies	464
5	Van der Laan Smith et al. (2005)	Exploring differences in social disclosures internationally: A stakeholder perspective	386
6	Amran et al. (2014)	The influence of governance structure and strategic corporate social responsibility toward sustainability reporting quality	383
7	Rupley et al. (2017)	Governance, media and the quality of environmental disclosure	258
8	Diouf & Boiral (2017)	The quality of sustainability reports and impression management: A stakeholder perspective	240
9	Helfaya & Moussa (2017)	Do Board's Corporate Social Responsibility Strategy and Orientation Influence Environmental Sustainability Disclosure? UK Evidence	228
10	Lock & Seele (2016)	The credibility of CSR (corporate social responsibility) reports in Europe. Evidence from a quantitative content analysis in 11 countries	206

Source: our elaboration

**Table 3** Top ten articles by citation per year by Scopus.

No	Reference	Articles	Citations per year
1	Michelon et al. (2015)	CSR reporting practices and the quality of disclosure: An empirical analysis	52.2
2	Amran et al. (2014)	The influence of governance structure and strategic corporate social responsibility toward sustainability reporting quality	34.82
3	Brammer & Pavelin (2008)	Factors influencing the quality of corporate environmental disclosure	32.65
4	Cormier et al. (2005)	Environmental disclosure quality in large German companies: Economic incentives, public pressures or institutional conditions?	31.15
5	Diouf & Boiral (2017)	The quality of sustainability reports and impression management: A stakeholder perspective	30
6	Helfaya & Moussa (2017)	Do Board's Corporate Social Responsibility Strategy and Orientation Influence Environmental Sustainability Disclosure? UK Evidence	28.5
7	Brammer & Pavelin (2006)	Voluntary environmental disclosures by large UK companies	24.42
8	Lock & Seele (2016)	The credibility of CSR (corporate social responsibility) reports in Europe. Evidence from a quantitative content analysis in 11 countries	22.89
9	Vitolla et al. (2019)	The impact of national culture on integrated reporting quality. A stakeholder theory approach	20
10	Rupley et al. (2017)	Governance, media and the quality of environmental disclosure	19.85

Source: our elaboration

### 2.4.2 Journals

Table 4 illustrates the journals in which at least three sampled articles were published. These journals cover the 46% of the papers selected as eligible for the SLR. As in Galletta et al. (2022) article, we reported citations, citations per article and the H-index as provided by Journal Citation Report. *Business Strategy and the Environment* was the journal with the highest number of sampled articles, citations and citations per article. According to the Journal Citation Report's categories, four out of the eight journals displayed in the Table 4 are classifiable into environmental categories. Precisely, three of them into 'environmental studies' (i.e., *Business Strategy and the Environment*; *Corporate Social Responsibility and Environmental Management*; *Sustainability Accounting Management and Policy Journal*) and one into the categories of 'engineering, environmental' and 'environmental sciences' (i.e., *Journal of Cleaner Production*). Furthermore, all journals included in Table 4 are quality journals, e.g. journals ranked with 1 (i.e., *Corporate Social Responsibility and Environmental Management*; *Social Responsibility Journal*; *Meditari Accountancy Research*), 2 (i.e., *Sustainability Accounting, Management and Policy Journal*; *Journal of Applied Accounting Research*; *Journal of Cleaner Production*) or 3 ABS stars (*Business Strategy and the Environment*; *Journal of Business Ethics*).

**Table 4.** Sample articles by journal

Journal	Sampled articles	H-index	Citations	Citations per article
Business strategy and the environment	12	115	1840	153
Corporate Social Responsibility and Environmental management	6	82	308	51
Journal of Cleaner Production	5	232	421	84
Sustainability Accounting, Management and Policy Journal	5	34	116	23
Journal of Applied Accounting Research	4	27	221	55
Social Responsibility Journal	4	37	172	43
Journal of Business Ethics	3	208	328	109
Meditari Accountancy Research	3	27	23	8

Source: our elaboration

### 2.4.3 Countries

We identified the most prolific countries according to the countries scientific production indicator. This indicator is determined by the affiliation of all the authors in the articles, meaning that if an article is written by two Italian authors, then Italy's scientific production increases by two. In Figure 5, the map showcases this production intensity through varying shades of blue, where darker shades signify higher scientific output per country. Table 5 lists countries with a scientific production of at least a score of 8, together with the total number of documents. Although Malaysia emerged as the most prolific country, we noticed a prevalence of developed nations over developing ones. This trend may stem from heightened awareness and demand for sustainable business practices among investors,

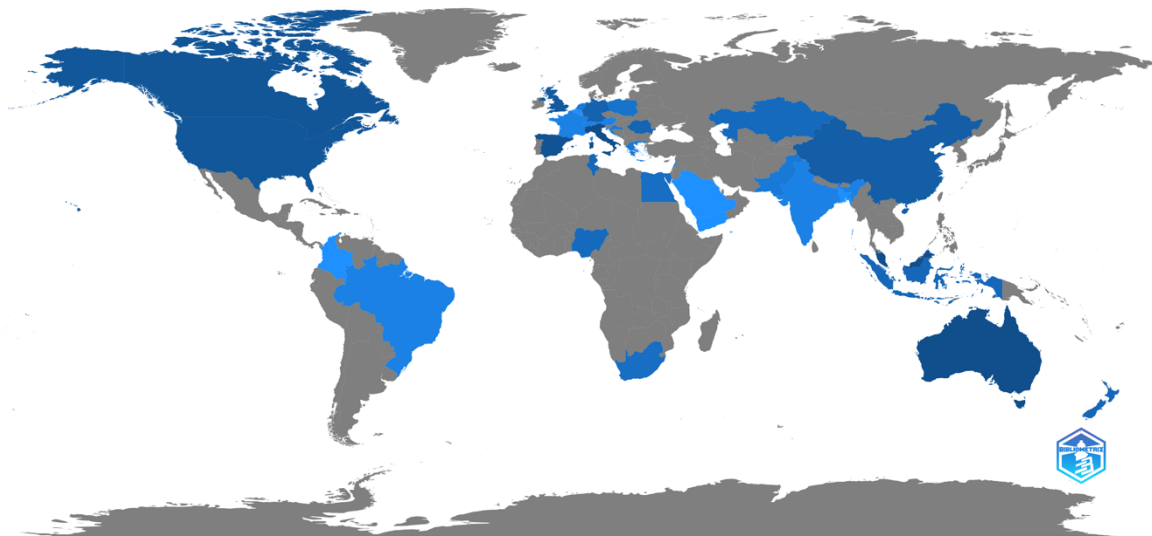
consumers, and stakeholders in developed economies. Conversely, many developing economies may have fewer regulatory requirements concerning ESG disclosure and reporting, thereby reducing the availability of non-financial disclosure.

**Table 5.** Sampled documents and scientific production per country

Country	Countries' scientific production	Total documents
Malaysia	28	8
Italy	25	10
Australia	24	12
Spain	19	8
Canada	17	9
United States	16	9
United Kingdom	14	9
China	11	5
Germany	9	3
Romania	8	3

Source: our elaboration

**Figure 5.** Country scientific production



Source: Bibliometrix

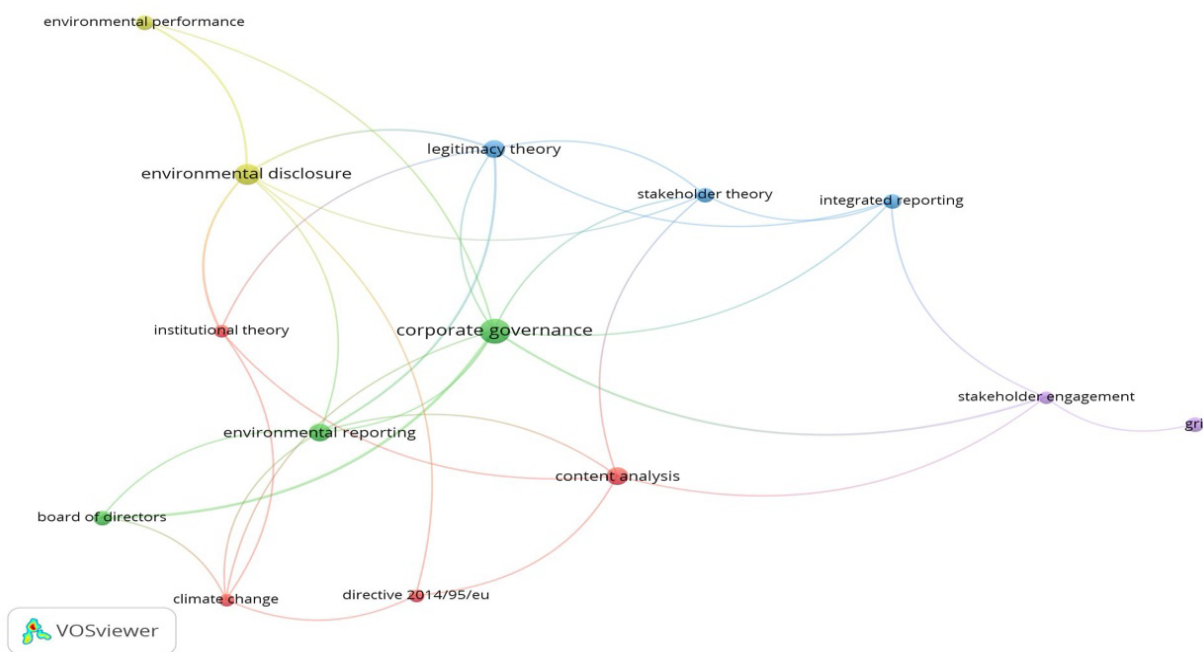
## 2.5 Science mapping analysis results

### 2.5.1 Keyword co-occurrence analysis

To analyze the authors' keywords, a co-occurrence network map has been built through VOSviewer, in which the co-occurrence networks nodes are the authors' keywords of the 91 papers. Only keywords that occur at least four times were taken into consideration. The number of links indicates the number of keywords which occur with another keyword. The link strength between two keywords represents the number of times two keywords occur together. The total link strength for a keyword is the sum of the single link strengths related to the keyword. The larger the size of each circle, the more

common a keyword (or set of keywords) is among all the papers; the thicker the line which connects two circles, the stronger the strength of the link is. As a parameter we chose keywords with a minimum number of 4 occurrences. Overall, the VOS algorithm detected 5 main clusters (i.e., green, yellow, blue, purple and red), where each cluster represents a specific research theme. Green and yellow clusters identify themes related to the firm-related drivers, blue and purple clusters identify themes related to the report-related drivers, whilst red cluster identifies themes related to the country-related drivers. Figure 6 depicts the network map.

**Figure 6.** Keyword co-occurrence analysis map



Source: Keyword co-occurrences network from VOSviewer

### 2.5.1.1 Green cluster: The influence of board-level firm governance on NFDQ

The green cluster groups studies which investigate the impact firm governance on NFDQ. It is evidently the most relevant and extensively discussed cluster within the scope of the analysis conducted. Specifically, studies within this cluster focused on board characteristics, distinguishing between classic board-level variables (board size and board independence) and sustainable governance variables (board gender diversity, sustainability committees and sustainable-related executive compensation).

Larger boards are typically associated with a greater diversity, as they encompass a broader spectrum of expertise and a variety of management viewpoints (Zahra & Pearce, 1989). Conversely,

smaller boards are linked with fewer decision-making challenges, marked by decreased internal conflicts and improved coordination and collaboration (Menicucci & Paolucci, 2023). In their investigation of listed firms in Nigeria, Erin et al. (2022) discovered a positive association between board size and NFDQ, particularly evident when the quality of disclosure is high. Mahmood & Orazalin (2017) conducted a study on thirty oil, gas, and mining companies in Kazakhstan between 2010 and 2013, evaluating NFDQ based on disclosed GRI items, yielding consistent findings. Similarly, Correa-Garcia et al. (2020) evaluated NFDQ based on GRI application levels, providing additional support for the favorable impact of board size. In contrast, Amran et al. (2014) found no significant association in their analysis of Asian firms through content analysis of sustainability reports (SRs), a conclusion echoed by Adel et al. (2019) in their examination of European companies.

The existing literature presents two distinct perspectives on the relationship between board independence and reporting quality (Rahman & Kabir, 2023). The first is the improvement of disclosure hypothesis, which posits a positive correlation between board independence and reporting quality. Conversely, the avoidance of monitoring hypothesis suggests that board independence does not necessarily lead to higher disclosure quality, as managers may conceal information to avoid costly board monitoring. In their study, Brammer & Pavelin (2008) employed five dependent variables to gauge the quality of environmental disclosure. They discovered that non-executive directors had no significant impact on most dependent variables, except for environmental initiatives disclosure, where they had a negative effect. In contrast, San Ong et al. (2019) identified a positive impact of non-executive directors on the quality of environmental disclosure. Research by Amran et al. (2014) did not find a significant effect of board independence on the quality of SR, a finding corroborated by Correa-Garcia et al. (2020), Erin et al. (2022), and Mahmood & Orazalin (2017). Conversely, Adel et al. (2019) reported a negative impact of board independence on NFDQ, except for the community disclosure sub-section, where a positive impact was observed. Considering the potential compromise of the monitoring role of independent directors due to lengthy tenure, Jamil et al. (2021) investigated the influence of the proportion of independent directors with tenure less than nine years on the NFDQ of Malaysian firms. However, they found no significant impact. In contrast to prior studies, Manning et al. (2019) examined board monitoring effectiveness as a function of board independence, sustainability expertise, and diversity, revealing a positive impact on NFDQ. Similarly, Helfaya & Moussa (2017) incorporated board independence into a composite measure assessing board sustainability orientation, alongside gender diversity and audit committee financial expertise, indicating a positive impact on environmental disclosure quality. In summary, these findings suggest that independent directors alone may not suffice to ensure effective monitoring mechanisms. Instead,

they may require support from gender-diverse boards and individuals with expertise in sustainability and finance.

Among the sustainable governance mechanisms investigated, sampled articles discussed mainly the level of board gender diversity and board-level sustainability knowledge. Female directors allow the board to meet a wide variety of stakeholders' expectations, thus simplifying the implementation of sustainable initiatives (Giannarakis, 2014). Regarding board gender diversity, there is consensus regarding the beneficial impact of female directors on NFDQ. García-Sánchez et al. (2019) demonstrated, through a diverse sample of firms spanning 12 countries and 18 sectors, that companies with a greater representation of female directors tend to produce non-financial reports that are more comprehensive, containing more extensive information and more comparable quantitative data. Mahmood & Orazalin (2017) found that board diversity positively influenced the overall NFDQ and the quality of social disclosure. This finding was corroborated by Erin et al. (2022), Gerwanski et al. (2019) and Mahmoudian et al. (2022). Even Jaggi et al. (2021), focusing on corruption disclosure, discovered a positive relationship with board gender diversity. However, Amran et al. (2014) presented contrasting results, showing no significant impact of board gender diversity on NFDQ.

Mahmoudian et al. (2022) also investigated the impact of executive compensation tied to sustainability and the presence of a sustainability committee revealing that they contributed to enhance NFDQ according to GRI guidelines. Helfaya & Moussa (2017) demonstrated that sustainability committees enhance environmental disclosure quality, while Malola & Maroun (2019) and Marwa et al. (2020) found no significant association. Adel et al. (2019) provided further support for the positive impact of sustainability committees on NFDQ. Jamil et al. (2021) tested whether having directors with sustainability-related experience may enhance NFDQ, finding corroborating evidence.

In summary, the findings indicate that conventional board-level governance mechanisms do not enhance NFDQ, whereas sustainable governance mechanisms do show improvement in this regard. Therefore, organizations striving to enhance their NFDQ should consider integrating sustainable governance mechanisms into their practices, such as incorporating executive compensation linked to sustainability performance, establishing dedicated sustainability committees or appointing directors with sustainability experience.

### 2.5.1.2 *Yellow cluster: The influence of environmental performance on NFDQ*

To evaluate environmental performance is challenging due to the wide array of industries and business sectors, the intricate nature of company operations and activities, the diverse spectrum of emissions and environmental impacts (ranging from nuclear waste to noise pollution), the scarcity of suitable instruments and technological methodologies for measurement, as well as the occurrence of accidental emissions, discharges, or spills (Radu & Francoeur, 2017). Studies investigating the impact of environmental performance (Adinehzadeh et al., 2018; Baalouch et al., 2019; Brammer & Pavelin, 2006; Mahmoudian et al., 2022; Radu & Francoeur, 2017) have utilized different proxies. Specifically, Baalouch et al. (2019), Mahmoudian et al. (2022) and Radu & Francoeur (2017) employed ESG ratings, Adinehzadeh et al. (2018) measured environmental performance in terms of the severity of problems caused by the firm, while Brammer & Pavelin (2006) based their measure on the level of fines firms incurred for environmental transgressions (i.e., a proxy for poor environmental performance). Brammer & Pavelin (2006) demonstrated, using a sample of large UK firms, that poor environmental performance enhances the quality of voluntary environmental disclosure, while Jeriji & Louhichi (2021) showed that poor performers disclose low quality negative NFI using SRs as a legitimizing tool rather than for accountability purposes. Conversely, Baalouch et al. (2019) found the opposite effect, suggesting that environmental performance had a positive impact on environmental disclosure quality for a sample of French listed firms. This result aligns with Adinehzadeh et al. (2018), supporting the hypothesis that firms are strongly incentivized to disclose positive news and mitigate negative ones. Radu & Francoeur (2017) supported this conclusion, also suggesting a substitution between environmental innovation and environmental performance in determining environmental disclosure, depending on the level of disclosure. Additionally, Mahmoudian et al. (2022) demonstrated that the relationship between environmental performance and NFDQ is binary, implying that either environmental performance affects NFDQ or vice versa.

Few studies suggested that poor environmental performance drives firms to enhance NFDQ, while the majority propose that strong environmental performance fosters transparent reporting to show positive achievements. Furthermore, the binary relationship identified by Mahmoudian et al. (2022) underscores the need for further investigation into the dynamic interactions between non-financial performance and NFDQ.

### 2.5.1.3 *Blue cluster: The impact of the type of report on NFDQ*

The blue cluster includes articles which investigated whether the type of the report, SR versus integrated reports (IR) or annual reports, may affect NFDQ. IR underwent a transformation to a

wholly distinct reporting model, serving as an additional report that delves into the value creation process (Aprile et al., 2023). Botha et al. (2022) work employed the technique of content analysis to assess water governance disclosure, showing that, on a sample of food, beverage and tobacco firms mainly located in South Africa and Australia, IR is superior to non-IR (either SR or annual reports) water governance disclosure quality. Even though Romero et al. (2019) found that the quality of sustainability information is higher when disclosed with IR than annual reports, they also demonstrated that the quality of IR is lower than the quality of SRs. Michelon et al. (2015) added evidence to this stream of the literature by investigating whether the use of stand-alone SR improves the quality of the information disclosed. They observed that, even though more information is disclosed through this report, its use is merely symbolic without any significant impact on quality. Conversely, Helfaya & Moussa (2017) showed that issuing a stand-alone SR increases both the quantity and the quality of environmental disclosure. Even Balluchi et al. (2021) highlighted that publishing a stand-alone social and environmental report enhances the credibility of the information disclosed. Other studies as well found a positive and significant impact of stand-alone social or environmental report on NFDQ (Orazalin & Mahmood, 2020; Rao et al., 2022).

Overall, blue cluster's studies brought evidence that stand-alone SR allows to delivery high-quality NFI. Nevertheless, studies focusing on a particularly relevant category of disclosure within the industry under consideration (Botha et al., 2022) have found that the IR is more appropriate. Therefore, future studies may carry out additional industry-specific research to test this relationship.

#### *2.5.1.4 Purple cluster: The influence of GRI standards on NFDQ*

The Global Reporting Initiative (GRI) standards represent the most extensively employed framework for the dissemination of sustainability-related data (KPMG, 2022). Initiated in 2000, the GRI guidelines have undergone iterative refinements, culminating in the release of the GRI G4 guidelines in 2013. Subsequently, in 2016, the inaugural version of GRI standards was introduced. Scholarly discourse, as indicated by Khan et al. (2021) and Michelon et al. (2015), delineates two modes of engagement with GRI guidelines: symbolic and substantive practices. Symbolic utilization may entail a perfunctory approach, characterized by mere box-ticking exercises without any improvement of disclosure quality. Conversely, substantive utilization entails leveraging GRI guidelines as a reliable, consistent and relevant tool to report high-quality NFI. Empirical investigations, such as that conducted by Comyns (2016) on GHG reporting within the Oil and Gas sector, elucidated the augmentative effect of GRI guidelines on the quality dimensions of reporting. Similarly, Rahman et al. (2019) corroborated this affirmative impact on voluntary environmental disclosure among

electricity generating companies hailing from 53 diverse nations. Further reinforcement emerges from Alam & Tariq (2022) and Khan et al. (2021), substantiating the positive influence of GRI guidelines on the enhancement of NFDQ among Asian entities. Conversely, studies by Malola & Maroun (2019) and Michelon et al. (2015) reveal a non-significant impact on the quality of IR within South African firms and on the quality of SRs within the UK context, respectively. While the aforementioned studies primarily scrutinize the impact of GRI guidelines on NFDQ, others employ GRI as a yardstick to evaluate NFDQ. Works by Bhattacharyya (2014), Gallén & Peraita (2017), Mariappanadar et al. (2022), Orazalin & Mahmood (2020), Ottenstein et al. (2022) and Papa et al. (2022) adopt this approach.

Additionally, a subset of studies adopts a qualitative methodology to explore stakeholders' perspectives on NFDQ. Notably, Diouf & Boiral (2017) probed the opinions of Sustainable Responsible Investing (SRI) practitioners, Safari & Areeb (2020) assessed the perceptions of preparers, while Boiral et al. (2019) conducted content analysis of assurance statements to gauge auditors' viewpoints. These studies collectively endorse the assertion that GRI guidelines, when applied substantively, contribute to enhancing NFDQ. However, they also pointed out that often GRI guidelines are fragmented utilized and characterized by the omission of pertinent information, the disclosure of irrelevant details, and the employment of disparate quantitative measures that impede the comparability of reports.

Overall, based on these results, GRI standards have the potential to improve NFDQ if they are used in a substantive way. Conversely, if GRI guidelines are used merely for the sake of being used, no discernible contribution to the quality of disclosure is determined. Therefore, the extent to which GRI guidelines impact the quality of disclosure depends on how they are utilized.

#### *2.5.1.5 Red cluster: The influence of non-financial regulation on NFDQ*

The studies, categorized within the red cluster, concentrated either on the effects of NFRD or on regulations enacted prior to its implementation. The widely recognized impact of imposing an obligation to reveal NFI on the quantity of disclosed information contrasts with the less clear influence of regulation on the quality of such disclosures (Mion & Loza Aduai, 2019).

Venturelli et al. (2019) undertook an examination of NFDQ in the UK and Italy pre-NFRD implementation. Their findings suggested a higher level of NFDQ among UK firms compared to Italian firms, indicating that this disparity in quality was influenced by the earlier adoption of regulations regarding non-financial disclosure in the UK. Dumitru et al. (2017) similarly assessed the

quality of non-financial disclosure before the introduction of NFRD in Romania, which had introduced a regulation on non-financial disclosure prior to NFRD, and Poland, which had not enacted any regulation before NFRD. They also demonstrated that the prior adoption of regulations regarding non-financial disclosure enhanced NFDQ in Romania. Panfilo & Krasodomska (2022) conducted an analysis on European companies, finding that regulations implemented prior to NFRD did not result in higher quality of climate change risk disclosure. Based on a sample of Italian firms, Papa et al. (2022) found no impact of the EU directive on the quality of environmental disclosure. Schröder (2022) investigated NFD in the context of German banks post-NFRD implementation, further confirming the evidence that reporting quality in a mandatory setting improves gradually over time. Rosa et al. (2022) contributed additional evidence to this research stream by suggesting that the quality of emissions-related disclosure provided by Italian companies may improve more through adherence to the Paris Agreement (voluntary disclosure) rather than adherence to mandatory regulation (NFRD).

Overall, the evidence shows that mandating the disclosure of NFI improves its quality. However, the results are not the same for environmental disclosure, whose quality seems to be more influenced by ad-hoc regulation.

Table 6 shows the topic associated with each cluster and the main insights.

**Table 6.** Summary of keyword co-occurrence clusters' results

Clusters	Main insights	Relevant keywords	Most influential articles
Green cluster: The influence of board-level firm governance on NFDQ- <i>Firm-related drivers</i>	Conventional board-level governance mechanisms do not affect NFDQ, whereas sustainable governance mechanisms enhance NFDQ	Corporate governance; Board of directors	Amran et al. (2014); Correa-Garcia et al. (2020); Helfaya & Moussa (2017); Mahmood & Orazalin (2017)
Yellow cluster: The influence of environmental performance on NFDQ- <i>Firm-related drivers</i>	Most of the studies show that strong environmental performance fosters NFDQ	Environmental performance	Baalouch et al. (2019); Brammer & Pavelin (2006); Mahmoudian et al. (2022); Radu & Francoeur (2017)
Blue cluster: The impact of the type of report on NFDQ- <i>Report-related drivers</i>	Overall, it emerged that the use of stand-alone reports effectively improve the quality of the information disclosed representing a substantive tool	Integrated reporting	Balluchi et al. (2021); Botha et al. (2022); Michelon et al. (2015); Romero et al. (2019)
Purple cluster: The influence of GRI standards on NFDQ- <i>Report-related drivers</i>	GRI standards have the potential to improve NFDQ if they are used in a substantive way	GRI	Alam & Tariq (2022); Boiral et al. (2019); Diouf & Boiral (2017); Khan et al. (2021)
Red cluster: The influence of non-financial regulation on NFDQ- <i>Country-level drivers</i>	Mandating non-financial disclosure improves NFDQ. However, the results are not the same for environmental disclosure, whose quality seems to be more influenced by ad-hoc regulation	Directive/95/2014/EU; Climate change	Dumitru et al. (2017); Ottenstein et al. (2022); Panfilo & Krasodomska (2022); Papa et al. (2022);

Source: our elaboration

## 2.6 Additional research clusters

The MCA led to the identification of other factors influencing NFDQ not emerged from the previous BA. In particular, we identified additional firm-related drivers, both related to governance factors (i.e., audit committee features and ownership structure) than to firms characteristics (i.e., firm leverage, firm size, firm experience) and report-related drivers (assurance).

Besides the board of directors, another important corporate governance body is represented by the audit committee, which plays a vital role in overseeing and controlling the internal mechanisms of an organization, supporting the board in taking decisions efficiently (Talpur et al., 2018). A strong audit committee exert an oversight function which ensure the management adheres to regulatory directives concerning SR (Erin et al., 2022). Regarding the characteristics of the audit committee, both sustainable and traditional aspects can be distinguished, with traditional traits being more extensively explored. Notably, the size, level of independence, and frequency of meetings are among the internal features of the audit committee that have received considerable scrutiny. Al-Shaer et al. (2017) incorporated these characteristics, alongside financial expertise, into an index aimed at evaluating audit committee quality. Their findings indicate that higher audit committee quality corresponds to

enhanced environmental disclosure quality, although these traits do not individually impact it. Furthermore, Erin et al. (2022) revealed that both the size of the audit committee and the frequency of its meetings contribute to improving SRQ. Talpur et al. (2018) corroborated these findings by demonstrating that the size of the audit committee, its independence, and the frequency of board meetings enhance the quality of corporate governance disclosure. Concerning sustainable mechanisms associated with the audit committee, Marwa et al. (2020) demonstrated that the presence of an environmental audit committee is associated with an improved quality of environmental disclosure, while Bravo & Reguera-Alvarado (2018) investigated gender diversity in audit committee, finding a positive impact on the quality of ESG reporting as proxied by DEVA rankings for Spanish firms. These studies found that audit committee characteristics, either traditional or sustainable, are relevant determinants of NFDQ.

Various ownership's characteristics were analyzed as having an impact on NFDQ. Foreign ownership and ownership concentration were the most investigated. With respect to emerging economies, the ownership structure takes on a different relevance. Foreign ownership is a less prevalent form of ownership structure, whereas domestic ownership is more widespread (Douma et al., 2006). Nonetheless, our observation reveals conflicting outcomes regarding developed economies, yet they indicate a favorable influence of foreign ownership on NFDQ within emerging economies. Cormier et al. (2005) study found a negative impact on a sample of German companies, while Cormier & Magnan (2004) found a positive impact for Canadian companies. The other studies, focused on emerging economies (Amidjaya & Widagdo, 2020; Correa-Garcia et al., 2020; Orazalin & Mahmood, 2018) evidenced that foreign ownership improves NFDQ. Given that firms in emerging economies benefit from the presence of foreign investors when the ownership is concentrated (Douma et al., 2006), future studies may attempt to identify the critical mass of foreign investors' ownership which determine an improvement of NFDQ. Cormier et al. (2005) also investigated the impact of ownership concentration supporting an inverse relationship between ownership concentration and environmental disclosure quality. A negative impact was confirmed also by other studies (e.g., Cormier & Magnan, 2004; Correa-Garcia et al., 2020). Sampled studies' results highlight that while the presence of foreign investors enhances NFDQ (especially in the context of developing economies), the existence of a blockholder negatively affects it supporting the hypothesis that controlling groups tend to collude and establish policies that harm other stakeholders (Correa-Garcia et al., 2020).

Different works assessed the effect of company's leverage, either as a control variable or among the main independent ones. We focused on the second ones which supposed a different impact of leverage on NFDQ. Cormier et al. (2005) hypothesized that firm's financial condition is positively

related with environmental disclosure quality arguing that only well financial performing firms (i.e, not much leveraged) may bear the negative consequence of providing higher quality's environmental disclosure. Orazalin & Mahmood (2018) supposed that one reason why leverage may enhance the quality of SR is that highly leveraged firms provide a more extensive disclosure to reduce information asymmetry, hence to lower cost of capital. Despite their different hypotheses, both studies found no significant effect of leverage. Instead, a negative impact was found by Cormier & Magnan (2004), Farooq et al. (2021) and Orazalin & Mahmood (2020). In contrast with these studies, Ismail et al. (2018) found that highly leveraged companies are likely to disclose high quality environmental information. Overall, despite some exceptions, the results support the view that highly leveraged firms are more likely to provide lower NFDQ.

As bigger firms are more exposed to stakeholder's attention with respect to smaller firms, they are expected to provide more sustainability information of higher quality. Among the stakeholders, especially investors expect high quality disclosure from larger firms with respect to small firms (Siddique & Sciulli, 2020). Menassa (2010) found a significant positive impact of firm size on social disclosure. A positive impact was also found by Bhattacharyya (2014), Munshi & Dutta (2016) and Orazalin & Mahmood (2020). Instead, Farooq et al. (2021), Lock & Seele (2016) and Orazalin & Mahmood (2018) found no significant effect.

Company's experience may refer either to firm age or to the specific experience the company has on publishing SR. Lock & Seele (2016) investigated quality of SRs in terms of credibility supposing that firm's experience may increase it. The authors proxied firm's experience both with firm age and firm's years of reporting without finding a significant impact. As Lock & Seele (2016), Mio (2010) supported the results according to which firm's experience in SR is not a determinant of its quality. Instead, Balluchi et al. (2021), found, on a sample of Italian companies, that firm's reporting experience positively affects the quality of social and environmental reporting. Bhattacharyya (2014) and Munshi & Dutta (2016) found no impact of firm age on the quality of SR. Also, Orazalin & Mahmood (2020) provided evidence of no impact of firm age on the overall quality of SR, but a positive impact on environmental disclosure. Menassa (2010) found a weak relationship between bank's age and social disclosure which is mainly driven by product innovation and customer service's disclosure. Correa-Garcia et al. (2020) and Orazalin & Mahmood (2018) found a positive impact of firm age on the quality of SR. Most of the studies found that neither firm age nor non-financial reporting experience affect NFDQ.

Previous literature has proven that the assurance on SR increases its credibility (Del Giudice & Rigamonti, 2020). A third-party verification enhances the perception that the information is faithfully

reported. Sampled studies investigated either the impact of external assurance of NFI or whether the auditors are Big 4 companies or not. Gerwanski et al. (2019) proved that the presence of external assurance increases materiality disclosure quality within IR. A positive impact of external assurance on the quality of South African firms' IR reports was also found by Malola & Maroun (2019). The impact of combined assurance was tested by Donkor et al. (2021). They found, on a sample of South African companies, that harmonizing and coordinating the assurance activities provided by different actors (i.e., management, internal and external assurers), enhances reporting quality, as measured by means of content analysis, across different kind of reports. In accordance with these results, Baalouch et al. (2019) found that environmental audit positively affects the quality of environmental disclosure. The studies of Venturelli et al. (2019) and Michelon et al. (2015) found conflicting results on UK firms, with the first showing that external assurance had a positive impact NFDQ, while the second one found no significant impact. Dumitru et al. (2017) showed that companies audited by a Big 4 company provided higher NFDQ with respect to the others. Even Rao et al. (2022), which investigated the quality of voluntary modern slavery disclosure, showed that assurance provided by Big 4 firms positively and significantly affects it. These findings, for Big 4 companies, were further corroborated by other studies (Marwa et al., 2020; Rep et al., 2022). In conclusion, both the presence of an assurance statement as well as the circumstance that it is carried out by providers with well-established reputation (i.e., Big 4 companies) improve NFDQ.

Table 7 summarizes the findings of our MCA.

**Table 7.** Summary of manual content analysis' results

<b>Additional drivers of NFDQ</b>	<b>Main insights</b>
<i>Firm-related drivers: ESG drivers</i>	
- Ownership structure	While the presence of foreign investors enhances NFDQ (especially in the context of developing economies), ownership concentration negatively affects it
- Audit committee features	Audit committee size, independence, gender diversity and the frequency of its meetings are relevant determinants of NFDQ
<i>Firm-related drivers: traditional drivers</i>	
- Firm size	Firm size has either a positive or no significant impact on NFDQ
- Firm leverage	Despite some exceptions, the results support the view that highly leveraged firms are more likely to provide lower NFDQ
- Firm experience	Despite some exceptions, neither firm age nor non-financial reporting experience affect NFDQ
<i>Report-related drivers</i>	
- Assurance process	Both the presence of an assurance statement as well as the presence of Big 4 companies as assurance providers improve NFDQ

Source: our elaboration

## 2.7 Discussion of the findings and research agenda

In this section, we interpret how well our results support the intended research aims (Öztürk et al., 2024). Therefore, we critically discuss the main insights deriving from a review of the most influential papers for each thematic cluster identified through the BA and the MCA, interpreting them in the light of our research framework, that identifies three types of NFDQ determinants, namely firm-related drivers, report-related drivers and country-level drivers (Figure 1).

For what concerns firm-related determinants, as emerged both from the green cluster of the keyword co-occurrence analysis and from the MCA, governance factors have been the most extensively studied in terms of their impact on sustainability disclosure (Michelon & Parbonetti, 2012). Among governance factors, board gender diversity has emerged as one of the most investigated drivers of NFDQ. Future research, starting from the critical mass theory, could identify a threshold beyond which women on board affect decision-making process, especially with regard to non-financial disclosure. Future research could also explore different facets of board diversity beyond gender, including but not limited to experience, age, education, ethnicity, culture, and tenure, as they may offer additional advantages. Even diversity in terms of religious beliefs could be studied. Indeed, Pope Francis' Encyclical "Fratelli Tutti" has stimulated the debate on the sustainable future of the planet. Roman Catholics believers may align their conduct with the teachings of the pope (Terzani & Turzo, 2021). Therefore, future studies could investigate whether the inclination to Catholicism among board members has an impact on NFDQ.

As regards other governance-related mechanisms, some studies have examined the impact of the presence of a sustainability committee on NFDQ (Helfaya & Moussa, 2017; Mahmoudian et al., 2022; Malola & Maroun, 2019; Marwa et al., 2020), finding evidence that concentrating sustainability knowledge within a specific committee may enhance NFDQ, others focused on the impact of the main features of audit committee on NFDQ finding evidence of their significance in affecting the quality of disclosure. Future research could explore, both for sustainability and audit committees, the impact of other measures of diversity beyond gender on NFDQ.

For what concerns the ownership structure, as several studies provided evidence that the presence of foreign investors enhances NFDQ within emerging economies, future research may attempt to identify which is the critical mass of foreign investors' ownership influencing NFDQ in the context of emerging economies.

On the relationship between environmental performance and NFDQ, discussed by the studies included within the yellow cluster, two conflicting hypotheses emerge: one proposing that poor performers engage in disclosure, employing soft claims to mitigate potential criticisms adopting a legitimacy strategy, while another suggests that superior environmental performers are more inclined

to engage in genuinely discretionary disclosure channels (Clarkson et al., 2008). Most of the sampled studies provided evidence that strong environmental performance enhances NFDQ. Several studies highlight that influential stakeholders pay particular attention to those measures of performance closely related to the economic performance (Baalouch et al., 2019). Future studies may thus focus on environmental performance proxies beyond the traditional measures, like eco-efficiency, which allow a comparative assessment of environmental and economic efficiency (Janicka & Sajnóg, 2023). Additionally, industry-specific measures to assess environmental performance may be also relevant for stakeholders. For instance, within the automobile sector, Scope 3 emissions (i.e., greenhouse gas emissions that occur in the value chain of a company's activities but are not directly owned or controlled by the company) are particularly significant.

Among the firm-related traditional drivers, firm size is one of the most studied in the investigated research field. Despite the fact that small and medium-sized enterprises (SMEs) represent the majority of businesses worldwide and have a significant impact on the economy (Cardoni et al., 2022), they have received limited attention in this area of research. The majority of the studies included in our analysis focused on large and publicly listed companies, even when examining voluntary disclosure (e.g., Mateo-Márquez et al., 2021; Rao et al., 2022). Therefore, future research may prioritize the investigation of SMEs and assess whether the size enhances or lowers the NFDQ.

Transitioning to the report-related drivers, several studies discussed which type of report allows for the highest quality disclosure of NFI within the blue cluster. Overall, it seems that stand-alone SR, which are dedicated specifically to reporting on sustainability performance and initiatives, are associated with higher NFDQ. However, given that IR provide a holistic view of a company's performance by integrating financial and NFI, this approach can be beneficial for industries where non-financial practices significantly influence financial performance (e.g., for companies heavily reliant on reputation and brand value). Future studies may assess the impact of the type of report on NFDQ by carrying out an industry-specific analysis (Botha et al., 2022).

Purple cluster studies assessed the impact of sustainability reporting guidelines, in particular GRI ones. Future studies may test whether the new EFRAG and ISSB standards will contribute to improving NFDQ assessing in this way the impact of new sustainability-related guidelines.

Finally, authors investigated non-financial regulation as country-related driver of NFDQ. The literature provides evidence that voluntary SRs provide several advantages, such as increasing firm value (Tsang et al., 2022) or reducing disagreement among ESG rating agencies (Kimbrough et al., 2022). Furthermore, as pointed out by Gatti et al. (2019), greenwashing practices, which occur when companies report actions about environmental issues without effectively addressing them (Torelli et al., 2020), can be better addressed when there is a combination of voluntary and mandatory aspects

of NFI disclosure. According to the results of studies belonging to the red cluster, non-financial regulation has generally improved NFDQ. Considering that the new European Directive, recently, entered into force, future studies may assess whether these findings still hold for CSRD.

Table 8 provides an overview of the main findings from the different analyses categorized by framework dimensions and the related future research directions.

**Table 8.** Framework dimensions and future research directions

Framework dimension	Determinants of NFDQ	Future research directions
<i>Firm-related drivers:</i> Governance	<ul style="list-style-type: none"> <li>- Board of directors</li> <li>- Sustainability committee</li> <li>- Audit committee</li> <li>- Ownership structure</li> </ul>	<ul style="list-style-type: none"> <li>- Future studies may test the impact of measures of diversity other than gender (experience, age, education, ethnicity, culture, tenure, religious belief)</li> <li>- Future studies may attempt to identify the critical mass of foreign investors' ownership which determine an improvement of NFDQ</li> </ul>
<i>Firm-related drivers:</i> ESG performance	<ul style="list-style-type: none"> <li>- Environmental performance</li> </ul>	<ul style="list-style-type: none"> <li>- Future studies may assess the impact of environmental performance measures different from the traditional ones (e.g., eco-efficiency, Scope 3 emissions)</li> </ul>
<i>Firm-related drivers:</i> Firm size	<ul style="list-style-type: none"> <li>- Firm size</li> </ul>	<ul style="list-style-type: none"> <li>- Future studies may focus on SMEs and assesses whether NFDQ depends on the firm size</li> </ul>
<i>Report-related drivers:</i> Type of report	<ul style="list-style-type: none"> <li>- Type of report</li> </ul>	<ul style="list-style-type: none"> <li>- Future studies may assess whether the type of report used to disclose NFI affects its quality depending on the industry investigated</li> </ul>
<i>Report-related drivers:</i> Sustainability-related reporting guidelines	<ul style="list-style-type: none"> <li>- GRI</li> </ul>	<ul style="list-style-type: none"> <li>- Future studies may test the impact of the new sustainability reporting standards (i.e., EGRAG, ISSB)</li> </ul>
<i>Country-level drivers:</i> Non-financial regulation	<ul style="list-style-type: none"> <li>- Directive 2014/95/EU</li> </ul>	<ul style="list-style-type: none"> <li>- Future studies may test the impact of the new non-financial regulation (i.e. CSRD)</li> </ul>

Source: our elaboration

## 2.8 Conclusions

The literature focused on the disclosure of non-financial information, and generally on its determinants, has experienced a relevant growth, following the implementation of mandatory NFI disclosure in Europe through the NFRD, further strengthened by the CSRD, which shift the focus from the 'why companies disclose NFI' (determinants of disclosure) to the 'how companies disclose NFI' (drivers of the quality of disclosure), from the amount of the disclosure to its quality. Among the studies which have investigated the topic (e.g., Bilal et al., 2024; Arkoh et al., 2023; Seow, 2023; Turzo et al., 2022), no study systematized the existing literature specifically focused on the (internal

and external) drivers of the NFDQ. While some literature reviews focused on the drivers of NFD (Afeltra et al., 2022) or on NFDQ (Minutiello & Tettamanzi, 2022; Afeltra et al., 2024), we focused on the specific sub-domain of the drivers of NFDQ.

By carrying out a study on the determinants of NFDQ, we addressed the call made in previous studies to shift the investigative focus beyond the level of disclosure (Clarkson et al., 2008) and to identify possible drivers of NFDQ (Minutiello & Tettamanzi, 2022).

The present study thus systematizes the scholars' contributions and the knowledge domain related to this topic through a rigorous protocol according to which the articles retrieved applying a SLR methodology have been analyzed by combining the quantitative approach of bibliographic analysis and the qualitative approach of the manual content analysis.

This study's central contribution is the identification of five main thematic clusters, representing the main knowledge routes on which the research focused on the NFDQ's drivers has expanded over the years. By integrating these clusters with the outcome of the MCA, we have been able to derive the main trajectories that the investigated field will run across. Specifically, the implementation of the keyword co-occurrence map led to the identification of the following five research clusters: (1) The influence of board-level firm governance on NFDQ (green cluster); (2) The influence of environmental performance on NFDQ (yellow cluster); (3) The impact of the type of report on NFDQ (blue cluster); (4) The influence of GRI standards on NFDQ (purple cluster); (5) The influence of non-financial regulation on NFDQ (red cluster).

Both the main results from the cluster and of the content analysis and the future research directions have been interpreted in the light of our research framework, which proposes an articulation of the potential drivers into firm-related (both ESG and traditional), report-related and country related.

Summarizing, the main drivers of NFDQ emerged from our BA are sustainable governance mechanisms, environmental performance, stand-alone report, substantive use of GRI guidelines and mandated non-financial regulation. From the MCA, we identified as additional factors, which improve NFDQ, foreign ownership, audit committee features and assurance.

In addition to the theoretical contributions provided by the paper, that is improving the knowledge in the sub-field of the drivers of NFDQ, applying a new methodology (the SLRA) to perform the analysis also providing an idea of the possible evolution of the research field in the future, the study offers theoretical, practical and policy implications.

As regards theoretical implications, our findings may represent a starting point for researchers interested in investigating this research field topic in several ways, by enhancing their understanding of the most influential authors and journals in the research field, of the current themes as identified by research clusters and of the gaps and opportunities for future researches. Furthermore, our analysis

could provide a rigorous and combined (quantitative and qualitative) methodology for scholars who intend to investigate a research field employing a literature review.

As regards the practical implications, the analysis of the papers conducted during the SLRA allowed identification of some key factors that managers should take into consideration to enhance the quality of the non-financial corporate disclosure (e.g., the implementation of sustainable governance mechanisms).

For what concerns the policy implications, regulators are continuously involved in drafting or revising standards to enhance the relevance of non-financial information for corporate stakeholders (e.g., CSRD). Therefore, the study may help regulators to orient their future work to promote the implementation in companies of several factors that the SLRA highlighted as affecting the NFDQ.

Although the study offers some interesting insights it is not exempt from limitations. Firstly, we focus only on peer reviewed academic journals, excluding books, book chapters and conference papers, so limiting the scope of our research. Although this is commonly considered a quality indicator, future analyses may include these publications to collect further evidence. Secondly, the subjective choices of researchers, in terms of keywords and tools to analyze the sampled articles could have introduced a certain degree of subjectivity in the analysis, even if we followed the best practices in SLRA to ensure consistency in our results. Further research could consider to use different keywords and filters and to go deeper into co-author relationships and networks through bibliographic coupling and co-citation analyses to obtain greater, more nuanced information. Thirdly, the study's results were generated using VOSviewer and Bibliometrix. Although they are among the most used and reliable software for performing bibliometric analyses, it would be interesting to complement our study results using other tools. Lastly, we derived the clusters' main insights and the future research directions in the light of our research framework, so hiding other potential issues to investigate. Future research could analyze which intellectual foundations are primarily cited to unveil the dominant theoretical paradigm in the current state of research.

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### 3. Sustainability materiality disclosure quality and sustainable governance: Empirical evidence from Italian listed SMEs

#### 3.1 Introduction

In contemporary business landscapes, firms' accountability extends beyond purely economic objectives to encompass environmental and social responsibilities. Sustainability disclosure serves as a catalyst for fostering stakeholders' trust, enhancing organizational processes and systems, widening the company's vision and strategy, and attaining a competitive advantage (Cardoni et al., 2022).

The need to fulfill the changing expectations of the stakeholders emphasizes the imperative for transparently disclosing non-financial information (Turzo et al., 2022). Driven by stakeholders' pressures, the relevance of these issues has also been underscored by the efforts of regulatory bodies. This is particularly notable in Europe, where non-financial regulations such as the Non-Financial Reporting Directive (NFRD) and the Corporate Sustainability Reporting Directive (CSRD) have placed a strong emphasis on setting disclosure benchmarks. In particular, the CSRD mandates non-financial reporting for listed small and medium-sized enterprises (SMEs) and proposes tailored standards for unlisted SMEs. This directive not only presents an opportunity to enhance sustainability practices among smaller firms but also poses challenges as SMEs must equip themselves with appropriate tools to ensure compliance. The rationale behind the CSRD, which extends the requirement for SMEs to disclose non-financial information, is to foster a culture of transparency regarding their societal and environmental impacts and improve the comparability, reliability, and relevance of the non-financial information disclosed (Santos et al., 2022).

Large corporations often find it more feasible to provide non-financial disclosure, whereas SMEs have to deal with several communication and reporting problems (Girella et al., 2019). Firstly, they lack adequate systems for collecting, processing and reporting such information and human and financial resources to devote to such initiatives. Secondly, the governance structure, mainly based on a conservative logic, is an obstacle to the implementation of social and environmental reporting practices (Gjergji et al., 2021). Thirdly, the concern to disclose strategic information to competitors limits the possibility to carry out these new reporting practices (Arena & Azzone, 2012; Del Baldo, 2017; Girella et al., 2019). Despite their smaller scale, SMEs wield significant influence over both the environment and society (Arena & Azzone, 2012). Considering that the majority of companies in Europe are SMEs, it is crucial to examine the non-financial data they disclose, as well as the characteristics of the companies that disclose it (Ortiz-Martínez & Marín-Hernández, 2021).

Given the prevailing voluntary nature of non-financial disclosure among SMEs, emphasizing the significance of the materiality principle is essential to mitigate the risks of greenwashing and information overload (Velte, 2022) and to incentivize the use of ESG data for taking investment decisions (Jonsdottir et al., 2022). Materiality stands as the primary guiding principle in disclosure of non-financial information, being connected with stakeholder engagement, sustainability governance and symbolizing a commitment to transparency and authenticity (Mazzotta et al., 2020). The materiality determination process allows companies to define the content of their reports in a structured manner, thereby limiting discretionary freedom and ensuring that the report covers topics and aspects that potentially affect the stakeholders involved (Beske et al., 2020; Fiandrino et al., 2022a).

Although the concept of materiality has long been established in financial reporting (Lai et al., 2017), identifying material sustainability issues remains a significant hurdle (Fasan & Mio, 2017; Ruiz-Lozano et al., 2022). The objective of a materiality assessment in sustainability reporting is to identify, select, and prioritize aspects and indicators that better portray the company's most significant economic, environmental, and social impacts (Calabrese et al., 2016). Organizations traditionally focused on standardizing financial reporting, such as the IFRS foundation, have recognized the importance of disclosing relevant sustainability information. This led to the establishment of the International Sustainability Standard Board (ISSB), which prioritizes financial materiality in sustainability reporting aimed at investors (Organismo Italiano Business Reporting, 2022). In contrast, the European Financial Reporting Advisory Group (EFRAG), responsible for European sustainability reporting standards, adopts the double materiality approach. Accordingly, information is deemed material from both a financial perspective and in terms of its impact on people and the environment (Organismo Italiano Business Reporting, 2022). This necessitates a shift in focus from solely investor interests to considering the broader stakeholder landscape (Giner & Luque-Vílchez, 2022; Fiandrino et al., 2022b; Baumüller & Sopp, 2021).

Corporate governance plays a leading role in orientating choices related to voluntary disclosure (Michelon & Parbonetti, 2012; Dimes & Molinari, 2024). A good governance structure pushes firms to be more responsible with respect to their social and environmental impacts (Chan et al., 2014) which also implies to be transparent and accountable in disclosing their performance to the most powerful stakeholders (Baalouch et al., 2019). Within corporate governance mechanisms, it is possible to distinguish among traditional governance mechanisms (e.g., board independence) and sustainable governance mechanisms. The latter ones distinguish themselves from standard corporate governance structures by being explicitly tailored to facilitate corporate sustainability practices (Kavadis & Thomsen, 2023). Among these mechanisms, we consider sustainability committees and

female directors. Sustainability committees create shared value by pursuing sustainability policies and by serving as a control mechanism over sustainability risks (Burke et al., 2019). Furthermore, female directors are often perceived as being more aligned with societal needs and more inclined towards the ethical dimensions of corporate conduct (Veltri et al., 2021).

In detail, our study focuses on the materiality disclosure quality (MDQ) among Italian listed SMEs that voluntarily report sustainability information<sup>2</sup>, investigating how and at what degree sustainable governance mechanisms, such as board gender diversity and the presence of a sustainability committee, affect the quality of non-financial information (NFI) disclosed. The research is carried out in Italy for several reasons. SMEs represent the majority of the Italian business landscape and play vital roles in the economy, both in terms of employment and value creation. They comprise over 90% of enterprises, contribute to 80% of employment, and generate 67% of value added (Girella et al., 2019). Moreover, Italy is characterized by a substantial number of small companies classified as family businesses, where families wield considerable influence over corporate matters (Maggi et al., 2023). In addition, Italy was among the first EU nations to implement gender quotas on corporate boards (Słomka-Gołębiowska et al., 2023). For these reasons, Italian firms' governance structure makes them particularly relevant (Cambrea et al., 2023).

Our research makes several contributions. Primarily, we focus on SMEs, which have received less attention in the literature on non-financial reporting that has predominantly centered on large-cap firms (Girella et al., 2019). However, SMEs constitute the vast majority of enterprises globally and wield significant economic influence (Cardoni et al., 2022). Moreover, we have adapted Gerwanski et al. (2019) index to create a version better suited for assessing Italian listed SMEs. This enhances the applicability of our methodology to the context of Italian SMEs. Finally, our analysis contributes to the literature on the determinants of non-financial disclosure quality by examining the potential impact of sustainable governance mechanisms.

The paper is structured as follows. Section 3.2 outlines the state of art on the relationship between sustainable governance and non-financial disclosure and the hypotheses development. In section 3.3, we described the methodology including the sample, the research variables and the model. Section 3.4 shows the results. In section 3.5, we discuss our work in terms of policy, theoretical implications and avenues for future research. Section 3.6 concludes the study.

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<sup>2</sup> According to the EU recommendation 2003/361, the requirements for identifying SMEs are:

- a medium enterprise is characterized by a number of employees less than 250; the annual turnover does not exceed 50 million EUR or balance sheet total does not exceed 43 million EUR;
- a small business is characterized by a number of employees less than 50; the annual sales or balance sheet total do not exceed €10 million;
- a microenterprise is characterized by a number of employees less than 10, the annual sales or balance sheet total do not exceed €2 million.

## 3.2 Literature review and hypothesis development

### 3.2.1 Sustainable governance and non-financial disclosure literature

Previous studies focused on sustainable governance mechanisms, mainly gender diverse board and non-financial disclosure, underlining a positive role of women directors on CSR/ESG reporting and disclosure<sup>3</sup> (Velte, 2022; Nicolò et al., 2021; Alia & Mardawi, 2021; Frias-Aceituno et al., 2013; Giron et al., 2020; Peng et al., 2021), specifically on the level or extent of disclosure (e.g. Issa & Fang, 2019; Ong & Djajadikerta, 2018), its transparency (De Masi et al., 2021; Garcia-Torea et al., 2017), lower risk of impression management strategies (Garcia-Sanchez et al., 2019). On the contrary, some studies state that the presence of female directors negatively influences sustainability disclosure (e.g. Cucari et al., 2018; Gallego-Alvarez and Pucheta-Martinez, 2020b) or does not have any effect on it (Giannarakis, 2014; Giannarakis et al., 2014; Yusoff et al., 2019). Finally, other studies find mixed results: according to Biswas et al. (2021) female directors who are affiliated to the governing family, founders and other board members reduce disclosure in family firms; instead, unaffiliated female directors enhance disclosure both in family and non-family firms. Some studies explain their results recurring to the critical mass theory (Bannò et al., 2023). According to this theory (Dahlerup, 2006), the number of female directors that produces significant effects on firms' disclosure is identified as at least three by for example Amorelli & Garcia-Sanchez (2020a) and De Masi et al. (2021). In this regard, Alazzani et al. (2017) suggest that the (insufficient) number of female directors considered in their analysis may have led to the conclusion that there is a moderate relationship between board gender diversity and CSR disclosure. Instead, according to Manita et al. (2018), even when the critical mass (three female directors) is reached, no significant relationship between board gender diversity and sustainability disclosure is found.

Fewer are the studies focused on the sustainability material disclosure quality (Mahmood & Orazalin, 2017; Vitolla et al., 2020), finding that sustainable corporate governance mechanisms positively affect sustainability reporting quality (Velte, 2022; Gerwing et al., 2022). Bearing in mind that a comprehensive definition of CSR disclosure quality has yet to be developed, the proxies for CSR disclosure quality have evolved over time (Stuart et al., 2022) and the notion of CSR disclosure quality is a concept with multi-faceted dimensions (Fiandrino et al., 2022b), we focus our attention on the MDQ and the interplay between two sustainable governance mechanisms, namely the gender diverse board and the presence of a sustainable committee, emerged from a recent review as the most analyzed in the literature regarding sustainable corporate governance and sustainability (Bannò et al., 2023).

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<sup>3</sup> We use CSR, ESG, sustainability, non-financial disclosure as synonyms.

The existence of an association between corporate governance and non-financial disclosure quality is supported different theoretical frameworks (Bini et al., 2023). Consistently with previous works (Velte, 2022), we focused on sustainable governance variables as determinants of MDQ under the lens of stakeholder theory (Freeman, 1984), which supported previous studies on materiality disclosure (Velte, 2022; Gerwanski et al., 2019; Beske et al., 2020; Meutia et al., 2022; Ngu & Amran, 2021; Ruiz-Lozano et al., 2022) and critical-mass theory (De Masi et al., 2021; Ben-Amar et al., 2017; Fernandez-Feijoo et al., 2014; Amorelli & García-Sánchez, 2020).

Sustainable governance mechanisms push firms to focus on firms' long-term developments and sustainability (Gerwing et al., 2022). According to stakeholder theory, sustainability board committees represent a signal of increased awareness of stakeholder needs and allow the institutionalized inclusion of environmental and social expertise (Velte, 2022). Given that the materiality analysis is carried out by considering stakeholders' expectations, the presence of this committee may improve MDQ. Even female directors reflect stakeholder interests in social and environmental issues (Francoeur et al., 2008). Stakeholders advocate for a critical mass of female directors on boards, as it increases the likelihood of implementing sustainability practices and setting ambitious sustainability targets (Velte, 2022). Given that the benefits of gender diversity may not be obtained when a few women sit on board (De Masi et al., 2021), we additionally considered the critical mass theory to support the hypothesis that women exert an influence on firms' decision making only when they reach a certain level.

### 3.2.2 Hypotheses development

#### 3.2.2.1 *Board gender diversity*

The inclusion of female directors brings empathy, collaboration, and long-term strategic thinking to the board, aligning effectively with sustainability objectives. Their presence is particularly crucial in SMEs, where the adoption of ESG initiatives is often supported by voluntary efforts (Fernandez et al., 2019). Previous studies found either a negative impact (Cucari et al., 2018) or a positive one (Mahmood & Orazalin, 2017) of board gender diversity on non-financial disclosure. Nevertheless, except for some studies (Fasan & Mio, 2017), evidence of a positive impact of board gender diversity on materiality disclosure has been mainly found (Gerwanski et al., 2019; Velte, 2022).

Based on the above literature, we posited the first research hypothesis (H1) as follows:

**H<sub>1</sub>.** *Board gender diversity has a positive and significant impact on sustainability materiality disclosure quality of Italian listed SMEs.*

### 3.2.2.2 *Female critical mass*

The token theory (Kanter, 1977) serves as a precursor to the critical mass theory. According to this theory, women represent a minority group which faces several obstacles in expressing their opinions and being heard. Therefore, it is argued that in boardrooms women have to reach a critical mass in order to affect firm sustainability practices (Cambrea et al., 2023; De Masi et al., 2021; Ben-Amar et al., 2017; Fernandez-Feijoo et al., 2014; Amorelli & García-Sánchez, 2020). Previous studies evidenced that a critical mass of women is reached in tilted boards (Kanter, 1977; Joecks et al., 2013), defined as boards in which women reach the 20-40%. We aligned with this critical mass cut-off point creating two different variables (one which identifies a critical mass of 20% and the other one based on a cut-off point at 30%) and hypothesizing that when female directors reach the cut-off (either 20% or 30%), MDQ improves.

Based on the above literature, we posited the second research hypothesis (H2) as follows:

**H<sub>2</sub>.** *Female directors have a positive and significant impact on sustainability materiality disclosure quality of Italian listed SMEs when they represent a critical mass.*

### 3.2.2.3 *Sustainability committee*

Board committees are established with the specific purpose of undertaking particular tasks. In particular, sustainability committees play a crucial role in influencing the decision-making process concerning non-financial reporting (Dimes & Molinari, 2024) contributing to provide more meaningful sustainability disclosure (Gerwing et al., 2022). By overseeing sustainability issues, these committees enhance companies' sustainability practices (Abdul Latif et al., 2023). Baalouch et al. (2019) contend that companies with environmental committees are more inclined to deliver high-quality environmental disclosures, thereby enhancing accountability to stakeholders. Additionally, sustainability committees may play a role in conducting materiality analyses to determine which issues are relevant (Lakshan et al., 2022). Our hypothesis aligns with the results reached by previous studies, supporting a positive and significant impact (Abdul Latif et al., 2023; Raghu Kumari et al., 2022; Fahad & Rahman, 2020).

Based on the above literature, we posited the third research hypothesis (H3) as follows:

**H<sub>3</sub>.** *The presence of a sustainability committee has a positive and significant impact on sustainability materiality disclosure quality of Italian listed SMEs.*

### 3.2.2.4 Sustainable governance index

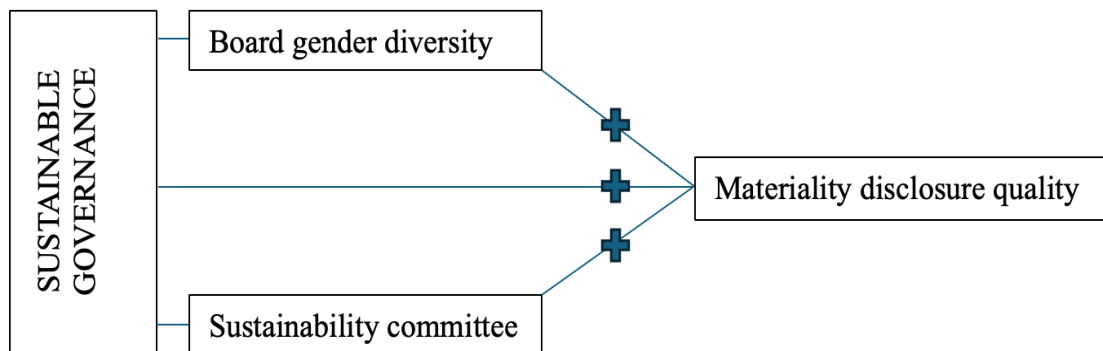
The literature mainly focused on separate categories of sustainable board governance such as board gender diversity, sustainability board expertise (frequently institutionalized via sustainability committees) and sustainability-related executive compensation (Velte, 2024). Within our paper, we decided to measure not only the impact of single sustainable corporate governance mechanisms, but also to combine the sustainable governance mechanisms selected (i.e., board gender diversity and sustainability committee) in a sustainability index which keeps into account contemporaneously the existence of a sustainability committee and the presence of a critical mass of women on board. As far as we are concerned, we did not find studies which assessed the combined impact of different sustainable governance mechanisms on the quality of non-financial disclosure.

We posited the fourth research hypothesis (H4) as follows:

**H4.** *Sustainable board governance index has a positive and significant impact on sustainability materiality disclosure quality of Italian listed SMEs.*

Figure 1 graphically illustrates the research framework.

**Figure 1.** Research framework



Source: our elaboration

## 3.3 Methodology

### 3.3.1 Sample

Our sample is made up by Italian SMEs listed on Euronext Growth Milan (EGM)<sup>4</sup>. SMEs form the backbone of Italy's economic structure, dominating the country's business landscape across diverse sectors. While these SMEs do not fall directly under the scope of the new CSRD, an examination of

<sup>4</sup> Euronext Growth Milan is made up of dynamic and competitive SMEs seeking capital for their growth.

their sustainability disclosure practices remains relevant. This relevance stems from two key factors: firstly, these SMEs receive financing from entities that are mandated to report; and secondly, they form integral components of supply chains that may encompass firms subject to reporting requirements (Assonime, 2023). Therefore, we capture a representative cross-section of Italy's commercial ecosystem (Filotto et al., 2023).

To select our sample, we started from the number of SMEs listed on EGM in 2021 (i.e., 174). Out of these, we considered only those who disclosed sustainability information within a sustainability or an integrated report. After collecting financial and governance data we excluded other firms because of missing data, obtaining a final sample of 49 firms.

We used 2021 sustainability/integrated reports to collect data for calculating MDQ. The financial statements were used as first source to collect data on the board and financials. If data were not retrievable from financial statements, we used the sustainability reports, or alternatively Orbis.

### 3.3.2 Research variables

#### 3.3.2.1 *Dependent variable*

To construct our primary dependent variable, we drew inspiration from Gerwanski et al. (2019), adapting their methodology to measure MDQ. Given our focus on the voluntary disclosure practices of Italian SMEs, we refined the indicator set, omitting some from the original study and introducing new ones to better suit our sample. Table 1 delineates the components of our index.

Our dependent variable comprises seven distinct items. The materiality section indicator is unique in its scoring range of 0 to 2 (0: absence of materiality section; 1: presence of materiality section; 2: materiality section included in the table of contents). In contrast to Gerwanski et al. (2019), we employed a binary 0-1 scale for the identification process of material topics, aiming to mitigate excessive subjectivity due to limited information granularity (0: identification process not described; 1: identification process described with some detail). The third item evaluates the presence of a materiality matrix (0: absent; 1: present). The fourth indicator assesses whether firms provide a risk map associated with material topics (0: no risk mapping; 1: presence of a table mapping risks to material topics). We developed two additional indicators based on our sample observations, which we deemed reasonable measures of MDQ. Our index incorporates the association of material topics with Sustainable Development Goals (SDGs) (0: no association; 1: association present) and the connection of material topics to the Global Reporting Initiative (GRI) standards (0: no table connecting material topics and GRI standards; 1: table present connecting material topics and GRI standards). Concluding, our index considers whether material topics are identified according to industry specific criteria. We, thus, consider adherence to Sustainability Accounting Standards Board

(SASB) to provide a complete index which also considers financial side of materiality (Pizzi et al., 2023). The metric ‘Reference to SASB’ relies on how many topics match with SASB standards topics (i.e., industry-specific material topics). In particular, it assumes the value of 1 for more than 50% of the specific SASB standard topic (SASB standard for the industry within which a firm is classified), 0 viceversa.

**Table 1.** Materiality disclosure quality index

Item no.	Scoring element	Score range	Reference
1	Materiality section	0-2	Gerwanski et al. (2019)
2	Identification process	0-1	Gerwanski et al. (2019)
3	Materiality matrix	0-1	Gerwanski et al. (2019)
4	Risks	0-1	Gerwanski et al. (2019)
5	Reference to SDG	0-1	Our elaboration
6	Reference to GRI	0-1	Our elaboration
7	Reference to SASB	0-1	Our elaboration
	$\Sigma$	0-8	

Source: our elaboration

### 3.3.2.2 *Independent variables*

Board gender diversity and the presence of a sustainability committee represent our main independent variables. We assessed board gender diversity both as the proportion of women on board (BDIV) and as the presence of a critical mass of female directors able to influence board decisions (DIVC30; DIVC20). Previous studies used different threshold level to identify a critical mass, considering both an absolute number or a proportion. We align with the argument according to which the proportion of female directors is more relevant than its actual size for influencing ESG-related decisions (Gull et al., 2023). In particular, we consider that within tilted boards (i.e., boards with a female representation which ranges between 20% and 40%), a critical mass of women, which affects firms’ ESG outcomes, is reached (Joecks et al., 2013). Given that our study focuses on SMEs and that board size is quite limited, we opted for a threshold of at least 30% females on boards (DIVC30). As for robustness, we also considered a critical mass of 20% (DIVC20) (i.e., the median percentage of female directors on board).

We built the variable (CSRC) as a dummy which takes the value of 1 if the firm has established a sustainability committee or a team comparable to a committee established with the same purposes,

0 otherwise. To assign 1, we didn't take into consideration the denomination of the committee. Instead, we assessed if a committee has been created with the purpose to work on sustainability/CSR issues. To measure the sustainable governance index (SGI), we considered the dummies built for the existence of a sustainability board committee and a critical mass of female board members. The score represents an average of the two dummies and has been calculated considering both thresholds for the critical mass of women. Specifically, SGI1 is based on the variable DIVC30, while SGI2 relies on the variable DIVC20.

### 3.3.2.3 *Control variables*

We controlled for firm size, profitability, sensitive industries, board size and the materiality word count index. The size was proxied with the natural logarithm of the total assets (TOAS), while firms' profitability with return on assets (ROA). The size of the board of directors (BSIZ) was defined as the 2021 total number of directors in the board. We further considered a materiality word count index (MWC) among the controls which is defined consistently with Fasan & Mio (2017). Specifically, we counted how many times the words containing the suffix 'material' were referred to the materiality analysis and expressed them in percentage of reports' number of pages.

**Table 2.** Research variables' definition

<b>Variables</b>	<b>Definition</b>
<b>Dependent variable</b>	
<b>TOT</b>	Our materiality disclosure quality index based on six indicators and expressed in percentage terms
<b>Independent variables</b>	
<b>BDIV</b>	Number of women directors on board/ Total number of board members
<b>CSRC</b>	Dummy variable taking a value of 1 if the firm has established a sustainability committee (or a team with the same purposes), 0 otherwise
<b>DIVC30</b>	Dummy variable which represents the critical mass of female directors equals to 1 if women on board are at least 30%, 0 otherwise
<b>DIVC20</b>	Dummy variable which represents the critical mass of female directors equals to 1 if women on board are strictly higher than 20%, 0 otherwise
<b>SGI1</b>	Sustainable board governance score calculated as the average of the sum of (1) the presence of a CSR committee and (2) a critical mass of female directors, which should be over 30%
<b>SGI2</b>	Sustainable board governance score calculated as the average of the sum of (1) the presence of a CSR committee and (2) a critical mass of female directors, which should be over 20%
<b>Control variables</b>	
<b>MWC</b>	Materiality word count/Number of pages of sustainability or integrated reports
<b>ROA</b>	Net income/Total Assets
<b>TOAS</b>	Natural logarithm of total assets
<b>BSIZ</b>	Total number of board members

Source: our elaboration

### 3.3.3 Regression model

We expressed our dependent variable in percentage terms, dividing each observation by seven (i.e., the highest possible score). We obtained, in this way, a continuous variable whose values range from 0 to 1 (also including the extreme values). The ordinary least squares (OLS) model becomes inappropriate when the response variable is confined within the interval (0, 1). This is because OLS might produce estimated values that exceed the lower and upper bounds of the variable of interest (Ferrari & Cribari-Neto, 2004).

Following prior research which dealt with dependent variables expressed in percentage terms (Dunham & Garcia, 2021; Gambetti et al., 2019), we employed a beta regression model. This model operates under the assumption that the dependent variable adheres to a beta distribution, a continuous probability distribution defined within the standard unit interval (Cribari-Neto & Zeileis, 2010). Given that two firms scored 0 and one firm scored 7, we had to include also extreme values (i.e., 0 and 1). Hence, we transformed our response variable according to Smithson & Verkuilen (2006) work. The suggested transformation can be summarized as follows:  $(y \cdot (n - 1) + 0.5)/n$  where  $y$  is our dependent variable and  $n$  is the total number of observations.

## 3.4 Empirical results

### 3.4.1 Descriptive statistics

We provided descriptive statistics for the index assessing the MDQ and for all the regression model variables as depicted in Table 3 and Table 4. On average, firms obtained a score of about 4.8. Two firms didn't provide any information about material topics, while only one firm obtained the highest score. The analysis indicated that a significant proportion of firms underscored the significance of reporting on material themes by incorporating dedicated sections in their tables of contents, illustrating materiality matrices, and delineating the methodology for identifying relevant topics. However, it is relevant noting that 8% of the firms mapped risks associated with material topics, rendering risk identification the least disclosed indicator among those examined which is consistent with the findings reached by previous works (Ortiz-Martínez & Marín-Hernández, 2021). Considering the disclosure of material topics with respect to the SASB and GRI standards and the SDGs, slightly less than half of the sampled firms achieved a score of one.

For what concerns our main independent variables, we observed that only nine firms implemented a committee with duties related to sustainability issues and the proportion of women seat on the board averages around 19%.

**Table 3.** Materiality index's descriptive statistics

<b>Variables</b>	<b>Obs</b>	<b>Mean</b>	<b>Median</b>	<b>Sd. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>Materiality index</b>	49	4.33	5	1.39	0	8
<b>Materiality section</b>	49	1.75	2	0.52	0	2
<b>Identification process</b>	49	0.88	1	0.33	0	1
<b>Materiality matrix</b>	49	0.75	1	0.43	0	1
<b>Risks</b>	49	0.08	0	0.28	0	1
<b>Reference to SDG</b>	49	0.41	0	0.5	0	1
<b>Reference to GRI</b>	49	0.45	0	0.5	0	1
<b>Reference to SASB</b>	49	0.47	0	0.5	0	1

Source: our elaboration

**Table 4.** Research variables' descriptive statistics

<b>Variables</b>	<b>Obs</b>	<b>Mean</b>	<b>Median</b>	<b>Sd. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>TOT</b>	49	0.60	0.625	0.20	0	1
<b>BDIV</b>	49	0.19	0.20	0.15	0	0.5
<b>DIVC30</b>	49	0.22	0	0.42	0	1
<b>DIVC20</b>	49	0.39	0	0.49	0	1
<b>SGI1</b>	49	0.20	0	0.32	0	1
<b>SGI2</b>	49	0.29	0	0.37	0	1
<b>CSRC</b>	49	0.18	0	0.39	0	1
<b>BSIZ</b>	49	5.75	5	2.27	1	12
<b>ROA</b>	49	0.05	0.04	0.07	-0.16	0.23
<b>TOAS</b>	49	17.45	17.44	1.04	13.38	20.03
<b>MWC</b>	49	0.35	0.34	0.25	0	1.16

Source: our elaboration

### 3.4.2 Correlation analysis

Before carrying out our regression model, we calculate the correlation between the variables used in the regression model. Table 5 depicts the Pearson correlation matrix for the variables included in our model. The presence of strong multicollinearity among the independent variables in the model can

impact the reliability of the analysis results (Zhou et al., 2022). Statistical tests to detect multicollinearity include Pearson correlation test and variance inflation coefficient (VIF) test. The maximum value of the correlation coefficient among the variables is 0.38 (higher correlation values refer to variables not included in the same regression model). We also calculated the VIF values for all the independent variables used in our models, not reported for brevity. They all are below 1.5, indicating no evidence of multicollinearity.

**Table 5.** Correlation matrix

	TOT	BDIV	DIVC30	DIVC20	SGH1	SGI2	CSRC	BSIZ	ROA	TOAS	MWC
TOT	1										
BDIV	0.12	1									
DIVC30	0.007	0.77***	1								
DIVC20	0.05	0.83***	0.68***	1							
SGH1	0.2	0.65***	0.81***	0.67***	1						
SGI2	0.21	0.68***	0.59***	0.87***	0.86***	1					
CSRC	0.19	0.24	0.25*	0.38**	0.77***	0.78***	1				
BSIZ	0.16	0.06	-0.25*	0.07	-0.17	0.04	-0.02	1			
ROA	-0.32**	0.20	0.093	0.25*	0.04	0.15	-0.03	-0.28*	1		
TOAS	0.03	0.14	0.01	0.18	0.14	0.23	0.21	0.24*	-0.08	1	
MWC	0.21	-0.14	-0.21	-0.18	-0.18	-0.16	-0.07	0.04	-0.005	-0.08	1

Notes: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Source: our elaboration

### 3.4.3 Beta regression results

Table 7 shows the results of the regression analysis. Column (1) considers as main independent variables the BDIV and CSRC. The results show a positive and statistically significant relationship both for board gender diversity ( $\beta = 1.79$ ,  $p < 0.05$ ) and the presence of a sustainability committee ( $\beta = 0.95$ ,  $p < 0.1$ ). In line with prior research on materiality disclosure (Velte, 2022; Ngu & Amran, 2021; Gerwanski et al., 2019), we find a positive relationship between the proportion of women directors and MDQ, indicating that women on board enhance the quality of voluntary sustainability reporting, in terms of relevance, as they may serve as monitoring mechanisms, reinforcing the commitment to provide valuable sustainability information and demonstrating greater stakeholder orientation (Bannò et al., 2023; Bravo & Reguera-Alvarado, 2019). Consistent with the predictions of stakeholder theory, gender diversity as well as the establishment of sustainability committees (Cucari et al., 2018; Amran et al., 2014) are crucial factors in creating a good corporate governance structure that aligns firms' interests with their shareholders, managers, stakeholders, and society

(Nicolò et al., 2021). Specifically, these mechanisms improve firms' ability to address the interests of the different groups of stakeholders identifying the non-financial topics to which they direct their attention.

In column (2) and column (3) the proportion of women on board is replaced with a critical mass of, respectively, 30% and 20%. While the results for the presence of the sustainability committee stay consistent over the first three models, we observed that achieving a threshold of women's representation on the board does not influence MDQ. The robustness of this result is reinforced by Model 3, where a lower threshold was considered. These results stand in contrast to the prevailing literature, which provided evidence that a critical mass of women enhances firms' ESG practices (Amorelli & García-Sánchez, 2020; Ben-Amar et al., 2017; Cambrea et al., 2023; De Masi et al., 2021; Fernandez-Feijoo et al., 2014), while they support the evidence provided by other studies finding no significant relationship between board gender critical mass and sustainability disclosure (e.g., Manita et al., 2018; Post et al., 2011).

Moving forward, column (4) and column (5) introduce the overall level of sustainable governance, denoted as SGI1 and SGI2. While the combined effect of sustainable governance mechanisms has been tested with respect to sustainability performance (Velte, 2024), none of the previous studies assessed its impact on sustainability disclosure and its quality. Our findings show a positive and statistically significant relationship both for both SGI1 ( $\beta = 1.08$ ,  $p < 0.01$ ) and SGI2 ( $\beta = 0.96$ ,  $p < 0.01$ ), showing that sustainable governance mechanisms are effective in influencing sustainability disclosure quality (Latella & Veltri, 2024).

Furthermore, our analysis reveals a negative correlation between company profitability and MDQ. Among the other control variables, only MWC exhibits significance, with a positive coefficient over all the models, suggesting that a higher frequency of terms, such as "material" and "materiality" used within non-financial reports, positively correlates with MDQ. Instead, consistently with previous studies on SMEs (Somoza, 2023), firm size does not affect sustainability reporting practices.

**Table 6.** Beta regression results

<b>Variables</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>
<b>BDIV</b>	1.79** (0.80)				
<b>CSRC</b>	0.95* (0.53)	0.98* (0.55)	1.0* (0.54)		
<b>DIVC30</b>		0.35 (0.30)			
<b>DIVC20</b>			0.40 (0.26)		
<b>SGI1</b>				1.08*** (0.39)	
<b>SGI2</b>					0.96*** (0.34)
<b>BSIZE</b>	0.05 (0.05)	0.08 (0.06)	0.05 (0.06)	0.08 (0.06)	0.04 (0.05)
<b>ROA</b>	-5.09*** (1.87)	-4.31** (1.98)	-5.00*** (1.94)	-4.64* (1.84)	-5.6*** (1.88)
<b>TOAS</b>	0.02 (0.11)	0.06 (0.12)	0.03 (0.12)	0.03 (0.12)	0.009 (0.12)
<b>MWC</b>	1.18** (0.47)	1.19** (0.49)	1.18** (0.49)	1.17** (0.48)	1.14** (0.48)
<b>Constant</b>	-0.94 (1.97)	-1.47 (2.03)	-0.87 (2.02)	-1.01 (2.01)	-0.44 (2.03)
<b>Observations</b>	49	49	49	49	49
<b>PseudoR<sup>2</sup></b>	0.3	0.25	0.27	0.26	0.26
<b>Log-likelihood</b>	16.28	14.45	14.99	15.14	15.05
<b>Wald test <math>\chi^2</math></b>	25.61***	19.55***	20.1***	21.21***	20.83***
<b>Likelihood</b>	21.30***	17.65***	18.73***	19.03***	18.84***

Notes: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Source: Our elaboration

### 3.5 Discussion

The aim of this study was to empirically test theoretical expectations regarding the presence of a CSR committee as well as the degree of board gender diversity in relation to sustainability-based materiality analysis disclosure. Under the lens of stakeholder theory, we argued that both the establishment of a specialized sustainability committee and a higher representation of female on board signal a greater commitment of the board towards the implementation of sustainable practices.

Based on a sample of the Italian listed firms belonging to the Euronext Growth Milan market, which were analyzed in 2021, our empirical results show that the presence of a sustainability committee, as well as the proportion of women on board and the SGI positively affect MDQ. Instead, female directors' critical mass does not have any significant impact on MDQ.

### 3.5.1 Implications for theory

This article contributes to both theories employed in our theoretical framework. In line with stakeholder theory, our study indicates that boards with a sustainable focus, characterized by strengthened leadership and oversight responsibilities concerning sustainability matters (Velte, 2024), are likely to improve non-financial reporting practices. The presence of women on board improves the interaction with the stakeholders allowing firms to identify relevant non-financial topics, supporting board's ability to evaluate the relevance of non-financial issues within the materiality assessment (Macchioni et al., 2024).

Sustainability committees provide oversight of the firm's sustainability reporting processes, thus positively influence reporting quality (Gerwing et al., 2022). In line with stakeholder theory, these committees facilitate stakeholder inclusion (Velte, 2022), which is at the core of the proper identification of material topics.

Although the proportion of female representation enhances MDQ, contrary to prior research on the impact of women on ESG outcomes (Cambrea et al., 2023; De Masi et al., 2021; Maggi et al., 2023; Velte, 2024) as well as the premises of critical mass theory, we did not uncover evidence that the influence of female directors depends on reaching an optimal threshold number. Our results suggest that within smaller boards, reaching a critical mass does not affect non-financial reporting practices.

### 3.5.2 Managerial and policy implications

The findings suggest that recruiting and retaining female board members could lead to more efficient decision-making process, which in turn leads to high-quality disclosure especially with regard to the materiality analysis. Even though female directors represent only a quarter of board members in listed companies globally, they enrich boards with experiences, perspectives, problem-solving skills (OECD, 2022). On average, female directors cover the 19% of sampled firms' boards seats. As for policy implications, this study reinforces the results reached by previous studies supporting the introduction of gender law quotas (Maggi et al., 2023) or tax benefits to companies with more diverse boards.

The results also show that the presence of a dedicated committee enhances the prioritization of material issues for stakeholders, ensuring disclosure is relevant and impactful. This committee ensures focus and expertise in curating relevant non-financial information, which in turn, help investors make informed decisions, potentially leading to increased capital inflows.

### 3.5.3 Limitations and future inquiry

Despite its contribution, this work suffers from several limitations. Firstly, we conducted our analysis on a sample of 49 Italian listed SMEs that publish sustainability information on a voluntary basis. Hence, our results are restricted to a small sample and further studies should test whether they hold in other contexts. Moreover, we measured MDQ based on a hand-collected index exposing our work to subjectivity. Indeed, we modified Gerwanski et al.'s (2019) version to make it more suitable to our sample. Although we clearly defined the searching criteria and checked multiple times the score we obtained, future works may check if the index fits other sample of firms. Furthermore, the analysis is focused on a single year as only a bit more than half of the sampled firms published the same report in the year before 2021. This gives way to reproduce the investigation extending the time frame of the analysis to test if the results are still valid.

For what concerns the research variables, we tested the impact of the presence of a sustainability committee supposing that concentrating sustainability knowledge on a separate group could enhance the quality of the disclosure. Future studies may assess the influence of the sustainability expertise of board members or sustainability committee members. Moreover, as SMEs are often managed by family members, future research may assess whether the status of family firms impacts their MDQ. While we assessed whether reaching a critical mass of female directors affects MDQ, it could be relevant to assess the influence of the role covered by female directors (chair, executive and non-executive) on MDQ (Cambrea et al., 2020). For what concerns sustainability committees, our research is limited to assess how its presence affects MDQ. Future research may test whether the composition of sustainability committee is relevant in influencing MDQ (Gull et al., 2023).

Our study proposes that sustainable governance mechanisms enhance the interaction with the stakeholders. However, it remains unexplored how these mechanisms improve stakeholder interactions, whether this influence is direct or mediated.

Given that the ultimate goal of the firm is represented by improved performance and continuous growth of the firms (Bannò et al., 2023), future studies may assess whether sustainable governance mechanisms could represent a tool which influence the financial dimension of the materiality analysis (the new CSRD requires firms to consider both financial and impact materiality), which in turn could affect firm performance and its value.

## 3.6 Conclusions

This article deals with materiality analysis disclosure within the non-financial dimension in the context of a particular capital market including SMEs with high growth potential, aiming at deepening the knowledge of the relationship between sustainable governance and MDQ. The materiality analysis

represents a topic of growing importance for policy makers as evidenced by the novelties introduced by CSRD. To enhance the quality and credibility of non-financial reports, it is crucial not only to provide extensive information on material issues but also to detail how the materiality assessment process is conducted by the organization (Ruiz-Lozano et al., 2022). This need becomes even more pronounced in a voluntary setting, where it is essential to understand whether SMEs are prepared to disclose non-financial information under a mandatory regime. Overall, our results suggest that implementing sustainable governance mechanisms may help SMEs in improving the relevance of the sustainability information disclosed, providing their stakeholders with more useful information (Gerwing et al., 2022).

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## 4. Do sustainable governance mechanisms affect firms' ES washing?

### 4.1 Introduction

Firms' environmental, social and governance (ESG) practices are increasingly under scrutiny by regulatory authorities, socially responsible investors, policy-makers, governments. Consequentially, academic scholars have increased their interest in corporate governance as a tool for driving ESG initiatives. Within the body of the literature focused on the relationship between corporate governance and sustainability, considerable attention has been directed towards the role of the board, as the primary decision-making entity within public corporations (Shaukat et al., 2016). At the board-level, traditional governance dimension encompasses board composition, integration of independent directors, board diversity, executive pay, board meeting (Wang et al., 2024). Researchers' varying approaches to board characteristics have enhanced comprehension of boards' impact on performance while also causing ambiguity regarding the significance of independent variables and complicating result comparisons, thus highlighting the need to carry out more research in this field (Hafsi & Turgut, 2013). Discussing corporate governance with respect to firms' sustainability performance involves, among the others, consideration around board size as larger boards are supposed to have more expertise and to represent the interests of a wide variety of stakeholders (Fasan & Mio, 2017), board independence which ensures a higher level of objectivity inside the board and a stronger commitment towards a long-term sustainable path for firms (Mahmood & Orazalin, 2017), board meetings which provide more time for discussions and implementation of ESG strategies (Alkurdi et al., 2023). Alongside these traditional board-level variables, we can identify other sustainable board-level mechanisms. They distinguish themselves from standard corporate governance structures by being explicitly tailored to incorporate socio-environmental considerations into the firm's decision-making processes (Minciullo et al., 2022). Sustainable board-level mechanisms, including sustainability committee, female directors and ESG-based compensation, may serve as both an incentive for disclosing legitimization strategies and a constraint on disclosure tendencies (Bernini & La Rosa, 2024). They could be designed to fulfill a symbolic aim devoted to avoid a reputational and regulatory damage, instead of pushing for actual environmentally responsible practices (Rodrigue et al., 2013; Cho et al. 2012). Alternatively, they may guarantee a vigilant monitoring which diminishes the incentives for management to resort to deceptive disclosure practices as a convenient arrangement (Gerwing et al., 2022; Gull et al., 2023a).

Stakeholders are becoming increasingly concerned about misleading ESG claims, particularly when firms fail to meet their ESG targets (Torelli et al., 2020). According to Delmas & Burbano (2011) definition of environmental and social washing (hereinafter ES washing)<sup>5</sup>, firms resort to this practice when they perform poorly while providing a positive communication towards their social or environmental performance. Social washing may refer to the strategic manipulation of advertising techniques to foster the impression that products meet social responsibility criteria (Rizzi et al., 2020), an extensive level of communication regarding their efforts in the realm of female empowerment, while underperforming in promoting it (Sterbenk et al., 2022; Venturelli et al., 2024), a deceptive communication of robust adherence to regulations and standards while the company fails to take adequate precautions for employee well-being potentially leading to increased risks of workplace accidents, injuries, or long-term health hazards. Greenwashing could as well refer to different levels of communications related to misleading environmental communication about a company's image and reputation, deceptive communication concerning future firm strategies, deceptive environmental communication aimed at concealing illegal activities, and concealing product-level communication pertaining to specific features such as labeling, advertising, packaging, and certifications (Torelli et al., 2020).

While few studies have assessed the role of the overall level of sustainable board governance (Velte, 2024), no study has yet investigated its role in driving ES washing. However, some studies (e.g., Gull et al., 2023a; Gull et al., 2023b) have included the three variables separately, showing which influence they have on these deceptive practices. Our work aims to fill this gap, assessing the impact of sustainable governance mechanisms (SGMs) on firms' ES washing practices in the U.S. context, adding knowledge to several streams of the literature. Firstly, it contributes to the sustainable governance literature by distinguishing among mechanisms established with the purpose of achieving specific sustainability outcomes through strategic oversight and financial incentives (i.e., the presence of a sustainability committee and the implementation of an ESG-based executive compensation) and mechanisms which can indirectly support sustainability outcomes (i.e., board diversity). Second, it advances the scientific knowledge in the field of firms' deceptive practices aimed at hiding the actual concerns related their sustainability performance by distinguishing between greenwashing and social washing.

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<sup>5</sup> We refer to ES washing as all the deceptive practices which involve a mismatch between ES disclosure and actual ES performance. ES washing includes both greenwashing and social washing.

The remainder of the article is structured as follows: section 4.2 presents the state of the art on the ES washing, the theoretical framework adopted and the development of research hypotheses. Section 4.3 represents the methodology section, articulated in the regression model, research variables and sample on which the study focuses on. Section 4.4 presents the results of the empirical analysis. Section 4.5 discusses the results, while section 4.6 provides the conclusions.

## 4.2 Literature review

### 4.2.1 The drivers of ES washing

A significant body of research has delved into firms' deceptive practices, which can be categorized into two macro research streams. The first line of investigation explores the effects of firms ES washing (Chen & Dagestani, 2023; García-Sánchez et al., 2021; Lee & Raschke, 2023; Li et al., 2023; Neumann, 2021), while the second line investigates its drivers (Aboud et al., 2024; Eliwa et al., 2023; Lu et al., 2023; Ruiz-Blanco et al., 2022; Yu et al., 2020; Zhang, 2022).

The first stream of the literature has been mainly focused on the financial relevance of ES washing, in particular previous studies tested its impact on firm value (Chen & Dagestani, 2023) or financial performance (Lee & Raschke, 2023; Li et al., 2023; Neumann, 2021). The second research stream, within which falls our study, analyzed the drivers of ES washing in terms of firms' specific characteristics (i.e., financial drivers, ESG drivers, level of digital transformation), sustainability report-related characteristics (i.e., the use of Global Reporting Initiative-GRI guidelines, assurance process) and country-level characteristics (i.e., non-financial regulation).

In examining the financial determinants influencing greenwashing, Zhang (2022) investigated the effects of financial constraints, financial management proficiency, and leverage on ES washing. Their findings provided empirical support for the role of the financial landscape in shaping greenwashing practices, highlighting that financial constraints and high leverage tend to exacerbate greenwashing, while strong financial management skills mitigate it. On the other hand, Eliwa et al. (2023) explored the influence of board gender diversity on ES washing and how religiosity moderates this relationship. They contributed evidence suggesting that firms with gender-diverse boards are less inclined to engage in ES washing. However, they noted that when board gender diversity interacts with the religiosity of the country where the firm is headquartered, the relationship becomes positive. Lee & Raschke (2023) proposed that maintaining high ESG performance can obviate the need to mislead stakeholders, thereby

reducing the likelihood of greenwashing. Additionally, Lu et al. (2023) evaluated the impact of digital transformation on greenwashing among Chinese listed companies, demonstrating a significant reduction in greenwashing as a result. Ruiz-Blanco et al. (2022) assessed the influence of sustainability reporting-related factors, indicating that the adoption of sustainability reports and adherence to GRI guidelines diminishes the occurrence of global greenwashing and social washing. They also found that the presence of an assurance statement reduces global greenwashing practices but has no significant effect on social washing. Other studies focused on ESG regulation revealing that while initiatives targeting carbon emissions reduction (Zhang, 2023) may exacerbate greenwashing, regulations mandating sustainability reporting (Aboud et al., 2024) serve to mitigate it.

ES washing can be interpreted as a corporate governance issue that advances the interests of managers at the expense of shareholders, and, notably in this instance, it also negatively impacts other stakeholders (Bernini & La Rosa, 2024). Conflicts between stakeholders and managerial interests can undermine ESG initiatives, leading to a loss of value for the firm (Venturelli et al., 2024). High-quality corporate governance standards have been shown to be effective in aligning stakeholders and managerial interests, thus reducing ES washing behavior and promoting genuine engagement of firms in social responsibility initiatives (García-Sánchez et al., 2021). The purpose of our study is to add knowledge to the role of sustainable board-level governance in influencing ES washing, comparing the effect of mechanisms directly linked to sustainability outcomes, represented by sustainability committee and ESG-based compensation (hereinafter they will be named SGDs when referring to them both), and mechanisms which indirectly affects sustainability outcomes (a threshold of female representation on board).

#### 4.2.2 Theoretical framework and research hypotheses

We rely on neo-institutional theory (NIT) to investigate how different SGMs affect ES washing practices. It represents a multi-dimensional framework which may explain direct and indirect linkages among SGMs and firms' outcomes (Haque & Ntim, 2020). We apply this theory as it includes two conflicting perspectives which explain how firms react to institutional pressures, i.e., the legitimacy (symbolic) view (Suchman, 1995) and the traditional economic perspective (Meyer & Rowan, 1977). Achieving 'social legitimacy' involves symbolic impression management efforts, whereas attaining 'economic efficiency' typically demands significant substantive efforts over a relatively extended timeframe (Haque & Ntim, 2020). This theory enables us to conduct an integrated and multi-dimensional analysis based on the difference

between SGMs which are implemented with the purpose of achieving social legitimacy and SGMs which determine an actual improvement of firm ESG performance.

The legitimacy view suggests that firms engage in good ESG practices to attain moral and relational legitimacy by effectively balancing the diverse and often conflicting demands of their various influential stakeholders (Ntim & Soobaroyen, 2013). It involves employing an impression management strategy, providing a higher level of sustainability disclosure to enhance firm's reputation (Adu et al., 2022), without substantial improvements of environmental or social performance (Aguilera et al., 2007).

The efficient view of NIT represents the perspectives of economic-based theories such as resource dependence and agency theory (Haque & Ntim, 2020) and suggests an actual commitment by firms to ESG practices (Ntim & Soobaroyen, 2013). Substantive strategies entail fundamental changes in a firm's goals, behaviors, and practices to satisfy the expectations and needs of societal stakeholders, addressing environmental and social issues, which may result in enhanced ESG performance (Orazalin et al., 2024).

We argue that SGDs mechanisms are purposefully established with the aim of obtaining social approval without any substantial ESG performance improvements (Haque & Ntim, 2020; Adu et al., 2022). These mechanisms may be used to shield the organization from reputational and regulatory damage, rather than to actively enhance ESG performance (Rodrigue et al., 2013). Instead, having a good level of female representation within the board may bring diversity in ideas and opinions to board discussions as well as qualities as empathy, collaboration and long-term thinking which in turn enhance actual ESG performance (Cambrea et al., 2023; Veltri et al., 2021).

Establishing a governance team responsible for ESG-related issues, a sustainability committee, aims to cultivate favorable perceptions among stakeholders and shield market value from sustainability-related vulnerabilities (Orazalin et al., 2024; Walls et al., 2012). Sustainability committees are supposed to exert only a symbolic influence over firms' ESG performance as their primary role appears to enhance ESG strength rather than mitigate actual concerns, thus focusing on improvements of firms' reputation than achieving genuine sustainability goals (Burke et al., 2019).

Boards may use the connection between top executive compensation and corporate ESG performance as a form of symbolic rather than substantive management to uphold their reputation with stakeholders concerned about ESG performance (Cordeiro & Sarkis, 2008). From this point of view, executive compensation is likely to encourage ESG-related practices that enhance corporate legitimacy, mitigate environmental and social reputational risks, and

increase the financial benefits for powerful economic agents (Haque & Ntim, 2020). A symbolic adoption of ESG-based compensation policy supports the implementation of good environmental and social initiatives without any actual impact on ESG performance (Adu et al., 2022; Haque, 2017).

Women excel in navigating ethical dilemmas due to their lower propensity for aggression, greater risk aversion, and heightened inclination to prioritize ethical considerations over protecting their reputation, when compared to men (Eliwa et al., 2023). Female directors have the potential to offer a diverse array of novel ideas, experiences, and skills that contribute to the oversight of managers' opportunistic behaviors (Giannarakis et al., 2023; Nguyen et al., 2021) and to enhance corporate transparency level with respect to provided ESG information (Pucheta-Martínez et al., 2019). Proponents of critical mass theory (Kanter, 1977) suggest that within male-dominated environments, when women reach a certain threshold, or critical mass, their influence increases. While the critical mass theory predicts an influence of women when they reach a critical mass, it doesn't predict when the critical mass is reached (Torchia et al., 2011). Previous studies used different threshold level to identify a critical mass, considering both an absolute number or a proportion. We align with the argument according to which the proportion of female directors is more relevant than its actual size for influencing ESG-related decisions (Gull et al., 2023b). In particular, we consider that within tilted boards (i.e., boards with a female representation which ranges between 20% and 40%), a critical mass of women, which affects firms' ESG outcomes, is reached (Joecks et al., 2013).

We formulate the research hypotheses according to the theoretical roots of the NIT. According to the legitimacy view of the NIT, we suppose that the presence of a sustainability committee and the design of an ESG-based executive compensation exacerbate ES washing. Instead, relying on the efficient view of the NIT, we hypothesize that the presence of tilted boards diminishes ES washing.

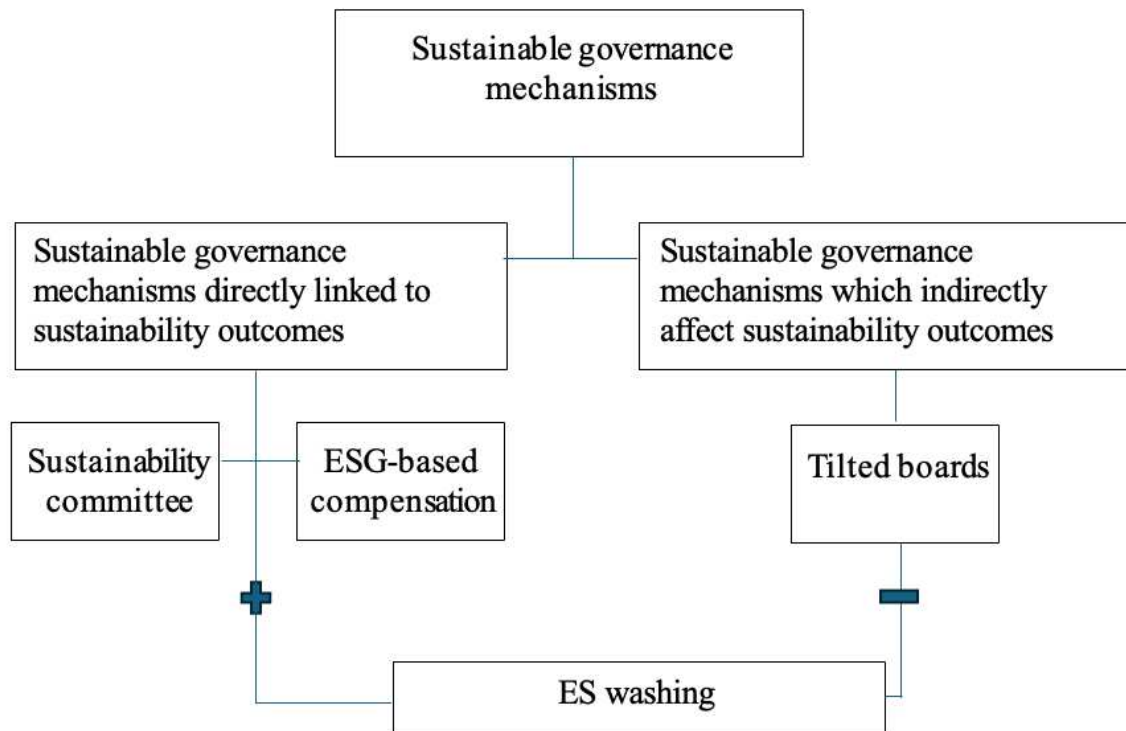
Within this study, we refer to sustainable governance as those mechanisms which implies an actual commitment towards sustainable practices. Therefore, we retain that a higher level of sustainable governance is determined by the presence of governance mechanisms indirectly linked to sustainability outcomes and by the absence of those governance mechanisms directly linked to sustainability outcomes.

*H<sub>1</sub>. The presence of sustainable governance mechanisms directly linked to sustainability outcomes exacerbate ES washing.*

*H2. The presence of sustainable governance mechanisms indirectly linked to sustainability outcomes limit ES washing.*

Figure 1 depicts our research framework.

**Figure 1.** Research framework



Source: Our elaboration

## 4.3 Methodology

### 4.3.1 Regression model

Our analysis is based on panel data ranging from 2013 to 2021. As argued by Delmas & Burbano (2011), ES washing occurs when companies portray a positive image of their poor ESG performance through communication. This phenomenon manifests when there is a mismatch between disclosed information and actual performance, characterized by greater disclosure than performance. Consistently, we need our dependent variable to be left-censored in order to take into consideration only positive ES washing scores. Therefore, we employ the Tobit model.

To address potential endogeneity concerns between sustainable governance and ES washing, an endogeneity test is performed by using instrumental variables (consistently with Chen et al., 2023).

#### 4.3.2 Research variables

According to previous studies, we define ES washers those firms which aiming for a transparent public perception through extensive disclosure of ESG data, yet underperform in actual ESG metrics (Yu et al., 2020). Companies engage in ES washing practices when they success in making false CSR claim to improve their reputation (Pope & Wæraas, 2016), thus there is a mismatch between ESG disclosure and ESG performance. Therefore, we calculate difference between the disclosure and the performance scores. Specifically, we attend three steps for obtaining the ES washing score. Firstly, we have divested, from the ESG score, the governance score given that we are assessing the impact of governance factors included within the governance score. Secondly, we reweighted the Refinitiv scores according to weights assigned by Bloomberg, thus giving the same weight to the environmental and social pillars. To calculate the ES washing score, we make the difference between the normalized Bloomberg disclosure scores and the normalized reweighted Refinitiv performance scores (Venturelli et al., 2024; Yu et al., 2020; Zhang, 2022). For the single pillar scores, we simply calculate the difference between the normalized social/environmental disclosure score and the normalized social/environmental performance score.

Our SGM index assess the sustainability-level of a board in terms of its actual commitment. According to our theoretical framework, it represents the mean of three variables: (1) a dummy variable which assumes the value of 0 if a sustainability committee has been established and 1 otherwise; (2) a dummy variable which assumes the value of 1 if female directors are more than 20% but less than or equal to 40% and 0 otherwise; (3) a dummy variable which assumes the value of 0 if the management compensation contract of executives includes ESG goals and 1 otherwise<sup>6</sup>. The SGD variable assumes the value of 1 when both the presence of a sustainability committee and an ESG-based executive compensation scheme are designed.

We also control for the size (TA), profitability (ROA), and the leverage (Debt/Equity ratio) and for traditional board-level governance variables represented by board size (BSIZE), board independence (BIND) and board meeting (BMEET).

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<sup>6</sup> While the dummies for sustainability committees and the design of an ESG-based compensation are formulated considering a value of 1 when they exist, 0 otherwise, the SGM index depends negatively on these two dummy variables consistently with our theoretical framework.

Table 1 illustrates the research variables.

**Table 1.** Research variables

<b>ES washing</b>		
<b>Variable name</b>	<b>Definition</b>	<b>Source</b>
ES WASHING SCORE - ESW	Difference between the normalized Bloomberg environmental and social disclosure score and the normalized reweighted Refinitiv environmental and social performance score	Our elaboration
SOCIAL WASHING SCORE - SW	Difference between the normalized Bloomberg social disclosure score and the normalized Refinitiv social performance score	Our elaboration
ENVIRONMENTAL WASHING SCORE - EW	Difference between the normalized Bloomberg environmental disclosure score and the normalized Refinitiv environmental performance score	Our elaboration
<b>Sustainable governance mechanisms</b>		
<b>Variable name</b>	<b>Definition</b>	<b>Source</b>
COMM	A dummy variable which assumes the value of 1 if a sustainability committee has been established and 0 otherwise	Our elaboration based on Refinitiv data
TILTED	A dummy variable which assumes the value of 1 if female directors are more than 20% but less than or equal to 40% and 0 otherwise	Our elaboration based on Refinitiv data
COMP	A dummy variable which assumes the value of 1 if the management compensation contract of executives includes ESG goals and 0 otherwise	Our elaboration based on Refinitiv data
SGM	Mean of the three dummy variables ( sustainability committee: a dummy variable which assumes the value of 0 if a sustainability committee has been established and 1 otherwise; tilted boards: a dummy variable which assumes the value of 1 if female directors are more than 20% but less than or equal to 40% and 0 otherwise; ESG-based compensation: a dummy variable which assumes the value of 0 if the management compensation contract of executives includes ESG goals and 1 otherwise)	Our elaboration based on Refinitiv data
SGD	A dummy variable which assumes the value of 1 if a firm establishes both a sustainability committee and implement an ESG-based compensation scheme and 0 otherwise	Our elaboration based on Refinitiv data
<b>Control variables</b>		
<b>Variable name</b>	<b>Definition</b>	<b>Source</b>
FSIZ	Natural logarithm of total assets	Refinitiv
ROA	Return on assets	Refinitiv
LEV	Total Debt / Total Equity	Refinitiv
BSIZ	Total number of board members	Refinitiv
BIND	Proportion of independent board members	Refinitiv
MEET	Annual number of board meetings	Refinitiv

Source: Our elaboration

### 4.3.3 Sample

The United States is among the largest and most influential economies globally. Therefore, the impact of ESG practices on this economy can offer valuable insights into the wider global economic landscape (Quereshi et al., 2024).

In the context of US, sustainability disclosure has traditionally been voluntary. With the aim to enhance transparency and accountability in the market by scrutinizing the accuracy of ESG-related statements and ensuring that companies adhere to their disclosed ESG practices, in March 2021 the US Securities and Exchange Commission (SEC) launched an enforcement task force dedicated to climate and ESG issues (Karpoff et al., 2022). This task force has the duty to proactively identify ESG-related misconduct (including ESG-washing). Recently, the SEC released final rules to require US firms disclosing climate change issues, however non-financial disclosure still remain largely voluntary, especially with respect to social issues which makes relevant the need to identify measures that can contrast unethical practices.

We carry out our analysis on S&P 500 US firms between 2013 and 2021 excluding firms with missing data relevant for social washing calculation (i.e., Bloomberg ESG disclosure score or Refinitiv ESG performance score). The final dataset includes 492 firms. Table 2 represents the sample selection process.

**Table 2.** Sample selection

	S&P 500
Initial number of firms	500
Number of firms removed due to data unavailability	8
Final number of firms	492

Source: Our elaboration

## 4.4 Results

### 4.4.1 Summary statistics and correlation analysis

Table 3 show the descriptive statistics related to the research variables. The mean for ES washing as well as environmental and social washing is equal to 0.03. Thus, we can argue that sampled firms resort a few to ES washing practice. The 62% of the sampled firms adopt SGDs, particularly the establishment of a sustainability committee. The boards of about half of the sampled firms are tilted in terms of female representation.

**Table 3.** Descriptive statistics

<b>Variables</b>	<b>Obs</b>	<b>Mean</b>	<b>Median</b>	<b>Sd. Dev.</b>	<b>Min.</b>	<b>Max.</b>
ESW	4,219	0.03	0.03	0.69	-2.13	3.3
SW	4,221	0.03	0.003	0.88	-2.39	4.21
EW	4,234	0.03	0.05	0.74	-2.15	3.60
SGM	4,253	0.31	0.33	0.24	0	1
SGD	4,428	0.62	1	0.48	0	1
COMM	4,428	0.93	1	0.26	0	1
COMP	4,428	0.64	1	0.48	0	1
TILT	4,253	0.52	1	0.5	0	1
BSIZ	4,253	10.97	11	2.28	1	30
BIND	4,253	83.95	85.71	9.17	33.33	100
BMEET	4,197	8.21	7	3.78	1	43
ROA	4,103	1.89	0.77	12.84	0	422.1
LEV	4,354	0.07	0.06	0.08	-0.41	0.76
FSIZ	4,375	23.52	23.47	1.48	17.45	28.82

Source: Our elaboration

Before carrying out our regression model, we calculate the correlation between the variables used in the regression model. The results are displayed in Table 4. The presence of strong multicollinearity among the independent variables considered within the regression model can impact the reliability of the analysis (Zhou et al., 2022). Statistical tests to detect multicollinearity include Pearson correlation test and variance inflation factors (VIF) test. Observing the correlation coefficients, we can rule out multicollinearity issues. We also computed VIF values among all the independent variables for each model. VIF values (not reported for brevity) reach a maximum value of 1.57, corroborating the evidence of no multicollinearity issues.

**Table 4.** Correlation matrix

	ESW	EW	SW	SGM	SGD	COMM	COMP	TILT	BSIZ	BIND	BMEET	ROA	LEV	FSIZ
ESW	1													
EW	0.85***	1												
SW	0.77***	0.33***	1											
SGM	-0.01	-0.02	-0.01	1										
SGD	0.03*	0.02*	0.03*	-0.67***	1									
COMM	-0.056***	-0.04***	-0.04***	-0.46***	0.36***	1								
COMP	0.026*	0.02	0.03**	-0.66***	0.96***	0.22***	1							
TILT	-0.03*	-0.03*	-0.001	0.59***	0.13***	0.07***	0.11***	1						
BSIZ	-0.07***	-0.07***	-0.02	-0.09***	0.18***	0.17***	0.16***	0.11***	1					
BIND	0.005	0.02	0.007	-0.1***	0.24***	0.14***	0.24***	0.17***	0.12***	1				
BMEET	-0.02	-0.03**	0.02	-0.04**	0.1***	0.05***	0.1***	0.06***	0.14***	0.07***	1			
ROA	0.02	0.008	0.03*	-0.005	0.0002	0.02	-0.003	-0.003	-0.02	-0.01	0.08***	1		
LEV	-0.06***	0.004	-0.11***	0.08***	-0.08***	-0.06***	-0.07***	0.008	-0.14***	-0.07***	-0.23***	0.009	1	
FSIZE	-0.11***	-0.13***	-0.02	-0.05***	0.23***	0.14***	0.20***	0.19***	0.5***	0.18***	0.28***	-0.02	-0.28***	1

Notes: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Source: Our elaboration

#### 4.4.2 Regression results

Table 5 shows the results of the regression analysis considering as main independent variable the SGM index, which include both mechanisms directly linked to sustainability outcomes (their absence enhances the score) and mechanisms which indirectly affects sustainability outcomes as represented by tilted boards (tilted boards increase the score). Specifically, the models 1-3 of Table 5 show the impact of SGM on ES washing (column 1), greenwashing (column 2), social washing (column 3). The results show a negative and statistically significant relationship between the SGM index and the ES washing ( $\beta = -0.12$ ,  $p < 0.05$ ), greenwashing ( $\beta = -0.12$ ,  $p < 0.05$ ), and social washing ( $\beta = -0.11$ ,  $p < 0.1$ ). They provide support for our research hypotheses, indicating that a higher level of sustainable governance, as represented by a higher SGM score, reduce the proliferation of sustainability deceptive practices.

**Table 5.** Tobit regression of SGM on ES washing, greenwashing, social washing

Variables	(1)	(2)	(3)
<b>SGM</b>	-0.12** (0.05)	-0.12** (0.051)	-0.11* (0.07)
<b>BSIZ</b>	-0.008 (0.006)	-0.005 (0.006)	-0.006 (0.008)
<b>BIND</b>	0.002 (0.001)	0.004*** (0.001)	0.002 (0.002)
<b>BMEET</b>	-0.001 (0.003)	-0.003 (0.003)	0.003 (0.004)
<b>ROA</b>	0.001 (0.001)	-0.0001 (0.001)	0.002* (0.001)
<b>LEV</b>	-0.91*** (0.18)	-0.27 (0.19)	-1.61*** (0.25)
<b>FSIZ</b>	-0.07*** (0.01)	-0.072*** (0.011)	-0.04*** (0.01)
<b>Constant</b>	1.57*** (0.24)	1.35*** (0.25)	0.84*** (0.32)
<b>Observations</b>	2,018	2,037	1,970
<b>PseudoR<sup>2</sup></b>	0.09	0.09	0.08
<b>Industry FE</b>	YES	YES	YES
<b>Year FE</b>	YES	YES	YES

Notes: \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

Source: Our elaboration

Models 1-3 of Table 6 introduce the differentiation between SGDs and mechanisms which indirectly affects sustainability outcomes (i.e., tilted boards). Specifically, model 1 shows that the coefficient of SGD is positive and statistically significant ( $\beta = 0.09$ ,  $p < 0.01$ ), while the coefficient of tilted boards is negative and statistically significant ( $\beta = -0.06$ ,  $p < 0.05$ ).

These results significantly support the predictions of our theoretical framework, according to which governance mechanisms may alternatively foster impression management strategies devoted to enhance reputation (i.e., legitimacy view) or they may determine an actual commitment towards sustainability initiatives (i.e., efficient view). Specifically, while establishing a sustainability committee and providing an ESG-based compensation exacerbate deceptive practices related to sustainability disclosure, a critical mass of women contributes to limit them.

**Table 6.** Tobit regression of SGD and TILT on ES washing, greenwashing, social washing

Variables	(1)	(2)	(3)
<b>SGD</b>	0.09*** (0.03)	0.09*** (0.03)	0.1*** (0.04)
<b>TILT</b>	-0.06** (0.02)	-0.06** (0.03)	-0.03 (0.03)
<b>BSIZ</b>	-0.009 (0.006)	-0.005 (0.006)	-0.006 (0.008)
<b>BIND</b>	0.002 (0.001)	0.004*** (0.001)	0.001 (0.002)
<b>BMEET</b>	-0.001 (0.003)	-0.003 (0.003)	0.003 (0.004)
<b>ROA</b>	0.001 (0.001)	-0.0001 (0.001)	0.002* (0.001)
<b>LEV</b>	-0.90*** (0.18)	-0.26 (0.19)	-1.61*** (0.24)
<b>FSIZ</b>	-0.07*** (0.01)	-0.073*** (0.011)	-0.04*** (0.01)
<b>Constant</b>	1.56*** (0.25)	1.33*** (0.26)	0.89*** (0.33)
<b>Observations</b>	2,018	2,037	1,970
<b>PseudoR<sup>2</sup></b>	0.09	0.09	0.08
<b>Industry FE</b>	YES	YES	YES
<b>Year FE</b>	YES	YES	YES

Notes: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Source: Our elaboration

Models 1-3 of Table 7 consider the impact of the individual SGD mechanisms, showing that the positive impact of SGD on ES washing is driven by ESG-based compensation, while sustainability committees affect it negatively and significantly. In line with previous studies (Gull et al., 2024; Gull et al., 2023a), our study shows that the establishment of a sustainability committee reduces the gap between disclosure and performance. Specifically, it represents a substantive tool which helps achieving actual ESG goals, reducing the positive gap between ESG disclosure and performance.

Furthermore, consistently with previous studies (Haque & Ntim, 2020; Haque, 2017), we provide evidence that an ESG-based compensation policy represents a symbolic sustainable governance mechanism which does not affect actual ESG initiatives, while it enhances their disclosure.

The evidence on the impact of female directors on greenwashing is conflicting, with some works showing that they pay more attention to firms' reputation exacerbating greenwashing (Taglialatela et al., 2024; Ghitti et al., 2024), while others report that, when they exert a significative influence over boards' decision, they reduce the gap between disclosure and actual commitment (Gull et al., 2023b). Our findings align with the second view, suggesting that a critical mass of women on board represents an effective mechanism to reduce the gap between 'walking' and 'talking'. However, in contrast with previous studies (Venturelli et al., 2024) we do not find significant evidence for social washing.

**Table 7.** Tobit regression of COMM, COMP and TILD on ES washing, greenwashing, social washing

<b>Variables</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
<b>COMM</b>	-0.16*** (0.05)	-0.13*** (0.05)	-0.14** (0.06)
<b>COMP</b>	0.11*** (0.03)	0.09*** (0.03)	0.12*** (0.04)
<b>TILT</b>	-0.05** (0.02)	-0.06** (0.03)	-0.03 (0.03)
<b>BSIZ</b>	-0.006 (0.006)	-0.003 (0.006)	-0.004 (0.008)
<b>BIND</b>	0.002 (0.001)	0.004*** (0.001)	0.001 (0.002)
<b>BMEET</b>	-0.001 (0.003)	-0.003 (0.003)	0.002 (0.004)
<b>ROA</b>	0.001 (0.001)	0.00001 (0.001)	0.002* (0.001)
<b>LEV</b>	-0.93*** (0.18)	-0.28 (0.19)	-1.64*** (0.24)
<b>FSIZ</b>	-0.07*** (0.01)	-0.075*** (0.011)	-0.04*** (0.001)
<b>Constant</b>	1.59*** (0.25)	1.33*** (0.26)	0.94*** (0.33)
<b>Observations</b>	2,018	2,037	1,970
<b>PseudoR<sup>2</sup></b>	0.09	0.09	0.08
<b>Industry FE</b>	YES	YES	YES
<b>Year FE</b>	YES	YES	YES

Notes: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Source: Our elaboration

#### 4.4.3 Endogeneity checks

To address the issue of endogeneity, we use the 2SLS estimation approach. We instrument our main independent variable SGM on the basis of the industry-year average of SGM and one-year lag of the same variable consistent with the measure used by previous studies (Nicolo' et al., 2024).

Table 8 shows the results obtained from the two-step IV Tobit regression model (first-stage regression results are presented in Model 1, whereas those of the second-stage regression are reported in Model 2). Our instrument (i.e., AV\_SGM) is significant and positively related to SGM. Furthermore, the weak instrument test suggests that it is not a weak instrumental variable (p-value < .000). In Model 2, the predicted value of SGM is significant and negatively related to ESW, thus confirming the results derived from the panel Tobit regressions (Table 5).

**Table 8.** Instrumental variable Tobit regression

<b>Variables</b>	<b>(1)</b>	<b>(2)</b>
<b>AV_SGM</b>	1.01*** (0.05)	
<b>Lag (WASHING)</b>		
<b>SGM</b>		-1.68*** (0.15)
<b>BSIZ</b>	-0.009*** (0.001)	-0.02*** (0.006)
<b>BIND</b>	-0.002*** (0.0004)	-0.001 (0.001)
<b>BMEET</b>	-0.001 (0.001)	-0.002 (0.003)
<b>ROA</b>	-0.0002 (0.0003)	0.0009 (0.0009)
<b>LEV</b>	0.003 (0.05)	-0.53*** (0.18)
<b>FSIZ</b>	-0.002 (0.003)	-0.07*** (0.01)
<b>Constant</b>	0.31*** (0.07)	2.25*** (0.25)
<b>Observations</b>	3,938	2,018
<b>Adjusted R<sup>2</sup></b>	0.13	
<b>Pseudo R<sup>2</sup></b>		0.11
<b>F-statistic</b>	66.04***	
<b>Weak instrument test</b>	216.07***	
<b>Industry FE</b>	YES	YES
<b>Year FE</b>	YES	YES

Notes: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Source: Our elaboration

## 4.5 Discussion

### 4.5.1 Theoretical implications

The growing number of articles on greenwashing demonstrates the increasing interest in this topic within both academia and management (Santos et al., 2024). Professional accountants and auditors assert that incorporating ESG governance into risk management procedures and controls, and potentially adopting a dedicated ESG policy, can effectively mitigate greenwashing and support businesses in making substantiated sustainability claims (Bernini & La Rosa, 2024). Relying on the theoretical foundations of NIT, this study stands in contrast with this argument, supposing that while a dedicated ESG governance policy exacerbates greenwashing and social washing, the ESG governance mechanisms not directly related to sustainability outcomes signals a greater commitment of the board towards the monitoring of firms' ESG practices. The findings yielded by the primary and additional analyses show that, consistently with our hypotheses, while a critical mass of women on board reduces the positive gap between ESG disclosure and ESG performance, the combined presence of a sustainability committee and an ESG-based remuneration scheme increase it. Further analyses reveal that the deteriorating effect is driven by the remuneration policy, as the presence of a sustainability committee also mitigates it.

Our results are in line with previous studies which have found that gender-diverse boards are more likely to challenge symbolic ESG activities and push for more substantive, impactful actions reducing the gap between walk and talk (Gull et al., 2023b). Accordingly, female directors play a crucial role in enhancing the integrity of ESG practices, leading to more rigorous oversight and ethical considerations and ensuring that sustainability claims are more closely aligned with actual practices. In contrast with previous studies (Venturelli et al., 2024), we do not find that gender diverse boards reduce social washing practices. The impact of female board members might be more pronounced in reducing greenwashing than social washing because environmental issues often have more established frameworks, standards, and public scrutiny. The tools and metrics for assessing social performance are less developed and standardized compared to environmental performance. This may render it harder for boards, including those with a critical mass of women, to effectively monitor, assess, and improve social outcomes.

Consistently with previous studies (Gull et al., 2023a), we find the existence of an ESG committee play a positive role in aligning ESG disclosures with actual performance. However, this result does not hold if this mechanism is paired with poorly designed incentive schemes.

For what concerns ESG-based compensation, the findings corroborate the results of Haque (2017) and Haque & Ntim (2020), who demonstrated that linking executive compensation with ESG metrics does not translate into actual reduction of firms' environmental impact. This suggests that firms might be more focused on the appearance of sustainability (symbolic actions) rather than making substantive changes that impact real-world outcomes.

Our study provides valuable theoretical contributions by challenging prevailing assumptions about ESG governance. It employs the theoretical foundations of NIT to argue against the assumption that dedicated ESG governance policies always lead to better sustainability outcomes. By showing that certain ESG policies may increase deceptive practices, the study highlights the complexity of institutional pressures and the potential for unintended consequences in governance practices such as linking executive compensation to ESG criteria.

By adopting the whole set of ESG governance mechanisms and a comprehensive theoretical framework, we identify the most suitable sustainable governance bundle (Jain & Zaman, 2019) to prevent green and social washing, as represented by a critical mass of women and an ESG committee, not paired with executive compensation linked to ESG criteria.

#### 4.5.2 Managerial and policy implications

Our study has also important managerial as well as policy implications. For managers, it offers a holistic view on how sustainable governance mechanisms should be designed to ensure an actual commitment towards sustainability. Given the results, we argue that the presence of a sustainability committee and a meaningful representation of women on board pursue an effective ESG commitment, without being necessary to link executive compensation to ESG targets, especially if these targets are short-term ones.

The findings from these studies also have significant implications for policymakers. If ESG policies and governance mechanisms can be exploited for symbolic purposes, then simply mandating such practices may not be enough to achieve real sustainability outcomes. Instead, policymakers should consider implementing stricter regulations and oversight concerning ESG-based remuneration schemes. By enforcing transparency and accountability into how ESG practices are set and targeted within remuneration policies, the risk of symbolic ESG commitments that do not translate into genuine sustainability performance can be a bit mitigated.

To prevent green and social washing, policymakers could collaborate with industry bodies to develop best practices for ESG governance. These practices should emphasize the importance of alignment between sustainability committees, remuneration policies, and actual

sustainability outcomes and transparent ESG reporting. Since they have a deep understanding of the specific challenges, opportunities, and dynamics within their sectors, industry bodies can tailor ESG guidelines that are both practical and effective for the companies they represent. Furthermore, they can help establish benchmarks for ESG performance. By aggregating data and insights from member companies, they can create standardized metrics and indicators that companies can use to measure their ESG performance. These benchmarks would allow companies to compare their efforts against industry standards and peers, encouraging continuous improvement and discouraging symbolic actions (green and social washing).

#### 4.5.3 Limitations and future research

Our study is affected by several limitations, which might open avenues for future research. We focused on a specific context (i.e., the US one), however ESG governance practices and their effectiveness in mitigating greenwashing and social washing vary across different countries with diverse social norms and regulatory environments. Future studies may enlarge the sample including other countries.

Our results show that ESG remuneration is not an effective tool in contrasting ES washing, highlighting the importance of carefully designing this type of compensation schemes. They should be aligned with long-term criteria, be supported by robust and transparent metrics, and ensure that executives are motivated to achieve genuine, sustainable outcomes rather than merely meeting short-term targets. Future studies may go in deep investigating whether there is a specific ESG-based remuneration scheme which instead reduces ES washing, or alternatively, if non-ESG remuneration schemes are more effective in contrasting this malpractice. In addition, they may investigate how the unintended consequences of linking executive compensation to ESG metrics can be mitigated. While the presence of sustainability committees alone is shown to mitigate some negative effects, it is the combination with poorly designed ESG remuneration schemes that is problematic. Future studies could investigate, through a case study, which is the role of sustainability committees in defining the ESG targets to which executive compensation is linked and whether these committees are responsible for defining ESG targets which fail to meet effective ESG goals.

Empirical works which assess the impact of board features face challenges with endogeneity, determined by unobservable characteristics across different firms which could impact their governance decisions. However, endogeneity has been ruled out by means of instrumental variables.

ES washing represents an abstract concept that does not allow direct measurement or observation (Ruiz-Blanco et al., 2022; Venturelli et al., 2024). Our measure of green and social washing relies on ESG ratings which can be easily influenced by companies (Kaupke & zu Knyphausen-Aufseß, 2023), further work may employ alternative measurements such as machine learning techniques to detect and quantify deceptive ESG practices.

Finally, the study employs a quantitative methodology. Future research could conduct in-depth case studies of companies that have successfully implemented ESG governance mechanisms and achieved substantial sustainability outcomes.

## 4.6 Conclusions

Our study offers new evidence on how corporate boards can effectively oversee and mitigate ESG-related malpractices. As emphasized by previous studies (Gull et al., 2023a), we adopt a bundling approach looking at how various governance mechanisms or practices work together as a whole to influence ESG outcomes. Our findings show that ESG-related incentive mechanisms exacerbate ESG deceptive practices, while the establishment of a sustainability committee not paired with this type of compensation and the circumstance of having tilted boards mitigate them. We can, thus, conclude that the governance bundle made up by tilted boards and sustainability committees, not paired with short-term ESG incentives supports the achievement of actual sustainability outcomes.

Our study fills a gap in the literature by providing novel evidence on the board-level deterrent of greenwashing and social washing. By testing the combined impact of different sustainable governance mechanisms as well as the differentiation between SGDs and mechanisms which indirectly affects sustainability outcomes, we enrich the literature debate representing the best sustainable governance structure to foster actual sustainability commitment.

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## 5. Final remarks

The thesis aims at discussing the factors which drive both the goodness of non-financial disclosure (i.e., its quality) and the related controversies (i.e., green and social washing).

The first chapter identifies several factors as drivers of the quality of non-financial disclosure which could be classified into firm-related drivers (both traditional and ESG ones), report-related drivers and country-level drivers. Within the first category, sustainable governance mechanisms emerged as factors which enhance firms' ability to disclose high quality non-financial information.

The second and third chapters are built upon the findings of the first. The second chapter relies on the frameworks of stakeholder theory and critical-mass theory to explain whether sustainable governance variables affect a specific quality dimension of non-financial disclosure, namely its relevance. Based on a sample of the Italian listed firms belonging to the Euronext Growth Milan market, which were analyzed in 2021, the study shows that the presence of a sustainability committee, as well as the proportion of women on board and the sustainable governance index positively affect sustainability materiality disclosure quality. Instead, female directors' critical mass does not have any significant impact.

While the second chapter investigates the impact of sustainable governance mechanisms on a positive facet of non-financial disclosure, the third one investigates them as possible deterrent factors for disclosure practices aimed at misleading users of non-financial information. The findings, yielded on a sample of S&P US 500 firms, show that while a critical mass of women on board reduces the positive gap between ESG disclosure and ESG performance, the combined presence of a sustainability committee and an ESG-based remuneration scheme increase it. Further analyses reveal that the deteriorating effect is driven by the remuneration policy, as the presence of a sustainability committee also mitigates it.

Analyzing comprehensively the results, the thesis highlights that establishing a sustainability committee has dual positive effect enhancing the relevance of non-financial disclosure as well as limiting the proliferation of malpractices; the presence of a critical mass of women on board does not enhance the quality of non-financial information disclosed while contributes to limit green and social washing. Instead, these practices are exacerbated by remuneration schemes linked to ESG factors which encourage managers to implement improper practices to secure higher compensation.