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The Determinants of TCFD Reporting: A Focus on the Italian Context

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Abstract: The recommendations of the Task Force on Climate Change Disclosure (TCFD) represent fundamental guidelines for managing climate-change-related risks. Indeed, the TCFD outlines good practices for integrated risk management as well as aims to protect investors and stakeholders through a more transparent and complete disclosure on the subject. However, the adoption of the recommendations was slow and differentiated between countries. The study aims to analyze the determinants that have influenced the voluntary choice of companies to adopt the TCFD recommendations. Using a logistic regression on a sample of Italian public interest entities, the results show that the size of the board, the integration of ESG risks, and the size of the company are variables that influenced the managers' decision to adopt the guidelines.

Keywords: climate accounting; Task Force on Climate-related Financial Disclosures (TCFD); Directive 2014/95/EU; sustainability reporting

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1. Introduction

In the last few years, the international situation has been characterized by increasing attention paid by citizens and policymakers regarding the need to rethink the global economy. Contrarily to the past, a pivotal role has been covered by the private sector, which has started to consider environmental, social, and governance (ESG) issues in their operations (Scheyvens et al. 2016). This paradigm shift has been driven by the attempt made by policymakers to introduce new forms of regulation to encourage companies to adopt more sustainable business models on a voluntary or quasi-mandatory basis (Caputo and Pizzi 2018).

However, despite the positive externalities related to the adoption of more sustainable business models, the current situation continues to be characterized by many issues related to anthropic activities (Bebbington et al. 2019). In particular, one of the main criticisms is a climate-change-related risk, which represents a global issue for governments and global organizations (Mateo-Márquez et al. 2020; Yunus et al. 2020). To respond adequately to this challenge, a global response is needed. The European Union ranks among the most dynamic institutions in the fight against climate change by setting ambitious targets for reducing gas emissions for 2030 and 2050. These targets will be pursued through various measures. For example, the Green New Deal, which represents the European plan for a more sustainable economy, involves huge investments to promote the transition to a circular and low-emission economy (European Commission 2019a). This issue is also a priority within the new EU taxonomy, as climate change is one of the six environmental objectives that qualify an investment as sustainable. The clear purpose of this classification is to encourage green investments to the detriment of those with a high environmental impact. Investors, banks, and the various stakeholders, therefore, need information on the risks and impacts of the strategies of private companies on climate change in an attempt to better define their investment strategies (Bank of England 2019; Pizzi et al. 2023). As evidenced by Lombardi (2021), non-financial information is also relevant for investors because of the existence of a theoretical interlinkage between companies' attitudes toward disclosing sustainability information and their financial performance. This evidence is also consistent with the recent debate about the opportunity to integrate ESG dynamics within financial statements (IFRS Foundation 2022).

In 2015, the Financial Stability Board set up a group of experts who drew up a document, published in July 2017, comprising the recommendations of the "Task Force on Climate-related Financial Disclosures" (TCFD) (TCFD 2017). The document contains recommendations for companies in all sectors, financial and non-financial, that businesses should publish for complete transparency on climate-change issues. Specifically, the recommendations focus on disclosing the financial implications of risks and identifying a company's mutual impacts on climate change. The good practices identified by the experts help to address two main types of problems. First, implementing the recommendations and dictates of the TCFD guarantees that a company will provide the necessary information to external stakeholders (TCFD 2017). Second, the document is a useful tool for better understanding and integrating climate-change issues into a company's business models (Demaria and Rigot 2021; Cosma et al. 2021). Among the various principles underlying the recommendations, there is, first of all, an integrated vision of the theme. The five areas into which the recommendations of the task force (governance, strategy, risk management, metrics, and targets) can be grouped cover all levels in the company, from the top to the most operational levels. Supporting the crucial function of forward-looking information both as an internal value for a complete understanding of the phenomenon and as externally important for investors, the document also includes a classification of the risks (physical and transition) and opportunities deriving from climate change (O'Dwyer and Unerman 2020).

This document has been appreciated by several organizations and institutions worldwide. Among others, the European Commission published an additional document in which it makes a parallel between the recommendations of the TCFD and the information requests of the Directive on non-financial reporting (European Commission 2019b). Although the European Commission and other international organizations have repeatedly reiterated the importance of these provisions, the number of companies that have decided to comply with the climate recommendations has not been as expected. Furthermore, it has been underlined that the TCFD recommendations were the basis upon which the first drafts of the European Financial Reporting Advisory Group (EFRAG) recommendations on climate change disclosure were recently defined (Pizzi 2022). In the latest reports released by the TCFD, there has been an increase in subscriptions to the framework but at a very low rate (TCFD 2020). This fact, combined with the delays of companies in terms of reducing emissions, does not represent a good sign from the private world.

This article aims to analyze the determinants that have contributed to the adoption of TCFD reporting by Italian companies. Analyzing the non-financial statements (NFSs) of 122 Italian companies, the study shows that company size, board size, and the integration of ESG risks into risk-management systems are factors that positively contributed to the alignment of NFSs with the recommendations of climate experts. The work contributes to extending the scarce literature on the TCFD (O'Dwyer and Unerman 2020) by investigating the phenomenon in one of the major European countries. At the same time, we also fill the research gap identified by Lombardi et al. (2022). In particular, Lombardi et al. underlined the need to provide a more in-depth evaluation of the enabling role assumed by Directive 2014/95/EU on non-financial reporting practices.

The results of this study are interesting for policymakers as they highlight some determinants of climate-change-related risk disclosure aligned with the TCFD recommendations. Because of the variability in data sources across nations, we decided to analyze a single country for our study (Clementino and Perkins 2021). In particular, we considered the Italian context, which is one of the main institutional settings considered by accounting scholars interested in evaluating the main implications related to the transposition of Directive 2014/95/EU by Member States (Korca and Costa 2020).

The paper is structured as follows. Section 2 consists of a literature review of climate-change-related disclosure. In Section 3, we describe our empirical approach. The results are shown in Section 4 and discussed in Section 5.

2. Literature Review

2.1. Climate-Change Disclosure

Climate-change-related disclosure has recently been a subject much studied by accounting scholars (He et al. 2022). The increase in physical phenomena caused by global warming and the attention of international organizations has been matched by proportional attention from scholars. Most of the studies have concerned carbon disclosure and performance (Panfilo and Krasodomska 2022; Depoers et al. 2016; Jung et al. 2018; Reid and Toffel 2009). These studies have highlighted, on the one hand, the state of the art in terms of GHG emissions and, on the other hand, have investigated the internal and external variables that have influenced corporate behavior. These studies first highlighted the first information shortcomings of climate-change-related disclosure, shortcomings that companies are starting to resolve by providing more and more information to the various categories of stakeholders (Luo et al. 2018; Panfilo and Krasodomska 2022).

Relying on some theoretical foundations, such as agency theory, regarding internal variables, several studies have analyzed the influence of governance characteristics on disclosure. Agency theory suggests that the board acts as management's oversight to protect the interests of shareholders (Jensen and Meckling 1976; Ben-Amar and McIlkenny 2015). Because there is a separation between ownership and management, there are certain governance features that are useful tools for monitoring the performance of management (Haque 2017). Furthermore, other studies have been conducted considering legitimacy theory, which represents a theoretical framework that analyzes the effects related to the disclosure of non-financial information by preparers. Building on the theoretical framework proposed by DiMaggio and Powell (1983), many accounting scholars have underlined that the choice to disclose non-financial information on a voluntary or mandatory basis can contribute to the legitimization of the business strategies identified by managers. In particular, non-financial disclosure can contribute to this goal through alternative effects, such as the mitigation of reputational risks or gaining a new competitive advantage (Deegan 2002).

Regarding previous research about the interlinkages between climate accounting and corporate governance, Tingbani et al., examining UK-listed companies, found that gender diversity is a characteristic that positively affects disclosure and carbon performance (Tingbani et al. 2020). Other scholars have reached similar results and have argued that a greater representation of women on the board increases the likelihood of voluntarily reporting GHG information (Ben-Amar et al. 2017). Other studies have highlighted the relevance of internal board committees. Of the various committees, the CSR committee has been the most investigated. Several scholars agree in deeming the need for the presence of a CSR committee to increase the transparency of information and to face the challenges posed by climate-change-related risks (Cordova et al. 2020; Elsayih et al. 2018). Another study emphasized the role of a board risk-management committee (Hossain and Farooque 2019). In particular, by analyzing a sample of global companies, scholars have shown that the presence of a board risk-management committee positively affects the quality of carbon information.

By comparison, other scholars have investigated the influence of context variables on carbon disclosure. Over the years, various scholars have highlighted that, in addition to the internal motivations for and determinants of companies' decision to report, country-level factors are also among the determinants of corporate reporting (Prado-Lorenzo et al. 2009; Grauel and Gotthardt 2016; Mateo-Márquez et al. 2020). According to these authors, institutional factors are decisive determinants of voluntary disclosure (Jensen and Berg 2012; Luo et al. 2012). Regulation, for example, represents a factor that can incentivize companies to enhance their accountability processes (Lombardi et al. 2021). Companies operating in countries with more stringent environmental regulations are subjected to greater pressure regarding their environmental commitment, including the reduction of carbon emissions (Prado-Lorenzo and Garcia-Sanchez 2010; Reid and Toffel 2009). This greater regulation can generate more social expectations that would encourage companies even further to consider participating in voluntary environmental disclosures, specifically, related to climate change (Mateo-Márquez et al. 2019). Even cultural factors can be a determinant that can influence the behavior of companies (Luo and Tang 2016). A recent study on a European sample has shown that cultural factors such as uncertainty avoidance or long-term orientation are factors that influence managers to disclose more carbon information (Panfilo and Krasodomska 2022).

2.2. TCFD Reporting

Although, as shown in the previous paragraph, the literature on the topic of climate change has developed, there are few contributions concerning disclosure aligned with the TCFD recommendations (Ngo et al. 2022; O'Dwyer and Unerman 2020). The first studies on the subject have highlighted both the critical issues of companies in adopting the 11 recommendations of the TCFD and, at the same time, the advantages that companies would obtain in terms of risk management related to climate change (O'Dwyer and Unerman 2020).

Some difficulties have been encountered by the first studies on the subject. Some scholars have argued that TCFD support does not correspond to transparent climate-change-related risk disclosure (Bingler et al. 2022). Evidence has shown that companies do not disclose material climate-related information. A recent study has highlighted the indirect relationship between TCFD emissions and disclosure (Ding et al. 2022). The authors argue that the companies with the highest carbon emissions use climate change-related risk disclosure as a tool for social legitimacy. This relationship was found for all the categories defined by the TCFD except for that of governance.

However, a study of French companies has shown that transparency about climate-change-related risks has grown over the years (Demaria and Rigot 2021). The authors of that study also highlighted that the companies analyzed focused more on metrics and risk management and little on the other two categories.

Although climate risks do not produce direct impacts, banks are also advised to align themselves with the TCFD recommendations. Some scholars have highlighted how banks, similarly to non-financial companies, are still behind in a process of maturation regarding these issues. They have suggested that the establishment of a CSR committee is a fundamental strategy for managing these risks and for providing transparent information to stakeholders (Cosma et al. 2022). Other scholars have analyzed the disclosure of 10 banks that are among the most active in carrying out their lending activities toward companies in the oil and gas sector (Elliott and Löfgren 2022). The results highlighted a lack of climate-change-related risk information, and it seems that the banks do not consider the indirect effects (for example, the GHG emissions of their customers).

Given the above, there is little evidence of the drivers that may have influenced the alignment of disclosure with the TCFD recommendations. Therefore, this work aims to answer the following research question:

RQ: What are the drivers of adoption of the TCFD recommendations?

3. Methodology

3.1. Sample

The sample consists of 122 Italian Public Interest Entities (PIEs) that are required to publish an NFS according to Directive 95/2014/EU. The 122 companies were selected from the list that Consob publishes annually about the Italian companies that fall within the legislation scope. Financial companies were excluded from the 209. Following the best practices found in the literature, the exclusion of these companies allows for the maintenance of a degree of homogenization in the sample. Financial companies have different characteristics compared to non-financial companies, as they are subject to more stringent sector regulations. Finally, the NFS for 2021 was analyzed. The characteristics of the sample by sector are summarized in Table 1.

Table 1. Sectors.

Sector	Obs.
Aerospace	2
Automotive	6
Chemicals	1
Construction and Engineering	8
Electronics	13
Energy	7
Food and Beverage	6
Healthcare and Pharma	6
Logistics and Transport	4
Machine and Plant	8
Manufacturing	17
Media and Publishing	5
Nautical	1
Oil and Gas	2
Retailers	3
Services	13
Steel	2
Technology	1
Telecommunications	3
Textile	7
Utilities	7
Total	122

3.2. Model and Measure

To evaluate whether some determinants can influence the attitude of companies in the voluntary adoption of climate recommendations, we performed a logit regression.

The dependent variable is a dichotomous variable that takes on a value of 1 if the companies have aligned themselves with the guidelines of the TCFD, while it has a value of 0 if they have not voluntarily adopted the recommendations.

Building on previous literature, for the independent variables, we considered variables that previous studies have found to influence non-financial reporting. In particular, given the influence of some governance characteristics on the transparency of non-financial reporting, the size of the board (Giannarakis et al. 2017; Hossain et al. 2017) and the percentage of women were included in the model directors (Charumathi and Rahman 2019; Elijido-Ten et al. 2019). Furthermore, because the TCFD recommendations are a document that not only intervenes in the disclosure but also aims to encourage climate risk-management practices, an ESGRM variable has been included. This is a dichotomous variable that takes on the value of 1 when companies have integrated ESG risks into their risk-management systems. E_rep is another dichotomic variable that estimates whether the NFS has been published in a separate report or within the management report.

Finally, some performance indicators were included as control variables. Dimensional indicators such as the logarithm of total assets and profitability indicators such as ROA and ROE have been added to the model (Almaqtari et al. 2019; Huang et al. 2014). Furthermore, we also considered the debt-to-equity ratio, which represents a financial proxy widely used by accounting scholars interested in evaluating the effects related to the adoption of external resources toward finance business operations (Pizzi et al. 2022; Pizzi 2022). Lastly, the Trucost environmental indicator was added (Dawkins and Fraas 2011). The economic and financial variables and the Trucost indicator were extracted from the Aida database (Venturelli et al. 2020).

The Table 2 summarizes the variables.

Table 2. Model's variables.

Abb	Variable	Measure
Size	Corporate size	Log of total assets
ROA	Return of asset	Net income on total assets
ROE	Return of equity	Net income on equity
D/E	Debt–equity ratio	Total debt on equity
Trucost	Trucost	Trucost index
E_rep	Separate report	E = 1 if the NFS is a standalone report; E_rep = 0 if the NFS is included in the management report
B_Div	Gender diversity	Percentage of women directors
B_Size	Board size	Number of board members
B_Ind	Independent directors	Percentage of independent directors
ESGRM	Integrated ESG risk management	Value 1 if ESG risks are integrated into risk-management systems, 0 otherwise

4. Results

Table 3 shows the descriptive statistics of the variables. In particular, only 12.3% of the sample voluntarily adopted the TCFD recommendations. This data is in line with the strong delays of European companies in adopting the guidelines. Concerning governance variables, on average, the boards of Italian PIEs are made up of around 11 members with an average representation of women directors equal to almost 39%. On the other hand, the statistics relating to the economic and financial indicators show that companies have average total assets of 13 million of euro, an ROE of around 8.46% and an ROA of 1.47%, and a debt-to-equity ratio of around 0.97. The Trucost indicator, an environmental indicator, of Italian companies settled at an average value of around 4. Finally, the descriptive statistics regarding the tendency of companies to integrate the NFS into the management report and the integration of ESG risks are interesting in risk-management systems. Most Italian companies (around 90%) have decided to report ESG information in a separate document and integrate ESG risks into their risk-management systems (97%).

Table 3. Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
TCFD	122	0.123	0.33	0	1
Size	122	13.409	1.835	6.498	18.566
ROA	122	1.469	5.345	−12.81	26.18
ROE	122	8.464	15.83	−54.19	84.25
D/E	122	0.979	1.42	0	12.33
Trucost	122	4.073	5.724	0.25	30.2
E_rep	122	0.18	0.386	0	1
B_Div	122	0.389	0.114	0	0.57
B_Size	122	11.213	4.121	4	25
ESGRM	122	0.975	0.158	0	1

Furthermore, the analysis provides interesting insights into TCFD reporting in Italy (Table 4). In particular, the summary statistics reveal that the sectors with the highest number of TCFD reporters are Energy (3) and Textile (3), followed by Construction and Engineering (2). Taking into account the incidence in relative terms, the sectors with the highest percentage of TCFD reporters are Aerospace (50%), Oil and Gas (50%), and Steel (50%). Interestingly, the two analyses indirectly confirm the existence of a direct relationship between the attitude to disclose sophisticated ESG information and reputational risks (Pizzi et al. 2021). Although inter- and intra- sectorial differences exist, both the sectors with the highest number of TCFD reporters and the sectors with the highest percentage of TCFD reporters can be summarized as controversial sectors. In this regard, the descriptive statistics underline the need to also encourage non-controversial companies to enhance their accountability processes by considering more sophisticated reporting standards (O'Dwyer and Unerman 2020).

Table 4. TCFD reporting in Italy.

Sector	Obs.	TCFD Reporters	% TCFD
Aerospace	2	1	50.00%
Automotive	6	0	0.00%
Chemicals	1	0	0.00%
Construction and Engineering	8	2	25.00%
Electronics	13	1	7.69%
Energy	7	3	42.86%
Food and Beverage	6	0	0.00%
Healthcare and Pharma	6	0	0.00%
Logistics and Transport	4	0	0.00%
Machine and Plant	8	0	0.00%
Manufacturing	17	1	5.88%
Media and Publishing	5	0	0.00%
Nautical	1	0	0.00%
Oil and Gas	2	1	50.00%
Retailers	3	0	0.00%
Services	13	1	7.69%
Steel	2	1	50.00%
Technology	1	0	0.00%
Telecommunications	3	0	0.00%
Textile	7	3	42.86%
Utilities	7	1	14.29%
Total	122	15	12.30%

Before performing the logistic regression, following the prevailing literature, we performed the correlation analysis. Correlation analysis is a useful tool for evaluating the presence of multicollinearity phenomena that would compromise the goodness of the model. Table 5 shows the results of the analysis. Because the analysis does not show values exceeding 0.60 (Kalnins 2018), it is possible to affirm the absence of multicollinearity among the variables.

Table 5. Matrix of correlations.

Variables	1	−2	−3	−4	−5	−6	−7	−8	−9	−10
(1) TCFD	1									
(2) Size	0.403	1								
(3) ROA	−0.09	−0.182	1							
(4) ROE	−0.068	−0.117	0.656							
(5) D/E	−0.104	−0.148	0.023	0.037	1					
(6) Trucost	0.151	0.119	−0.036	−0.095	−0.089	1				
(7) E_rep	0.041	0.175	−0.02	−0.077	0.092	0.032	1			
(8) B_Div	−0.078	0.002	0.055	0.014	0.083	−0.264	−0.01	1		
(9) B_Size	−0.148	0.227	−0.191	−0.177	−0.08	−0.01	0.198	−0.003	1	
(10) ESGRM	−0.1	0.148	0.009	−0.101	0.04	0.075	−0.072	0.057	−0.002	1

Table 6 reports the results of the logit regression. The variables Trucost (β = 0.06, $p < 0.1$) and Size (β = 1.082, $p < 0.01$) positively influence the dependent variable. The results demonstrate an indirect relationship between climate performance and reporting. This evidence is consistent with those studies that consider voluntary reporting a useful tool only for legitimizing oneself with stakeholders (Hummel and Schlick 2016). Furthermore, the results show a positive relationship between independent directors (β = 6.115, $p < 0.01$) and the dependent variable. Based on the agency theory, independent advisers are a monitoring tool (Ben-Amar and McIlkenny 2015). A greater presence of independent directors increases information transparency in the area of climate-change-related risk disclosure (Jaggi et al. 2018). At the same time, they can also contribute to the development of strategies that can mitigate the negative externalities related to the increasing attention paid by stakeholders to sustainable development. In this regard, considering legitimacy theory as a theoretical framework, the choice to disclose information in accordance with the TCFD could be considered by stakeholders as a signal of orientation toward sustainable development.

Table 6. Linear regression.

TCFD	Coef.	St.Err.	t Value	*p* Value	[95% Conf	Interval]	Sig
Size	1.082	0.363	2.98	0.003	0.37	1.793	***
Roa	−0.012	0.108	−0.11	0.911	−0.224	0.199	
Roe	−0.059	0.039	−1.50	0.134	−0.136	0.018	
D/E	−0.606	0.672	−0.90	0.367	−1.924	0.712	
Trucost	0.06	0.082	0.73	0.064	−0.101	0.222	*
E_rep	−1.8	1.337	−1.35	0.178	−4.421	0.82	
B_Size	−0.04	0.104	−0.39	0.068	−0.243	0.163	*
B_Div	−2.561	4.786	−0.54	0.593	−11.942	6.819	
B_Ind	6.115	2.358	2.59	0.01	1.493	10.737	***
ESGRM	−3.765	2.021	−1.86	0.063	−7.727	0.197	*
Constant	−14.43	4.931	−2.93	0.003	−24.094	−4.767	***
Mean dependent var		0.136	SD dependent var			0.344	
Pseudo r-squared		0.444	Number of obs			103	
Chi-square		36.360	Prob > chi2			0.000	
Akaike crit. (AIC)		67.523	Bayesian crit. (BIC)			96.505	

*** $p < 0.01$, * $p < 0.1$.

On the contrary, the variables B_Size (β = −0.04, $p < 0.1$) and ESGRM (β = −3.765, $p < 0.01$) are significant and negatively influence the dependent variable. This evidence could be related to the isomorphic effects related to the disclosure of non-financial information by a large number of companies (Shabana et al. 2017). In this regard, the choice to disclose information according to the TCFD represents an over-experimentation made by companies interested in legitimatizing their reports. In fact, the coexistence of reports prepared by companies with different attitudes toward sustainable practices negatively impacts the legitimacy effect related to the adoption of accountability tools (Pizzi et al. 2023). Thus, adherence to the TCFD on a voluntary basis could favor engagement with stakeholders because of the novelty of this practice.

5. Discussion and Conclusions

The relevance that the TCFD recommendations have assumed for international organizations and stakeholders, in general, is a fact. The guidelines represent both a challenge and an opportunity for global businesses. They define the relevant information for investors and are intended to guide companies on the path toward more effective management of risks related to climate change. It is also necessary to highlight the regulatory advantages that companies that have voluntarily adopted the recommendations have compared to their competitors. With the obligation to draft the EFRAG Standards for companies falling within the scope of the Corporate Social Responsibility Directive (CSRD), companies that have already voluntarily approached the TCFD recommendations have an advantage in responding to the climate framework due to accumulated experience economies.

The present work presents an analysis conducted on Italian non-financial PIEs to evaluate the determinants that influence the decision of managers to adopt TCFD recommendations. The results show that larger companies with higher environmental risk are more likely to report climate-change-related information in line with what has been defined by the climate change task force. These data are in line with previous studies in the more general field relating to ESG information and those relating to the climate. Larger companies have the resources to align their corporate behavior and disclosures with TCFD recommendations (Chithambo et al. 2020; Cosma et al. 2022). Furthermore, as highlighted by Ding et al., the adoption of TCFD recommendations may be driven more by legitimacy needs in the eyes of investors rather than the real mitigation of climate-change-related risks (Ding et al. 2022). Concerning the determinants of governance, the presence of independent directors is confirmed as a variable that influences carbon disclosure (Liao et al. 2015; Kılıç and Kuzey 2019). Independent directors increase the likelihood of adopting the TCFD recommendations. This evidence is consistent with previous studies that have underlined the enabling role assumed by independent directors in enhancing corporate information transparency (Galbreath 2010). Furthermore, independent directors tend to have a long-term perspective that fits well with the topic of climate change (Liao et al. 2015). The analysis also found a negative relationship between board size and the probability of adopting the recommendations of the TCFD. This figure is consistent with part of the literature that highlights the critical issues of a very numerous board. The presence of a large number of directors could reduce the efficiency of the board (Lee et al. 2019). Also of interest is the negative relationship between alignment with the TCFD recommendations and the integration of ESG risks into risk-management systems. The data suggest that companies that have adopted an ESG risk-management system tend not to align themselves with climate standards.

The study presents results of interest to regulators and practitioners. The data show that the majority of Italian companies have decided not to align corporate disclosure with the TCFD recommendations. Although the complexity of adhering to the recommendations has been repeatedly stressed, the data are not to be considered sufficient. Because the effects of climate change are real with a tendency to increase, especially in recent years, they require a prompt and decisive response from companies. The lack of information and adherence to stakeholders' expectations represents a critical issue because of the need to mitigate the information asymmetries between companies and users. The low tendency of alignment with the TCFD recommendations may be a sign of the difficulty of processing such information (for example, the complex scenario analysis). The critical issues highlighted can be useful for EFRAG in the development of the standards relating to climate change. In this regard, the attempt made by the European Commission to introduce more strict requirements for accountability processes should represent an effective way to the achievement of this ambitious goal (KPMG 2022). Furthermore, the transition from analogic to digital reporting also favors the disclosure of more reliable information about climate change because of the opportunity to integrate digital features within traditional accountability processes (Galeotti et al. 2022).

The study has some limitations that future research can overcome. Firstly, the study analyzes a sample from 2021. Future studies could carry out panel analyses to highlight the trend of the phenomenon over time. Furthermore, focusing on the Italian context, future studies could make comparisons between European countries and between European and non-European countries to assess whether there are differences between contexts. Furthermore, the analysis of different contexts would also allow us to study the influence of factors external to the company's reality. Future studies could explore the relationship between TCFD reporting and the integration of ESG risks into traditional risk-management systems. Scholars could analyze the inverse relationship between the two variables, differently from what was done in the present work.

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