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ESG disclosure and financial performance in the European oil and gas industry

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Abstract: Lately, the disclosure of sustainability issues has played a pivotal role in corporate reporting. In the academic debate, some scholars noted the need for more concerning the influence exerted by environmental, social and governance (ESG) issues over the corporate image, reputation and value creation. To bridge the last gap, this study investigates the relationship between ESG disclosure and financial performance by analysing a sample of European-listed large-sized companies operating in the oil and gas industry from 2010–2014. The methodological choice for that period resides in the intention to investigate the earlier relationship before the entry into force of the EU Directive 95/2014 on disclosure of non-financial information. Our findings demonstrate that financial performance dimension, pertinent to corporate profitability or the firm's financial autonomy, can positively affect ESG disclosure policies. These empirical findings can highlight the effectiveness of ESG disclosure by confirming the relevance of the EU initiatives.

Keywords: environmental, social and governance; ESG; disclosure; EU Directive; integrated reporting; financial performance; oil and gas industry; Europe.

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1 Introduction

Lately, the disclosure of sustainability issues has played a pivotal role in corporate reporting. There are different attempts or, in general, frameworks or guidelines meant to standardise annual reports or other forms of corporate reports. Along this process of comparability, environmental, social and governance (ESG) information is increasingly given by a combined approach, such as annual or integrated/sustainability reports (IIRC, 2013, 2021; GRI, 2016, GRI Universal Standard, 2021) rather than using stand-alone (KPMG, 2022) or 'silo' disclosure.

A similar trend stimulated growing attention by both academic and practitioner audiences towards the following scopes:

- The ways to improve the quality of non-financial information (NFI) disclosure (Adams, 2004; Parker, 2005: Bebbington and Larrinaga, 2014; Unerman and Chapman, 2014).

- The implications of organisational structure caused by the implementation of ESG policies (Battaglia et al., 2015; Pizzi et al., 2020; Aggarwal and Agarwala, 2023; Mateen et al., 2023).
- The integration of the Chief Sustainability Officer (CSO) into the firm organisational structure (Miller and Serafeim, 2015).
- The preparation of standards meant to recommend the thresholds of materiality regarding NFI (Eccles et al., 2012; IFAC, 2015b; Aprile et al., 2023).
- The criteria and technicalities related to the external audit of stand-alone reports (GRI, 2016; Gaudencio et al., 2020).

Building on the earlier considerations, this research explores the relationship between ESG disclosure and financial performance in the European listed large-sized companies in the oil and gas industry. This methodological choice stems from the latter being an environmentally sensitive sector (Guenther et al., 2007; Dong and Burritt, 2010; Doni et al., 2022). Furthermore, the growing attention on the state of sustainability disclosure should be emphasised against the relevant expectations of several stakeholders concerning the legitimisation of business activities (Raufflet et al., 2014). ESG data cover a wide range of NFI, (i.e., carbon emissions, waste disposal, supply chain, human rights, community relations, executive compensation, shareholders' rights, etc.) and represent a fundamental information basis for risk assessment, firm compliance with human rights and corporate governance path. Recently, the European Commission issued the new directive corporate sustainability reporting directive, CSRD (European Union, 2023), which will be mandatory for many companies and attract attention to ESG issues from a more significant number of companies in different industries.

In the academic debate, some scholars pointed out the lack of concern about the influence exerted by ESG issues on the corporate image (Du and Vieira, 2012), reputation (Michelon et al., 2015) and value creation (Dutot et al., 2016). Extensive literature analysed the relationship between ESG and financial performance by providing mixed and inconsistent findings (i.e., Shin et al., 2023; Chen and Xie, 2022; Coelho et al., 2023). For example, an interesting study (Huang, 2021) demonstrated a positive, statistically significant, but economically modest relationship between ESG performance and corporate financial performance (CFP). Given the difficulty of ensuring the positive link between ESG factors and financial performance, our study intended to investigate this topic in the period before the issuing of the EU Directive on sustainability disclosure. Our research question aims to analyse the link between ESG disclosure and financial performance gained by a sample of European-listed large-sized companies operating in the oil and gas industry, from 2010–2014. The methodological choice for that period resides in the intention to provide interesting and original insights about the earlier relationship before the entry into force of the EU Directive 95/2014 in the European context (Doni et al., 2020).

Our empirical findings support the economic disclosure theory but do not align with the socio-political theoretical construct (Eccles and Serafeim, 2013). The positive influence of some financial performance indicators on ESG disclosure engenders insightful practical/managerial implications as well as confirms the findings described in prior studies, albeit ESG disclosure scores and financial performance indicators were different (Clarkson et al., 2008; Gompers et al., 2003; Nilsson et al., 2008). Nonetheless,

the crucial requirement resides in integrating ESG policies into corporate strategy so that sustainability might reveal a source of competitive advantage and a key determinant of innovation (Porter and Kramer, 2011; Eccles and Serafeim, 2013; Churet and Eccles, 2014).

Our empirical evidence provides a further contribution to the current body of knowledge, given that the research question attempted to fill the gap pertinent to the examination in depth of a broader range over NFI (Rahaman et al., 2014) rather than focusing on just environmental disclosures (Nilsson et al., 2008; Dong and Burritt, 2010; Pled and Iatridis, 2012; Ayoola and Olasanmi, 2012; Alazzani and Wan-Hussin, 2013; Shvarts et al., 2016; Jain et al., 2020; Brahmana and Kontesa, 2021). There is an urgent claim to investigate the oil and gas sector as only a few studies analysed this industry by focusing on circular economy issues (Kazamias and Zorpas, 2021; Sharma et al., 2023) or green gas emissions disclosures (Dragomir, 2012). One recent study analysed the influence of the ESG index on corporate financial strategy in a large sample of companies in different countries (Ramírez-Orellana et al., 2023).

The rest of this paper is organised as follows: Section 2 summarises previous research on sustainability reporting and, in particular, on the oil and gas industry, from which research hypotheses are developed in Section 3. Section 4 explains the methodological approach adopted, the sample analysed and the data collection process; Section 5 describes and comments on the empirical evidence; last, Section 6 highlights conclusive remarks on findings, managerial implications and limitations of this study.

2 Literature overview

2.1 Terminology issues

In the past 30 years, ESG disclosure can be deemed a relevant backbone of corporate disclosure policy (Galbreath, 2013). Among different definitions (Costanza and Patten, 1995; IFAC, 2015a, 2015b), the concept of ‘sustainability’ seems ambiguous, and it is often used in the sense of sustainable development. Moreover, it was defined by many governments and organisations as a sustainable development from the Brundtland Report ‘that meets the needs of current generations without compromising the ability of future generations to meet their own needs’ (Brundtland Report, 1987). Along this definition, being companies an integral part of society and economy, the primary trend is to contribute positively to sustain human and biological life and the planet’s natural assets. Hence, the financial sustainability of a business is not only a concern of chief executives and chief financial officers (IFAC, 2015a). This view is confirmed by the value creation model suggested by the International Integrated Reporting Framework (IIRC, 2013, 2021), which identified a broad set of inputs or capitals, such as financial, manufacturing, natural, intellectual and relational/social resources (Bianchi Martini et al., 2016a; Corvino et al., 2019; Doni et al., 2019a). These capitals can be considered stocks of value, and they can increase or decrease through the activities and outputs of the organisation. Therefore, companies can be evaluated as a part of a more extensive interconnected system, and all the activities that involve planet, community, profit and corporate social responsibility (CSR) services to develop a more resilient business model that can create and enhance value over time.

Recently, there have been many attempts to specify the definition of sustainability: for instance, the details of the triple bottom line concept (Elkington, 1998) in economic, social and environmental pillars (Bell and Morse, 2007). From the general concept of sustainability, it is usual to shift to the definition of CSR, which can be defined as a continuing commitment by companies to act ethically and to improve economic, environmental and social development (Moir, 2001). CSR is a concept that is closely coupled with stakeholder theory because it is widely shared that companies with ethical behaviour can realise profits in the longer term. In addition to CSR, it is defined as the concept of corporate sustainability (CS) which can be treated as the ultimate aim to reach detailed objectives now without bargaining the needs of future generations (Marrewijk, 2003). Companies' commitment to sustainable conduct (CSR) can be evaluated as an intermediate step towards achieving CS. Finally, a recent recurring acronym, especially in responsible investment reports (Briand et al., 2011), is ESG, i.e., ESG, which refers to NFI on three pillars of CS (Bassen and Kovacs, 2008).

2.1.1 Corporate reporting versus sustainability (non-financial) disclosure

Sustainability disclosure moved from a mere niche, consisting of a few firms belonging to industries more sensitive to social and environmental issues (CR Perspective, 2013; Eurosif, ACCA, 2013) to broader adoption, as highlighted by recent surveys (KPMG, 2022). In addition to the preparation of integrated or stand-alone reports, there is an extension of the sustainability topics, given that the focus is also oriented on gender diversity, respect for human rights and the expectations of society.

The increasing trend towards preparing integrated reports eased the combination between ESG and financial content. By so doing, the categorisation between mandatory financial information described in the annual reports and NFI given voluntarily in other different corporate responsibility (CR) reports has significantly faded over recent years. One of the main determinants could be ascribable to the growing interest of investors and financial analysts towards a unique, integrated report. To this end, the framework recommended by the International Integrated Reporting Council (IIRC, 2013, 2021) constitutes a relevant attempt (Eccles and Krutz, 2010; Eccles et al., 2015) to overcome the 'silo' logic for which each kind of information is an end unto itself without any possibility of integration. Such logic is increasingly becoming unusual, given that a growing trend in preparing integrated reports was recorded over the last decade.

A generally accepted framework stems from the growing need to compare and assess NFI. Through this route, the Global Reporting Initiative (GRI) published the first framework for sustainability reporting in 2000. The latest reporting guidelines (GRI, 2013) were issued on May 2013 and stood out for an equivalent setting to GRI G3. In 2016, GRI issued specific standards that changed the structure of the sustainability guidelines. The contents have remained almost the same. The core indicators encompass the scopes reported below:

- Environmental (materials, energy, water, biodiversity, emissions, affluence and waste problems, products and services, compliance, transport, overall, screening and assessment, remediation).
- Social divided into two sub-categories: labour practices and decent work (employment, training and education, etc.)

- Human rights (investment, non-discrimination, child labour, etc.), society (local community, corruption, etc.)
- Product responsibility (customer health and safety, product and service labelling).

The number of firms compliant with GRI reporting guidelines significantly heightened during 2000–2012, specifically in the European context (CR Perspective, 2013).

The quality of disclosure can assess the relevance of corporate reporting. In academic literature, a plethora of studies has been performed in developed and emerging economies to assess the extent and quality of corporate disclosure in companies operating in the financial and non-financial industries (Wallace and Naser, 1995; Raffournier, 1995; Patton and Zelenka, 1997; Inchausti, 1997; Haniffa and Cooke, 2002; Aktaruddin et al., 2009; Sampong et al., 2018; Doni et al., 2019b; Corvino et al., 2020). The quality of disclosure depends not only on finances but also on NFI. Hence, there is growing attention to the non-financial items (Akhtaruddin et al., 2009), i.e., sustainability or ESG factors (Tarquino et al., 2018). For instance, the analysis of the quality of a firm's environmental disclosures (Plumlee et al., 2015) and the analysis of greenhouse gas (GHG) reporting quality (Comyns and Figge, 2015; Ganda and Milondzo, 2018) can improve transparency and credibility of companies' corporate reports, especially when companies move efforts on three critical factors: materiality, valuation of externalities and integration (IFAC, 2015b).

2.1.2 Theoretical frameworks

The measurement and assessment of sustainability disclosure and appreciation of its benefits for investors and other stakeholders are due to the legitimacy theory (Deegan and Rankin, 1996; Wilmshurst and Frost, 2001; Cho and Patten, 2007; Hahn and Kuhnen, 2013). In particular, in the oil and gas and mining sectors, the socio-political theories are used to legitimise the CR disclosure in order to increase the credibility of investments and business activities towards stakeholders and to improve transparency towards investors (Raufflet et al., 2014; Du and Vieira, 2012; Fonseca et al., 2014). The stakeholder theory can justify the analysis of the association between ESG factors and firm performance (Ullman, 1985; Donaldson and Preston, 1995). Several studies assessed this relationship by the analysis of stakeholder satisfaction, which is strongly tied to the achievement of excellent financial performance (Hill and Jones, 1992; Orlitzky et al., 2003), or the assessment of the influence exerted by the prioritisation of multiple stakeholders' interests on high financial performance (Freeman and Evan, 1990). However, if some or all stakeholders become dissatisfied, the company cannot continue to operate from a going concern perspective (Clarkson, 1995).

2.1.3 Sustainability reporting and ESG factors: the case of the oil and gas industry

The oil and gas industry is undoubtedly one of the significant sectors in tackling environmental, social (Bianchi Martini et al., 2016b) and governance issues as it may cause the potential for the degradation of the environment (Magness, 2012; Berthelot and Robert, 2011). Other crucial factors pertain to most of the natural resources available in emerging countries where national regulation is insufficient and the unstable economic and financial context (Liesen et al., 2015). There is industry-specific guidance, such as

GRI oil and gas sector supplement guidelines, launched in February 2012 by the GRI in response to increased attention from the investors and communities to the oil and gas sector and IPIECA's oil and gas industry guidance on voluntary sustainability reporting, released in 2010 (http://www.ipieca.org). GRI recently issued a specific standard, GRI 11, Oil and Gas Sector 2021. These two organisations have regular interactions to minimise divergences and promote synergies. They suggested two different approaches but pursued a common goal to encourage consistent and high-quality sustainability reporting (Alazzani and Wan-Hussin, 2013). In particular, GRI is multi-sector, focused on a broader external engagement. At the same time, IPIECA prioritises industry-specific issues and provides definitions and protocols by bringing more technical expertise to the process.

Table 1 Brief literature review on sustainability disclosure in the oil and gas industry

Author/year	*Journal*	*Topic*	*Sample/method/theory*
Magness (2007)	*Issue in Social and Environmental Accounting*, Vol. 1, No.1, pp.54–71.	Relationship between profitability and national pollutant release inventory information.	Oil and gas industry Canada/regression analysis
Dong and Burritt (2010)	Sustainable Development, Vol. 18, pp. 108-118	Analysis of social and environmental reporting practices.	Oil and gas industry Australia content analysis
Berthelot and Robert (2011)	*Issue in Social and Environmental Accounting*, Vol. 5, No. ½, pp.106–123	Relationship between climate change disclosures and political exposure and media visibility.	Oil and gas industry/ Canada/regression analysis
Dragomir (2012)	*Journal of Cleaner Production*, Vols. 29–30, pp.222–237	Analysis of GHG reporting in sustainability reports.	Oil and gas industry/ Europe/cross-sectional data
Ayoola and Olasanmi (2013)	*Issue in Social and Environmental Accounting*, Vol. 7, No. 1, pp.30–54	Analysis of ESG factors in integrated reporting	Oil and gas industry/ Nigeria/content analysis
Alazzani and Wan-Hussin (2013)	*Ecological Indicators*, Vol. 32, pp.19–24.	GRI environmental reporting: analysis of GRI indicators	Oil and gas /content analysis
Raufflet et al. (2014)	*Journal of Cleaner Production*, Vol. 84, pp.256–270.	CSR leading practices and CSR institutional expectations.	MOG (mining and oil and gas) industry/ content analysis and interviews
Shvarts et al. (2016)	*Business Strategy and the Environment*, Vol. 27, No. 7, pp.3509–3525	Environmental rating effects on environmental transparency and performance.	Oil and gas/Russia/ comparison of environmental responsibility rating
Dong et al. (2020)	*Journal of Cleaner Production*, Vol. 252, p.119758.	Environmental policy loosening effects on investment efficiency.	Oil and gas/Canada/ regression models

Source: Our elaboration

Table 1 Brief literature review on sustainability disclosure in the oil and gas industry (continued)

Author/year	*Journal*	*Topic*	*Sample/method/theory*
Obeidat et al. (2020)	*Journal of Business Ethics*, Vol. 164, pp.371–388	Green human resource management (GHRM)/environmental performance.	Oil and gas/Qatari/ partial least squares (PLS)
Jain et al. (2020)	*Business Strategy and the Environment*, Vol. 29, No. 8, pp.3509–3525	Circular economy-targeted environmental and economic performances.	Oil and gas/India/ questionnaire-based survey method
Al Gaudencio et al. (2021)	*Integrated Environmental Assessment and Management*, Vol. 17, No. 3, pp.614–625	Application of a sustainability indicator system	Oil and gas production units in marine environment/Brazil/ analysis of sustainability performance
Khresna and Kontesa (2021)	*Business Strategy and Environment*, Vol. 30, No. 7, pp.3411–3423	Clean technology as moderating variable/ relationship between environmental performance and financial performance.	Oil and gas/global companies/dynamic panel generalised method of moments (GMM)

Source: Our elaboration

The bulk of previous studies assessed the extent and the quality of ESG disclosure through content analysis, mainly social and environmental disclosure (Dong and Burritt, 2010), the impact of carbon reporting practices on investment banking (Haigh and Shapiro, 2012) and the evolution of the quality of GHG reporting (Comyns and Figge, 2015).

3 Research hypotheses

Investors and financial analysts guess ESG facets might be positively conditioned by firm performance. In the stakeholder theory view, the latter might positively influence sustainability policies.

3.1 Financial performance

Firm performance can be investigated from both accounting and market performance perspectives. The former refers to company profitability ratios calculated in a detailed period, while the latter concerns investment portfolio returns (Orlitzky et al., 2003).

The current literature is focused on the relationship between ESG factors and portfolio performance (Gompers et al., 2003; Abramson and Chung, 2000; Brammer et al., 2006; Duuren et al., 2015). This academic interest is confirmed by an extensive study carried out in 2009 by Mercer and the Asset Management Working Group of the United Nations (Mercer and UNEP FI AMWG, 2009). The findings from the analysis of 36 papers show that different ESG scores can be considered influential on financial

performance for most of the initial research (55%). Moreover, it is essential to highlight that a lower percentage of those studies (22%) deepen all three dimensions of ESG issues.

In the same way, several studies can demonstrate a positive effect of ethical investing on ESG and market performance (Abramson and Chung, 2000; Gompers et al., 2003; Orlitzky et al., 2003). Either Ziegler et al. (2011) or Griffin and Sun (2013) found a positive correlation between the disclosure of carbon reduction and climate change information with stock performance. An opposite point of view ensues from the results obtained by other studies that show a negative correlation between social responsibility activities and operating performance and stock returns (Peiris and Evans, 2010; Manescu, 2011). A part of academic literature exhibits a neutral position on this interesting topic. Still, there is no correlation between ESG and performance, confirmed by some empirical analyses of ethical and non-ethical investments (Kreander et al., 2005; Gregory and Whittaker, 2007). Stanny and Ely (2008) also found no relationship between carbon disclosure and investment.

If we evaluate the financial performance regarding profitability and economic benefits, a brief overview highlights the mixed findings. Prado-Lorenzo et al. (2009) showed a negative relationship between GHG disclosure and return on equity, whilst Magness (2012) pointed out that there is a positive correlation between profit and National Pollutant Release Inventory Information (Magness, 2012). Still, the negative findings suggest that investors recognise environmental information disclosure as bad news (Rahaman et al., 2014).

Beyond this perspective of analysis, it is interesting to underline that other manuscripts focused on the attitude of firm performance to influence NFI pertinent to ESG items. In this regard, some scholars highlighted that environmental and financial performance is positively associated with disclosures achievable from environmental and social reports or corporate websites (Clarkson et al., 2008). In more detail, the findings confirmed the predictions issued by economics based on voluntary disclosure theories (Verrecchia, 1983; Dye, 1985). In other words, these theories advocate that superior financial and environmental performers are more likely to provide discretionary non-financial disclosures.

In some studies, country factors, such as political culture, socio-economic context and existing legislation, can condition the relationship between ESG and performance rather than industry (Wanderley et al., 2008). This aspect motivated our choice of a cross-country analysis in Europe as it allowed us to explore this topic extensively to shed light on the influence of the country of origin on ESG and performance (Balatbat et al., 2012).

In addition, most previous studies cannot consider all three dimensions, i.e., ESG, but only one of them, primarily environmental issues, such as GHG reporting or carbon or water accounting. Furthermore, in other research, the measurement used for CSR or the indexes built for the empirical analysis often need to be completed. Sometimes, they attributed zero when a company still needs to implement CSR and one otherwise (Balatbat et al., 2012; Rajesh and Rajendran, 2020). In our work, we attempted to provide an in-depth analysis of ESG extent, including the three dimensions, not only limited to CSR activities (Brine et al., 2007), that is just a part of the scores calculated in our database, i.e., ASSET 4.

Building on these premises and the mixed results shown by prior studies on this stream, we formulated the following research question:

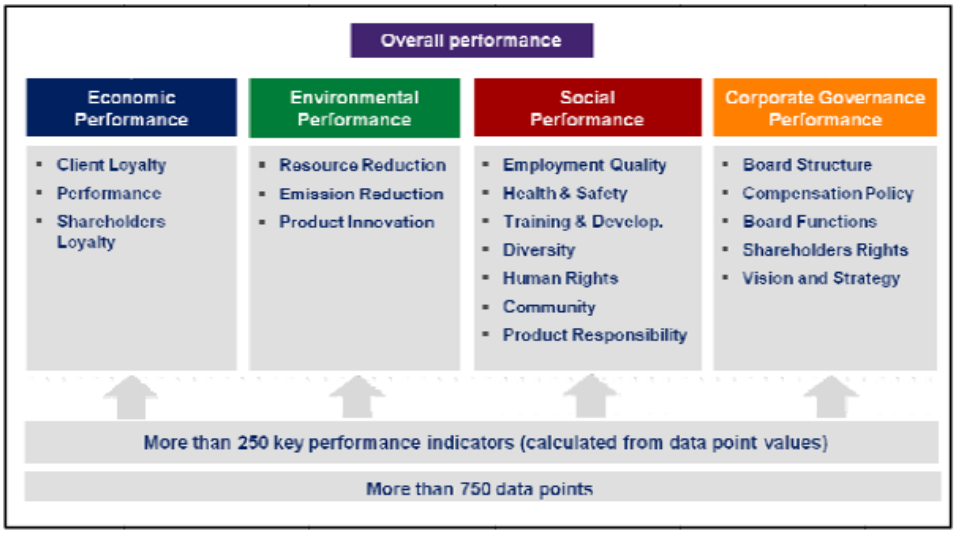
RQ There is a strong positive correlation between ESG scores and firm performance in the European oil and gas industry.

4 Research method and variables description

In our research design, the single dependent variable is the ESG total score (ESGtscore). We assigned the code: *esg_total_score* and selected it as a proxy able to capture firm attitude to disclose NFI pertinent to ESG scopes.

In particular, we mined it from the database named 'ASSET4' and handled by Thomson Reuters. In more detail, it is distinguished secondary data and an overall score computed based on more than 750 specific ESG items called 'data points' that, in turn, are aggregated in more than 250 key performance indicators (KPIs).

Figure 1 Asset4 Thomson Reuters (see online version for colours)



Data available in ASSET4 are taken from documents and reports, such as annual reports, sustainability/CR reports, companies' websites, proxy filing, NGO and other important information that leading providers can provide. For instance, data inherent to CO_2 is drawn by the Carbon Disclosure Project (https://ww.cdproject.net/en-US/results/Pages/responses.aspx). ESG information refers to the data provided by companies with periodicity on an annual basis, despite companies usually publishing their CSR reports around two months after the publication of the formal annual report.

Instead, the independent variables pertain to some financial KPIs. Building on our research question, we outlined two main firm performance dimensions: profitability and financial autonomy. To this end, concerning the former dimension, we selected the following independent variables:

- EBITDA margin (code: *ebitda_margin*)
- profit margin (code: *profit_margin*)
- return on assets (code: *roa*)
- return on capital employed (code: *roce*)
- earnings per share (code: *eps*).

Concerning the latter dimension, we opted for the operating cash flow (code: *cf_op_rev*) to consider the influence of cash deriving from business operations in supporting the adoption of ESG non-financial disclosure policies.

Still, we considered the strong propensity to draw up the integrated report and its possible impact on ESG non-financial disclosure policies. In this regard, we collected a dummy variable (code: *integr_report*) that takes the value of 1 if the firm prepared the integrated report and zero otherwise.

Moreover, the single control variable concerns the number of total assets (code: *ln_ta*) and gauges firm size. As known, it is a firm-specific variable, and we computed the natural logarithm to improve its statistical distribution. We picked up financial data related to the preceding firm performance dimensions from the database, named 'Amadeus', and handled by Bureau van Dijk. The final sample equals 42 listed European large-sized companies operating in the oil and gas industry. This amount stems from matching the secondary data available in the database mentioned above. The data collection covers the time lapse from 2010–2014. Therefore, the maximum number of observations is equal to 210. The methodological choice for that period resides in the intention to investigate the relationship between ESG disclosure and firm performance before the entry into force of the EU Directive 95/2014 in the European context. In other words, differently from prior studies based on just one European country (Mio and Venturelli, 2013; Venturelli et al., 2017; Manes-Rossi et al., 2018; Sampong et al., 2018; Ganda and Milondzo, 2018), our empirical study pursues the aim to explore such relationship but, in terms of novelty, it encompasses the European context, albeit the industry is narrow to oil and gas.

Since we carried out a longitudinal analysis, the multivariate analysis is centred on fixed effects (FE) regression models. From a methodological point of view, we chose that quantitative approach to prevent possible endogeneity problems that could bias the robustness of our findings. In FE regression models, error terms are not correlated to independent variables. Furthermore, they can measure the heterogeneity across firms in the sample investigated (Stock and Watson, 2011).

5 Results

Table 2 sets out the descriptive statistics of the variables in our research design. In more detail, the ESGtscore ranges from 9.67 to 95.78. The maximum value of the earnings per share ratio is 9.97. On the contrary, the minimum value of return on capital employed ratio is equal to –288.01. On average, the profit margin ratio amounts to 18.65%.

Table 3 reports the findings stemming from the Pearson correlations. The such bivariate analysis aims to record possible multicollinearity problems between the independent and control variables. In this regard, it is interesting to note that the

correlation between the variables: *eps* and *ln_ta* is not relevant, in terms of multicollinearity problems, given that the Pearson coefficient is equal to 0.445 (*p-value* < 0.001), and it does not overcome the critical threshold of |0.80| (Jing et al., 2008; Haniffa and Coke, 2005). In addition, from the methodological standpoint, intending to prevent contingent biased results, we calculated the robust standard errors in the following multivariate analyses.

Table 2 Descriptive statistics

Variables	*Observations*	*Mean*	*Std. dev.*	*Min*	*Max*
esg_total_score	164	70.6263	24.2264	9.67	95.78
ebitda_margin	167	32.0380	28.5624	–34.06	95.97
profit_margin	181	18.6492	26.2844	–92.52	94.70
roa	190	5.7688	11.7084	–62.67	54.23
roce	157	14.5399	50.6694	–288.01	292.87
eps	137	1.6329	2.1336	0.01	9.97
cf_op_rev	165	21.5179	24.1026	–42.06	99.71
integr_report	210	0.0524	0.2233	0	1
ln_ta	191	15.6144	2.4852	6.38	19.52

Consistently with our research design, it is worthwhile pointing out the correlation between the preparation of an integrated report and the *esg_total_score* (Pearson coefficient: 0.206; *p-value* < 0.01).

Table 4 highlights that the Ebitda margin ratio positively affects the *esg_total_score* (beta coefficient: 0.1726; *p-value* < 0.10). Therefore, our results are in line with our RQ. On the contrary, preparing an integrated report is not positively associated with ESG non-financial disclosure policies (beta coefficient: 1.3642; *p-value* > 0.10).

Model 2 also displays that the profit margin ratio is positively associated with our dependent variable (beta coefficient: 0.1402; *p-value* < 0.05). Thus, our findings confirm our RQ. Similar to *model 1*, the beta coefficient of the independent variable named *integr_report* is not statistically significant (beta coefficient: 1.5109; *p-value* > 0.05).

Table 6 shows that the return on assets ratio (*roa*) exerts a positive influence on ESG non-financial disclosure policies (beta coefficient: 0.3339; *p-value* < 0.05). Hence, *model 3* supports our RQ. Conversely, the preparation of the integrated report is not statistically significant (beta coefficient: 1.8081; *p-value* > 0.10).

Table 7 exhibits that the return on capital employed ratio is uncorrelated with the *esg_total_score* (beta coefficient: 0.0726; *p-value* > 0.10). Consequently, our empirical evidence is different from the RQ mentioned above. Vice versa, it is helpful to underline that the drawing up of the integrated report could significantly condition ESG non-financial disclosure policies (beta coefficient: 4.3063; *p-value* < 0.001).

Model 5 points out the absence of a positive association between the earnings per shares ratio and the *esg_total_score* (beta coefficient: –0.2666; *p-value* > 0.10). Consequently, our RQ must be rejected. Nonetheless, similar to *model 4*, it should be mentioned that the preparation of the integrated report positively influences ESG non-financial disclosure policies (beta coefficient: 3.5211; *p-value* < 0.001).

Table 3 Pearson correlation matrix

		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1	esg_total_score	1								
		(164)								
2	roa	0.129	1							
		(151)	(190)							
3	eps	0.290**	0.132	1						
		(111)	(136)	(137)						
4	ebitda_margin	–0.091	0.439***	–0.305***	1					
		(136)	(167)	(111)	(167)					
5	profit_margin	0.002	0.616***	–0.146	0.753***	1				
		(145)	(181)	(132)	(163)	(181)				
6	roce	0.116	0.725***	0.052	0.281***	0.313	1			
		(127)	(157)	(113)	(149)	(153)	(157)			
7	cf_op_rev	0.066	0.427***	–0.256**	0.842***	0.665***	0.300***	1		
		(134)	(165)	(121)	(165)	(162)	(147)	(165)		
8	integr_report	0.206**	–0.008	0.024	–0.141	–0.091	–0.020	–0.096	1	
		(164)	(190)	(137)	(167)	(181)	(157)	(165)	(210)	
9	ln_ta	0.597***	0.088	0.445***	–0.009	0.038	–0.004	–0.019	0.197**	1
		(151)	(190)	(136)	(167)	(181)	(157)	(165)	(191)	(191)

Note: Significance level: ^$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 4 FE regression model with robust standard errors, model 1

Variable dependent: esg_total_score	*Beta coefficients*	*Robust standard errors*
ebitda_margin	0.1726^	0.0880
integr_report	1.3642	1.5040
ln_ta	10.6615*	4.5253
constant	–102.0210	73.2784
No. of observations	136	
R^2	0.378	
F-statistic	2.47^	

Note: Significance level: ^$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 5 FE regression model with robust standard errors, model 2

Variable dependent: esg_total_score	*Beta coefficients*	*Robust standard errors*
profit_margin	0.1402**	0.0506
integr_report	1.5109	1.9029
ln_ta	7.5600	4.0925
constant	–50.4876	65.6541
No. of observations	145	
R^2	0.346	
F-statistic	2.80^	

Note: Significance level: ^$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 6 FE regression model with robust standard errors, model 3

Variable dependent: esg_total_score	*Beta coefficients*	*Robust standard errors*
roa	0.3339*	0.1454
integr_report	1.8081	2.0026
ln_ta	5.9080	3.6487
constant	–24.7646	58.0236
No. of observations	151	
R^2	0.384	
F-statistic	2.24^	

Note: Significance level: ^$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 7 FE regression model with robust standard errors, model 4

Variable dependent: esg_total_score	*Beta coefficients*	*Robust standard errors*
roce	0.0726	0.0697
integr_report	4.3063***	0.3692
ln_ta	3.5382	3.1636
constant	14.9027	49.6651
No. of observations	127	
R^2	0.452	
F-statistic	14.16***	

Note: Significance level: ^$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 8 FE regression model with robust standard errors, model 5

Variable dependent: esg_total_score	*Beta coefficients*	*Robust standard errors*
eps	—0.2666	0.3416
integr_report	3.5211***	0.8970
ln_ta	3.1495	3.5185
constant	22.2606	58.1245
No. of observations	111	
R^2	0.418	
F-statistic	2.56***	

Note: Significance level: ^$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 9 FE regression model with robust standard errors, model 6

Variable dependent: esg_total_score	*Beta coefficients*	*Robust standard errors*
cf_op_rev	0.1096*	0.0449
integr_report	1.2442	1.9774
ln_ta	8.7643	5.3341
constant	–68.7402	84.8717
No. of observations	134	
R^2	0.412	
F-statistic	2.38^	

Note: Significance level: ^$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Consistently with our research design, it is worth noting that the financial ratios tested, thanks to the five previous FE regression models, sit in the first firm performance dimension amenable to corporate profitability.

The second firm performance dimension, pertinent to financial autonomy, is contrarily verified through *model 6*. In particular, Table 9 reports that the operating cash flow ratio positively affects the *esg_total_score* (beta coefficient: 0.1096; *p-value* < 0.05). Therefore, the empirical evidence supports our RQ.

Moreover, similar to the first three FE regression models, the independent variable *integr_report* is not statistically significant (beta coefficient: 1.2442; *p-value* > 0.10).

6 Discussion and conclusions

This research provides further ground for the academic debate concerning the role played by firm performance over ESG disclosure (Ullman, 1985; Orlitzky et al., 2003; Haniffa and Cooke, 2005; Brine et al., 2007; Bassen and Kovacs, 2008; Plumlee et al., 2009; Peiris and Evans, 2010; Balatbat et al., 2012; Buallay, 2019; Huang, 2021). In more detail, this study offers an interesting contribution by investigating an environmentally sensitive industry such as the oil and gas sector in the European context. Our findings demonstrate that financial performance can stimulate the adoption of ESG non-financial disclosure policies. The financial performance dimension, pertinent to corporate profitability or financial autonomy, can positively affect ESG non-financial disclosure

policies. Using traditional performance indicators, our findings demonstrate that a firm's profitability can facilitate the adoption of ESG disclosure practices. In contrast, adopting Integrated Reporting does not affect this relationship as this variable is not statistically relevant. The positive relationship between a liquidity ratio and ESG disclosure policies offers an exciting insight into the importance of the firm's financial autonomy for adopting and enhancing ESG disclosure policies in the oil and gas sector. These companies must adopt sound environmental management systems and select technological investments in ESG issues by continuously innovating their business processes and activities. These results demonstrate that firm's profitability and liquidity can positively influence sustainability-oriented practices by confirming the need to limit the mandatory requirements on ESG disclosures to several European companies.

Although this research cannot confirm the validity of the scope included in the European Directive NFRD, it is necessary to avoid excessive burdens and costs for companies that tend to enhance ESG policies, if they have good profitability and liquidity. The EU's choice to oblige only the significant public interest entities can be interpreted as a greater likelihood of having a large company with sound financial performance than a small or medium company (Muserra et al., 2019). Our findings suggest a different way of selecting the obliged companies regarding the firm's profitability and liquidity rather than the firm's size. Our findings confirm the results by Ramírez-Orellana et al. (2023) that show an exciting influence of an ESG index on CFP by highlighting the greater weight of the environmental dimension on the other two dimensions, social and governance. Our analysis can provide an original contribution to the existing literature, as we focused on the European oil and gas sector by highlighting the relevance of the issuing of the EU Directive. This new requirement will enhance the companies' financial performance by ensuring a positive financial effect after the adoption of the earlier directive.

Still, regarding managerial implications, it is worth emphasising the results amenable to implementing an integrated thinking approach that generally triggers the preparation of the integrated report. Indeed, this report boosts the provision of ESG information. Therefore, our findings could sit in the recent debate into which some distinguished professional institutions (i.e., the Chartered Institute of Management Accountants, etc.) promote a holistic vision of firm performance to ease stakeholders' understanding of corporate strategy.

The main caveat of our empirical research is amenable to the fact that we exclusively investigated the European context and the listed large-sized firms. Therefore, we suggest broadening the cross-country analysis to other geographical areas, (i.e., North America, Asia, etc.) and considering medium-sized firms to explore the managerial approaches put in place and the presence of possible and significant differences. Another caveat pertains to the adoption of a not exhaustive KPIs dashboard. To this end, it could be interesting to examine the effects generated over ESGtscore by other ratios focused on the firm financial autonomy indexes and capital adequacy.

Additionally, concerning the future research routes, it should be noted that the focus of our study was centred before the entry into force of EU Directive 95/2014, so the research question was explored from a voluntary disclosure perspective in the European context, albeit the industry was narrow to oil and gas. Therefore, new research is welcome in a mandatory disclosure view after the compulsory adoption of the previous EU Directive. To this end, fruitful insights might stem from the comparison based on an analysis ex-ante and ex-post of the coming into force of the EU Directive over NFI.

References

Abramson, L. and Chung, D. (2000) 'Socially responsible investing: viable for value investors?', *Journal of Investing*, Vol. 9, No. 3, pp.73–80.

Adams, C. (2004) 'The ethical, social and environmental reporting-performance portrayal gap', *Accounting, Auditing and Accountability Journal*, Vol. 17, No. 5, pp.731–757.

Aggarwal, P. and Agarwala, T. (2023) 'Relationship of environmental strategy and performance: role of green human resource management', *International Journal of Business Environment*, Vol. 14, No. 1, pp.37–66.

Akhtaruddin, M., Hossain, M.A., Hossain, M. and Yao, L. (2009) 'Corporate governance and voluntary disclosure in corporate annual reports of Malaysian listed firms', *Journal of Applied Management Accounting Research*, Vol. 7, No. 1, pp.1–21.

Alazzani, A. and Wan-Hussin, W.N. (2013) 'Global reporting initiative's environmental reporting. A study of oil and gas companies', *Ecological Indicators*, Vol. 32, pp.19–24.

Ayoola, T.J. and Olasanmi, O.O. (2012) 'Business case for integrated reporting in the Nigerian oil and gas sector', *Issue in Social and Environmental Accounting*, Vol. 7, No. 1, pp.30–54.

Balatbat, M., Siew, R.Y.J. and Carmichael, D.G. (2012) 'ESG scores and its influence on firm performance: Australian evidence', *Australian School of Business School of Accounting*, Vol. 2, pp.1–32.

Bassen, A. and Kovacs, A.M. (2008) 'Environmental, social and governance key performance indicators from a capital market perspective', *Zeitschrift für Wirtschafts und Unternehmensethik*, Vol. 9, No. 2, pp.182–192.

Battaglia, M., Bianchi, L., Frey, M. and Passetti E. (2015) 'Sustainability reporting and corporate identity: action research evidence in an Italian retailing cooperative', *Business Ethics: A European Review*, Vol. 24, No. 1, pp.52–72.

Bebbington, J. and Larrinaga, C. (2014) 'Accounting and sustainable development: an exploration', *Accounting, Organisations and Society*, Vol. 39, No. 6, pp.395–413.

Bell, S. and Morse, S. (2007) 'Problem structuring methods: Theorising the benefits of deconstructing sustainable development projects, *Journal of the Operational Research Society*, Vol. 58, No. 5, pp.576–587.

Berthelot, S. and Robert, A.M. (2011) 'Climate change disclosures: an examination of Canadian oil and gas firms', *Issues in Social & Environmental Accounting*, Vol. 5, Nos. 1–2, pp.106–123.

Bianchi Martini, S., Corvino, A. and Doni, F. (2016b) 'Investigating the respect of human rights within corporate social responsibility reporting. Evidence from the European oil and gas sector', *International Journal of Business Research*, Vol. 16, No. 2, pp.135–151.

Bianchi Martini, S., Corvino, A., Doni, F. and Rigolini, A. (2016a) 'Relational capital disclosure, corporate reporting and company performance: evidence from Europe', *Journal of Intellectual Capital*, Vol. 17, No. 2, pp.186–217.

Brahmana, R.K. and Kontesa, M. (2021) 'Does clean technology weaken the environmental impact on the financial performance? Insight from global oil and gas companies', *Business Strategy and the Environment*, Vol. 30, No. 7, pp.3411–3423.

Brammer, S., Brooks, C. and Pavelin, S. (2006) 'Corporate social performance and stock returns: UK evidence from disaggregate measures', *Financial Management*, Vol. 35, No. 3, pp.97–116.

Briand, R., Urwin, R. and Chia, C.P. (2011) 'Integrating ESG into the investment process', *MSCI ESG Research*, New York, NY [online] http://www.msci.com/resources/research_papers/integrating_esg_into_the_investment_process_2.html (accessed 19 March 2020).

Brine, M., Brown, R. and Hackett, G. (2007) 'Corporate social responsibility and financial performance in the Australian context', *Economic Round-up Autumn*, pp.47–58.

Brundtland Report (1987) *Report of the World Commission on Environment and Development: Our Common Future*, United Nations, New York [online] https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf (accessed 30 January 2020).

Buallay, A. (2019) 'Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector', *Management of Environmental Quality: An International Journal*, Vol. 30, No. 1, pp.98–115.

Chen, Z. and Xie, G. (2022) 'ESG disclosure and financial performance: moderating role of ESG investors', *International Review of Financial Analysis*, Vol. 83, p.102291.

Cho, C. and Patten, D. (2007) 'The role of environmental disclosure as tools of legitimacy: a research note', *Accounting and Organization Society*, Vol. 32, Nos. 7–8, pp.630–647.

Churet, C. and Eccles, R.G. (2014) 'Integrated reporting, quality of management, and financial performance', *Journal of Applied Corporate Finance*, Vol. 26, No. 1, pp.56–64.

Clarkson, M.B.E. (1995) 'A stakeholder framework for analysing and evaluating corporate social performance', *Academy of Management Review* Vol. 20, No. 1, pp.42–56.

Clarkson, P.M., Li, Y., Richardson, C.D. and Vasvari, F.P. (2008) 'Revisiting the relation between environmental performance and environmental disclosure: an empirical analysis', *Accounting, Organisation and Society*, Vol. 33, Nos. 4–5, pp.303–327.

Comyns, B. and Figge, F. (2015) 'Greenhouse gas reporting quality in the oil and gas industry', *Accounting, Auditing and Accountability Journal*, Vol. 28, No. 3, pp.403–433.

Corvino, A., Caputo, F., Pironti, M., Doni, F. and Bianchi Martini, F. (2019) 'The moderating effect of firm size on relational capital and firm performance: evidence from Europe', *Journal of Intellectual Capital*, Vol. 20, No. 4, pp.510–532.

Corvino, A., Doni, F. and Bianchi Martini, S. (2020) 'Corporate governance, integrated reporting and environmental disclosure: evidence from the South African context', *Sustainability*, Vol. 12, No. 12, p.4820.

Costanza, M.C. and Patten, B.C. (1995) 'Defining and predicting sustainability', *Ecological Economics*, Vol. 5, No. 3, pp.193–196.

CR Perspectives (2013) *Global CR Reporting Trends and Stakeholder Views*, November [online] https://www.corporateregister.com (accessed 29 July 2020).

Deegan, C. and Rankin, M. (1996) 'Do Australian companies report environmental news objectively? An analysis of environmental disclosures by firms prosecuted successfully by the Environmental Protection Authority', *Accounting, Auditing and Accountability Journal*, Vol. 9, No. 2, pp.52–69.

Donaldson, T. and Preston, L.E. (1995) 'The stakeholder theory of the corporation: concepts, evidence, and implications', *Academy of Management Review*, Vol. 20, No. 1, pp.65–91.

Dong, S. and Burritt, R. (2010) 'Cross-sectional benchmarking of social and environmental reporting practice in the Australian oil and gas industry', *Sustainable Development*, Vol. 18, No. 2, pp.108–118.

Doni, F. and Corvino, A. and Bianchi Martini, S. (2022) 'Corporate governance model, stakeholder engagement and social issues evidence from European oil and gas industry', *Social Responsibility Journal*, Vol. 18, No. 3, pp.636–662.

Doni, F., Bianchi Martini, S., Corvino, A. and Mazzoni, M. (2020) 'Voluntary versus mandatory non-financial disclosure: EU Directive 95/2014 and sustainability reporting practices based on empirical evidence from Italy', *Meditari Accountancy Research*, Vol. 28, No. 5, pp.781–802.

Doni, F., Larsen, M., Bianchi Martini, S. and Corvino, A. (2019a) 'Exploring integrated reporting in the banking industry: the multiple capitals approach', *Journal of Intellectual Capital*, Vol. 20, No. 1, pp.165–188.

Doni, F., Corvino, A. and Bianchi Martini, S. (2019b) 'King codes on corporate governance and ESG performance. Evidence from FTSE/JSE all-share index', in Idowu, S.O., Del Baldo, M. (Eds.): *Integrated Reporting. Antecedents and Perspectives for Organizations and Stakeholders*, Springer, Berlin/Heidelberg.

Dragomir, V.D. (2012) 'The disclosure of industrial greenhouse gas emissions: a critical assessment of corporate sustainability reports', *Journal of Cleaner Production*, Vols. 29–30, pp.222–237.

Du, S. and Vieira Jr, E.T. (2012) 'Striving for legitimacy through corporate social responsibility: insights from oil companies', *Journal of Business Ethics*, Vol. 110, pp.413–427.

Dutot, V., Galvez, E.L. and Versailles, D.W. (2016) 'CSR communication strategies through social media and influence on e-reputation', *Management Decision*, Vol. 54, No. 2, pp.363–389.

Duuren, E., Plantinga, A. and Scholtens, B. (2015) 'ESG integration and the investment management process: fundamental investing reinvented', *Journal of Business Ethics*, Vol. 138, pp.525–533.

Dye, R.A. (1985) 'Disclosure of non-proprietary information', *Journal of Accounting Research*, Vol. 23, No. 1, pp.123–145.

Eccles, R.G. and Krutz, M.P. (2010) *One Report – Integrated Reporting for a Sustainable Society*, John Wiley and Sons Inc., New Jersey.

Eccles, R.G. and Serafeim, G. (2013) 'The performance frontier. Innovating for a sustainable strategy', *Harvard Business Review*, May, pp.50–60.

Eccles, R.G., Krzus, M.P. and Ribot, S. (2015) 'Meaning and momentum in the integrated reporting movement', *Journal of Applied Corporate Finance*, Vol. 27, No. 2, pp.8–17.

Eccles, R.G., Krzus, M.P., Rogers, J. and Serafeim, G. (2012) 'The need for sector-specific materiality and sustainability reporting standards', *Journal of Applied Corporate Finance*, Vol. 24, No. 2, pp.65–71.

Elkington, J. (1998) 'Partnerships from cannibals with forks: the triple bottom line of 21st-century business', *Environmental Quality Management*, Vol. 8, No. 1, pp.37–51.

European Sustainable Investment Forum (Eurosif), Association of Chartered Certified Accountants, (ACCA) (2013) *What do Investors Expect from Nonfinancial Reporting?* [online] https://www.accaglobal.com/content/dam/acca/global/PDF-technical/sustainability-reporting/tech-tp-wdir.pdf (accessed 30 July 2020).

European Union (2023) Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting [online] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022L2464 (accessed 30 March 2023).

Fonseca, A., McAllister, M.L. and Fitzpatrick P. (2014) 'Sustainability reporting among mining corporations: a constructive critique of the GRI approach', *Journal of Cleaner Production*, Vol. 84, pp.70–83.

Freeman, M. and Evan, W.M. (1990) 'A within and between analysis of the relationship between corporate social responsibility and financial performance', *Journal of Behavioural Economics*, Vol. 19, No. 4, pp.337–359.

Galbreath, J. (2013) 'ESG in focus: the Australian evidence', *Journal of Business Ethics*, Vol. 118, pp.529–541.

Ganda, F. and Milondzo, K.S. (2018) 'The impact of carbon emissions on corporate financial performance: evidence from the South African firms', *Sustainability*, Vol. 10, No. 7, p.2398.

Gaudencio, L.M.A.L., de Oliveira, R., Curi, W.F., Santana, C.F.D., Silva, J.N. and Meira, C.M.B.S. (2020) 'Oil and gas companies operating in Brazil adhere to GRI-G4 essential sustainability indicators: a critical review', *Environment, Development and Sustainability*, Vol. 22, pp.1123–1144.

Global Reporting Initiative (GRI) (2013) *An Introduction to G4. The Next Generation of Sustainability Reporting* [online] https://www2.globalreporting.org/standards/Documents/Other%20old/GRI-An-introduction-to-G4.pdf (accessed 30 July 2015).

Global Reporting Initiative (GRI) (2016) *A Short Introduction to GRI Standards* [online] https://www.globalreporting.org/media/wtaf14tw/a-short-introduction-to-the-gri-standards.pdf (accessed 20 August 2020).

Gompers, P.A., Joy, L.I. and Andrew, M. (2003) 'Corporate governance and equity prices', *Journal of Economics*, Vol. 118, No. 1, pp.107–155.

Gregory, A. and Whittaker, J. (2007) 'Performance and performance persistence of ethical unit trusts in the UK', *Journal of Business Finance & Accounting*, Vol. 34, Nos. 7/8, pp.1327–1344.

GRI Universal Standard (2021) [online] https://www.globalreporting.org/standards/standards-development/universal-standards/.

Griffin, P.A. and Sun, Y. (2013) 'Going green: market reaction to CSR newswire releases', *Journal of Accounting and Public Policy*, Vol. 32, No. 2, pp.93–113.

Guenther, E., Hoppe, H. and Poser, C. (2007) 'Environmental corporate social responsibility of mining and oil and gas firms', *Greener Management International*, Vol. 53, pp.7–25.

Hahn, R. and Kühnen, M. (2013) 'Determinants of sustainability reporting: a review of results, trends, theory, and opportunities in an expanding field of research', *Journal of Cleaner Production*, Vol. 59, pp.5–21.

Haigh, M. and Shapiro, M. (2012) 'Carbon reporting: does it matter?', *Accounting, Auditing and Accountability Journal*, Vol. 25, No. 1, pp.105–125.

Haniffa R.M. and Cooke, T.E. (2005) 'The impact of culture and governance on corporate social reporting', *Journal of Accounting and Public Policy*, Vol. 24, No. 5, pp.391–430.

Haniffa, R.M. and Cooke, T.E. (2002) 'Culture, corporate governance and disclosure in Malaysian corporations', *Abacus*, Vol. 38, No. 3, pp.317–349.

Hill, C.W.L. and Jones, T.M. (1992) 'Stakeholder-agency theory', *Journal of Management Studies*, Vol. 29, No. 2, pp.131–154.

Huang, D.Z. (2021) 'Environmental, social and governance (ESG) activity and firm performance: a review and consolidation', *Accounting & Finance*, Vol. 61, No. 1, pp.335–360.

Inchausti, B.G. (1997) 'The influence of company characteristics and accounting regulation on information disclosed by Spanish firms', *The European Accounting Review*, Vol. 6, No. 1, pp.45–68.

International Federation of Accountants (IFAC) (2015a) *Accounting for Sustainability: From Sustainability to Business Resilience* [online] https://www.ifac.org/knowledge-gateway/preparing-future-ready-professionals/publications/accounting-sustainability-sustainability-business-resilience (accessed 3 April 2020).

International Federation of Accountants (IFAC) (2015b) *Materiality in Integrated Reporting. Guidance for the Preparation of Integrated Reports* [online] https://www.ifac.org/knowledge-gateway/preparing-future-ready-professionals/publications/materiality-integrated-reporting (accessed 3 April 2020).

International Integrated Reporting Council (IIRC) (2013) *The International <IR> Framework*, pp.1–37 [online] https://www.integratedreporting.org/wp-content/uploads/2013/12/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf (accessed 31 July 2021).

International Integrated Reporting Council (IIRC) (2021) *The International <IR> Framework*, pp.1–58 [online] https://www.integratedreporting.org/wp-content/uploads/2021/01/InternationalIntegratedReportingFramework.pdf (accessed 31 July 2021).

Jing, L., Pike, R. and Haniffa, R. (2008) 'Intellectual capital disclosure and corporate governance structure in UK firms', *Accounting & Business Research*, Vol. 38, No. 2, pp.137–159.

Kazamias, G. and Zorpas, A.A. (2021) 'Drill cuttings waste management from oil & gas exploitation industries through end-of-waste criteria in the framework of circular economy strategy', *Journal of Cleaner Production*, Vol. 322, p.129098.

KPMG (2022) 'Big shifts, small steps', *KPMG Global Survey of Sustainability Reporting 2022* [online] https://kpmg.com/xx/en/home/insights/2022/09/survey-of-sustainability-reporting-2022.html (accessed March 2023).

Kreander, N., Gray, R.H., Power, D.M. and Sinclair, C.D. (2005) 'Evaluating the performance of ethical and non-ethical funds: a matched pair analysis', *Journal of Business Finance & Accounting*, Vol. 32, Nos. 7/8, pp.1465–1493.

Liesen, A., Hoepner, A.G., Patten, D.M. and Figge, F. (2015) 'Does stakeholder pressure influence corporate GHG emissions reporting? Empirical evidence from Europe', *Accounting, Auditing and Accountability Journal*, Vol. 28, No. 7, pp.1047–1074.

Magness, V. (2012) 'Legitimacy in green: pollution vs profit in Canadian oil refiners', *Issue in Social and Environmental Accounting*, Vol. 1, No. 1, pp.54–71.

Manescu, C. (2011) 'Stock returns in relation to environmental, social and governance performance: mispricing or compensation for risk?', *Sustainable Development*, Vol. 19, No. 2, pp.95–118.

Manes-Rossi, F., Tiron-Tudor, A., Nicolò, G. and Zanellato, G. (2018) 'Ensuring more sustainable reporting in Europe using nonfinancial disclosure-De facto and De Jure evidence', *Sustainability*, Vol. 10, No. 4, p.1162.

Marrewijk, M.V. (2003) 'Concepts and definitions of CSR and corporate sustainability: between agency and communion', *Journal of Business Ethics*, Vol. 44, No. 2, pp.95–105.

Mateen, A., Raza Bilal, A. and Khushi, M.A. (2023) 'Unveiling the influence mechanism between green relational capital and social sustainability outcomes', *International Journal of Business Environment*, Vol. 14, No. 2, pp.145–163.

Mercer and UNEP FI AMWG (2009) *Shedding Light on Responsible Investment. Approaches, Returns and Impacts*, Mercer LLC [online] https://www.sustainablefinance.ch/upload/cms/user/Shedding_light_on_responsible_investment_free_version.pdf.

Michelon, G., Pilonato, S. and Ricceri, F. (2015) 'CSR reporting practices and quality of disclosure: an empirical analysis', *Critical Perspective on Accounting*, Vol. 33, pp.59–78.

Miller, K.P. and Serafeim, G. (2015) 'Chief sustainability officers, who are they, and what do they do',? in *Leading Sustainable Change. An Organisational Perspective*, SSRN [online] https://ssrn.com/abstract=2411976 (accessed 30 August 2022).

Mio, C. and Venturelli, A. (2013) 'Nonfinancial information about sustainable development and environmental policy in the annual reports of listed companies: evidence from Italy and the UK', *Corporate Social Responsibility and Environmental Management*, Vol. 20, No. 6, pp.340–358.

Moir, L. (2001) 'What do we mean by corporate social responsibility?', *Corporate Governance*, Vol. 1, No. 2, pp.16–22.

Muserra, A.L., Papa, M. and Grimaldi, F. (2019) 'Sustainable development and the European Union policy on nonfinancial information: an Italian empirical analysis', *Corporate Social Responsibility and Environmental Management*, Vol. 27, No. 1, pp.22–31.

Nilsson, H., Cunningham, G.M. and Hassel, L.G. (2008) 'A study of the provision of environmental information in financial analysts' research reports', *Sustainable Development*, Vol. 16, No. 3, pp.180–194.

Orlitzky, M., Schmidt, F.L. and Rynes, S.L. (2003) 'Corporate social and financial performance: a meta-analysis', *Organisation Studies*, Vol. 24, No. 3, pp.403–441.

Parker, L.D. (2005) 'Social and environmental accountability research: a view from the commentary box', *Accounting, Auditing and Accountability Journal*, Vol. 18, No. 6, pp.842–860.

Patton, J. and Zelenka, I. (1997) 'An empirical analysis of the determinants of the extent of disclosure in annual reports of joint stock companies in the Czech Republic', *The European Accounting Review*, Vol. 6, No. 4, pp.605–626.

Peiris, D. and Evans, J. (2010) 'The relationship between environmental social governance factors and U.S. stock performance', *Journal of Investing*, Vol. 19, No. 3, pp.104–112.

Pizzi, S., Caputo, A., Corvino, A. and Venturelli, A. (2020) 'Management research and the UN sustainable development goals (SDGs): a bibliometric investigation and systematic review', *Journal of Cleaner Production*, Vol. 276, p.124033.

Pled, V. and Iatridis, G.E. (2012) 'Corporate social responsibility reporting: evidence from environmentally sensitive industries in the USA', *International Review of Accounting, Banking and Finance*, Vol. 4, No. 2, pp.61–99.

Plumlee, M., Brown, D., Hayes, R.M. and Marshall, R.S. (2015) 'Voluntary environmental disclosure quality and firm value: further evidence', *Journal of Accounting and Public Policy*, Vol. 34, No. 4, pp.336–361.

Plumlee, M.A.R.L.E.N.E., Brown, D.A.R.R.E.L.L. and Marshall, R.S. (2009) 'Voluntary environmental disclosure quality and firm value: roles of venue and industry type', Unpublished paper, University of Utah and Portland State University [online] http://papers.ssrn.com/sol3/papers.cfm.

Porter, M.E. and Kramer, M.R. (2011) 'Creating shared value', *Harvard Business Review*, Vol. 89, pp.62–77.

Prado-Lorenzo, J.M., Rodriguez-Dominiguez, L., Gallago-Alvarez, I. and Garcia-Sanchez, I.M. (2009) 'Factors influencing the disclosure of greenhouse gas emissions in companies worldwide', *Management Decision*, Vol. 47, No. 7, pp.1133–1157.

Raffournier, B. (1995) 'The determinants of voluntary financial disclosure by Swiss listed companies', *European Accounting Review*, Vol. 4, No. 2, pp.261–280.

Rahaman, N.R.A., Rasid, S.Z.A., Basiruddin, R. (2014) Exploring the relationship between carbon performance, carbon reporting and firm performance. A conceptual paper, Procedia. Social and Behavioral Sciences, 164, 118-125.

Rajesh, R. and Rajendran, C. (2020) 'Relating environmental, social, and governance scores and sustainability performances of firms: an empirical analysis', *Business Strategy and the Environment*, Vol. 29, No. 3, pp.1247–1267.

Ramírez-Orellana, A., Martínez-Victoria, M., García-Amate, A. and Rojo-Ramírez, A.A. (2023) 'Is the corporate financial strategy in the oil and gas sector affected by ESG dimensions?', *Resources Policy*, Vol. 81, p.103303.

Raufflet, E., Cruz, L.B. and Bres, L. (2014) 'An assessment of corporate social responsibility practices in the mining and oil and gas industries', *Journal of Cleaner Production*, Vol. 84, pp.256–270.

Sampong, F., Song, N., Boahene, K.O. and Wadie, K.A. (2018) 'Disclosure of CSR performance and firm value: new evidence from South Africa on the GRI guidelines for sustainability disclosure basis', *Sustainability*, Vol. 10, No. 12, p.4518.

Sharma, M., Joshi, S., Prasad, M. and Bartwal, S. (2023) 'Overcoming barriers to circular economy implementation in the oil & gas industry: environmental and social implications', *Journal of Cleaner Production*, Vol. 391, https://doi-org.unimib.idm.oclc.org/10.1016/j.jclepro.2023.136133.

Shvarts, E.A., Pakhalov, A.M. and Knizhnikov, A.Y. (2016) 'Assessment of environmental responsibility of oil and gas companies in Russia: the rating method', *Journal of Cleaner Production*, Vol. 127, pp.143–151.

Stanny, E. and Ely, K. (2008) 'Corporate environmental disclosures about the effects of climate change', *Corporate Social Responsibility and Environmental Management*, Vol. 15, No. 6, pp.338–348.

Stock, J.H., Watson, M. (2011) *Introduction to Econometrics*, 3rd ed., Prentice Hall, Upper Saddle River, New Jersey.

Tarquinio, L., Raucci, D. and Benedetti, R. (2018) 'An Investigation of global reporting initiative performance indicators in corporate sustainability reports: Greek, Italian and Spanish evidence', *Sustainability*, Vol. 10, No. 4, p.897.

Ullman, A.A. (1985) 'Data in search of a theory: a critical examination of the relationships among social performance, social disclosure, and economic performance of U.S. firms', *Academy of Management Review*, Vol. 10, No. 3, pp.540–557.

Unerman, J. and Chapman, C. (2014) 'Academic contributions to enhancing accounting for sustainable development', *Accounting, Organisations and Society*, Vol. 39, No. 6, pp.385–394.

Venturelli, A., Caputo, F., Cosma, S., Leopizzi, R. and Pizzi, S. (2017) 'Directive 2014/95/EU: are Italian companies already compliant?', *Sustainability*, Vol. 9, No. 8, p.1385.

Verrecchia, R. (1983) 'Discretionary disclosure', *Journal of Accounting and Economics*, Vol. 5, pp.179–194.

Wallace, R.S.O and Naser, K. (1995) 'Firm-specific determinants of comprehensiveness of mandatory disclosure in the corporate annual reports of firms on the Stock Exchange of Hong Kong', *Journal of Accounting and Public Policy*, Vol. 14, No. 4, pp.311–368.

Wanderley, L.S.O., Lucian, R., Farache, F. and de Sousa, F.J.M. (2008) 'CSR information disclosure on the web: a context-based approach analysing the influence of country of origin and industry sector', *Journal of Business Ethics*, Vol. 82, No. 2, pp.369–378.

Wilmshurst, T.D. and Frost, G.R. (2001) 'The role of accounting and the accountant in the environmental management system', *Business Strategy and the Environment*, Vol. 10, No. 3, pp.135–147.

Ziegler, A., Busch, T. and Hoffmann, V.H. (2011) 'Disclosed corporate responses to climate change and stock performance: an international empirical analysis', *Energy Economics*, Vol. 33, No. 6, pp.1283–1294.

Appendix

Table A1 Calculation method of dependent variables

Variable	*KPI*	*Calculation method*
Ebitda margin (%)	Profitability ratio	(Ebitda/total assets) * 100
Profit margin (%)	Profitability ratio	(Profit before tax/total assets) * 100
ROA using net income (%)	Profitability ratio	(Net income/total assets) * 100
ROCE using net income (%)	Profitability ratio	(Net income + Interest paid)/(Shareholder funds + Non-current liabilities) *100
Earnings per share (EPS)	Profitability ratio	Net income/average outstanding common shares
Cash flow/operating revenue (%)	Liquidity ratio	(Cash flow/operating revenue) * 100

Source: Amadeus User Guide, 2015 Bureau van Dijk