How do companies measure and report corporate sustainability? A comparison among the most innovative European companies

Ortiz-de-Mandojana, N.

Antolín-López, R.

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Contact information
Name: Natalia Ortiz-de-Mandojana
Address: Campus de la Cartuja, s/n. Facultad de Ciencias Económicas y Empresariales. Universidad de Granada, Spain.
Email: nortiz@ugr.es

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Abstract

The field of measuring and reporting corporate sustainability (CS) practices currently faces relevant challenges. First, although important steps have been taken towards transparency in reporting CS practices, there is still significant flexibility in terms of the international sustainability frameworks that guide the reporting, the key performance indicators (KPIs) that need to be included, and even the specific aspects that must be reported. Second, there is a wide range of CS metrics rooted in different methodologies and assumptions that still lack standardization and convergence. These two challenges make it difficult to compare companies and understand their evolution towards greater sustainability. Based on these challenges in measuring and reporting CS practices, this study has two objectives: (1) analysing companies' CS reporting to determine the trends in terms of the terminology, EU regulations, international sustainability frameworks, ratings and indices, KPIs, and materiality approaches used, and (2) comparing the CS metrics of some of the most relevant rating agencies to identify their similarities and differences. To achieve these objectives, we collected data on the 250 EU companies ranked better in the 2021 EU Industrial R&D Investment Scoreboard. Overall, this work aims to contribute to advancing greater homogenisation in the measurement and reporting of CS.

Acknowledgements

Authors

Natalia Ortiz-de-Mandojana, University of Granada

Raquel Antolín-López, University of Almería

Executive summary

Aim of the study

The field of measuring and reporting Corporate Sustainability (CS) practices currently faces relevant challenges. The previous JRC report "Measuring and disclosing environmental, social and governance (ESG) information and performance" by Antolín-López and Ortiz-de-Mandojana (2023) highlighted two main issues. First, although important steps have been taken towards transparency in reporting CS practices, there is still significant flexibility in terms of the international sustainability frameworks that guide the reporting, the key performance indicators (KPIs) that need to be included, and even the specific aspects that must be reported. Second, there is a wide range of CS metrics rooted in different methodologies and assumptions that still lack standardization and convergence. These two challenges make it difficult to compare companies and understand their evolution towards greater sustainability.

Based on these challenges in measuring and reporting CS practices, this study has two objectives. First, we aim to identify and understand current trends in CS reporting among the most innovative companies in the European Union (EU). Specifically, we perform text analyses to identify trends in terms of the use of terminology to refer to CS issues, EU regulations acknowledged, most cited international sustainability frameworks, environmental, social, and governance (ESG) ratings and indices mentioned, the ESG key performance indicators (KPIs) used, and the CS materiality approaches adopted. Second, we analyse the most popular metricsto measure CS performance to discern similarities and incongruencies and contribute to a greater understanding of the state of the art in CS measurement. Our comparative analysis of the Refinitiv ESG Scores, Sustainalytics' ESG Risk Ratings, S&P Global Sustainability Yearbook, RepRisk Index (RRI), Global 100 Index, and the Top 100 World's Most Ethical Companies enabled us to draw interesting conclusions about the high diversity and incongruencies that currently exist in CS metrics. To achieve both goals, this study focused on the most innovative EU companies that were extracted from the top ranked companies of the EU Industrial R&D (Research & Development) Investment Scoreboard developed by the European Commission in 2021. Innovative companies are a good context for analysis, as they are attentive to the environment and change.

With the development of these two objectives, this work aims to contribute to advancing greater homogenisation in the measurement and reporting of CS.

Policy context

The EU has demonstrated a strong commitment to sustainable growth by committing to the Sustainable Development Goals (SDGs) on the United Nations and climate-related goals of the Paris Agreement, and incorporating them into the European Green Deal and Action Plan on Financing Sustainable Growth. European regulations are currently in full swing, with new regulations coming into full force by 2022 and 2023.

Among previous main milestones, we can highlight the Non-financial Reporting Directive (NFRD), which has been enforced since 2018 on large public-interest companies that requires companies to disclose non-financial information such as measures taken regarding environmental and social matters, treatment of employees (Directive 2014/95/EU). Another milestone is the Sustainable Finance Disclosure Regulation (SFDR), established in 2021 to set sustainability-related disclosure requirements for financial market participants, financial advisers, and financial products (Regulation EU 2019/20881). Additionally, we can mention the proposal of the Corporate Sustainability Reporting Directive (CSRD), which is enforced on all large companies and all companies listed on regulated markets (except listed micro companies) and introduces more detailed reporting requirements and mandatory reporting. Finally, we highlight the EU Taxonomy Regulation (Regulation (EU) 2020/852) and the EU Taxonomy Climate Delegated Act, which are related to a classification system based on scientific criteria establishing a list of environmentally sustainable economic activities.

Main findings

This study delivers interesting trends in CS reporting and identifies relevant CS measurement divergencies among a sample of the most EU innovative companies.

With regards to CS reporting, our results revealed important trends related to a lack of homogeneity in how CS reports are coined, the type of information included, and how CS information is disclosed. Such divergencies could be solved by establishing clearer recommendations and global standards which would enable stakeholders to locate this information more easily, thereby improving access and transparency in terms of CS reporting and the benchmark of companies. KPIs are a key aspect in advancing reporting quality and should be more standardised, at least the most relevant ones. Additionally, it is important to differentiate between the levels of different KPIs and make KPIs more actionable for measurement (for example, emissions vs. climate

change). EU regulations such as the EU Taxonomy will help achieve this goal. Finally, we identified that the references to materiality are still very limited. Companies must understand and clarify the double materiality of their activities, i.e. their CS reporting and measurement must allow for the identification of not just the impacts social and environmental issues may have on their financial aspects, but also the impact the company has on global sustainability.

Concerning the analysis of the CS metrics of the most innovative EU companies, our results revealed that the analysed rating agencies differ in how their metrics evaluate the CS performance of companies, existing great differences in the companies placed in top positions by their rankings. The rankings divergencies can be explained by the fact that the different CS metrics deeply differ in their conceptualization and purpose. Therefore, the value of the CS metrics depends on whether the stakeholder uses them to gain a thorough understanding of the assumptions on which each CS measure is built and what each measure represents. Indeed, some CS metrics can be used in a supplementary manner, given that the approach and focus of existing CS metrics differ considerably.

We hope that in the future greater clarity and standardisation will be developed in CS reporting and measurement to allow for a more effective comparison among companies and the improvement of their monitorisation and evolution. Eventually, it could ensure greater sustainability in companies, and overall, global sustainability.

1 Introduction

Measuring and reporting corporate sustainability (CS) practices are central to advancing global sustainable development. Companies should align their strategies, and measure and communicate their contributions to global sustainability (SDG Compass, 2015). Many different stakeholders also need instruments to evaluate and compare CS practices. For example, financial market players may evaluate where to invest responsibly and NGOs may offer their support to the most sustainable companies and collaborate to help spread change.

Despite the importance of measuring and reporting CS practices, currently, this field has relevant challenges. In the European context, important steps have been taken towards transparency in reporting CS practices, such as with the Non-financial Reporting Directive (NFRD) (Directive 2014/95/EU) and the European Union (EU) Taxonomy Regulation (Regulation (EU) 2020/852). However, European regulations for reporting CS information still offer significant flexibility to companies in terms of international frameworks that guide the report, key performance indicators (KPIs) that need to be included, and even the specific aspects that must be reported. This flexibility, while enabling companies to tailor their reporting to their idiosyncratic conditions, also makes it more difficult to compare companies and understand their evolution towards greater sustainability. In fact, linked to the flexibility in company CS reporting, there is a challenge related to the wide range of proposed CS measures, with a lack of standardisation among these instruments. Antolín-López and Ortiz-de-Mandojana (2023) concluded that CS metrics and the rating market are dominated by a few big clusters of rating agencies, such as Moody's ESG Solutions, London Stock Exchange Group (LSEG) (which integrated Refinitiv), Morningstar Group (Sustainalytics), and Standard & Poors (S&P). Although the rating market is concentrated, these rating agencies use different methodologies and assumptions and their resulting CS measures do not always converge (Berg et al., 2019; Chatterji et al., 2016; Christensen et al., 2022).

Considering these two major challenges in measuring and reporting CS practices, this study has two objectives. First, we analyse companies' CS reporting to determine the trends in terms of the terminology used to refer to CS issues, the EU regulations acknowledged, the most cited international sustainability frameworks, the environmental, social, and governance (ESG) ratings and indices followed, the KPIs used, and the approach to the materiality of the CS aspects adopted. Second, we compare CS measurement instruments including the metrics of some of the most relevant rating agencies, such as Refinitiv ESG Scores, Sustainalytics' ESG Risk Ratings, and the S&P Global Sustainability Yearbook, and a measure of ESG risk exposure on the media, such as the RepRisk Index (RRI), along with important indices such as the Global 100 Index and the 100 World's Most Ethical Companies ranking to identify their similarities and differences. With the development of these two objectives, this work aims to contribute to advancing greater homogenisation in the measurement and reporting of CS.

To achieve these objectives, we have focused on the most innovative EU companies. The EU has demonstrated a strong commitment towards sustainable growth by committing to the sustainable development goals (SDGs) and climate-related goals of the Paris Agreement and translating them into the European Green Deal and Action Plan on Financing Sustainable Growth. While Europe is a pioneer in promoting CS reporting, countries such as the United States are currently in a phase of intense debate regarding what type of information should be required from companies in their mandatory reports (Jebe, 2019; Securities and Exchange Commission, 2022). Among all the EU companies, we analysed only those ranked at the top of the EU Industrial R&D (Research & Development) Investment Scoreboard (hereinafter the EU R&D Scoreboard), developed by the European Commission, in 2021. Innovative companies are a good context for analysis, as they are attentive to the environment and change.

The remainder of this paper is structured as follows. Section 2 details the methodology used to achieve the objectives. In Section 3, we discuss the analyses related to CS reporting. In Section 4, we illustrate the analyses related to the comparison of different CS metrics. Finally, Section 5 presents a discussion of the results and the derived conclusions.

2 Methods

2.1 Sample and data collection

To achieve the objectives of this study, we built a sample of the most innovative companies in Europe. To identify these, we selected the 250 European companies better ranked in innovation worldwide according to the 2021 EU R&D Scoreboard, which had the latest data available. Next, we collected information on CS reporting and CS metrics for 2021. Owing to the data availability, the final sample for the reporting analysis included 238 companies, while the sample for the CS metrics analysis was reduced to 184 companies with complete data. Tables 1 and 2 include details on the frequency counts of the headquarters' countries and industries for the companies included in each sub-sample.

Table 1. Country distribution in the 250 EU R&D Scoreboard and both sub-samples

Country	EU R&D		CS reporting sample		CS metrics sample	
	Freq.	%	Freq.	%	Freq.	%
Austria	7	2.80	7	2.94	3	1.63
Belgium	8	3.20	8	3.36	7	3.80
Denmark	17	6.80	17	7.14	8	4.35
Finland	7	2.80	7	2.94	7	3.80
France	42	16.80	39	16.39	36	19.57
Germany	82	32.80	78	32.77	51	27.72
Hungary	1	0.40	1	0.42	1	0.54
Ireland	19	7.60	18	7.56	16	8.70
Italy	12	4.80	12	5.04	10	5.43
Luxembourg	2	0.80	2	0.84	2	1.09
Netherlands	27	10.80	25	10.50	21	11.41
Poland	1	0.40	1	0.42	1	0.54
Portugal	1	0.40	1	0.42	1	0.54
Slovenia	1	0.40	1	0.42	0	0.00
Spain	7	2.80	7	2.94	7	3.80
Sweden	16	6.40	14	5.88	13	7.07
Total	**250**	**100**	**238**	**100**	**184**	**100**

Source: Elaborated by the authors

The country with the highest number of companies included in both subsamples is Germany, with 78 cases in the CS reporting analysis sample and 51 in the CS metrics analysis sample. This corresponds to the fact that 32.80% of the top 250 companies in the EU R&D Scoreboard are German. The next most represented countries are France with 39 and 36 companies and the Netherlands with 25 and 21 companies in the CS reporting analysis sample and the CS metrics analysis sample, respectively. Again, these two countries are ranked second and third in terms of the number of companies positioned among the top 250 in the EU R&D Scoreboard.

Regarding the industry distribution, we have described the sub-samples based on NACE Rev. 2 classification available for the analysed companies in Bureau van Dijk's Orbis database. Among the most frequently occurring industries, we find companies from the following sectors: services (NACE 70–74, NACE 82, and NACE 93), pharmaceuticals (NACE 21), manufacturing of computers, electronics, and optical products (NACE 26), and manufacturing of motor vehicles and other transport (NACE 29 and NACE 30). We note that many service companies present missing values in the CS metrics analysis subsample, which could be due to these companies receiving less attention than industrial firms do, as they have less of an environmental impact.

Table 2. Industry distribution of the 250 top-ranked companies in the EU R&D Scoreboard and the two sub-samples

Industries		EU R&D		CS reporting sample		CS metrics sample	
Denomination	NACE	Freq.	%	Freq.	%	Freq.	%
Agriculture	01	3	1.20	3	1.26	2	1.09
Mining	05–09	3	1.20	3	1.26	3	1.63
Food and beverages	10–11	4	1.60	4	1.68	3	1.63
Textiles, leather, and footwear	13, 14, and 15	4	1.60	4	1.68	4	2.17
Wood and paper	17–18	3	1.60	3	1.26	3	0.54
Chemicals	20	13	5.20	13	5.46	13	7.07
Pharmaceuticals	21	29	11.60	29	12.18	18	9.78
Rubber, plastics, and other non-metallic minerals	22–23	7	2.80	6	2.52	5	2.72
Metals	24–25	8	3.20	7	2.94	5	2.72
Computers, electronics, and opticals	26	28	11.20	28	11.76	23	12.5
Electrical equipment	27	8	3.20	8	3.36	8	4.35
Machinery and equipment	28	16	6.40	16	6.72	13	7.07
Motor vehicles and other transport	29–30	23	9.20	22	9.24	22	11.96
Other manufacturing	32	5	2.00	5	2.1	2	1.09
Electricity, gas, and steam	35	6	2.40	6	2.52	6	3.26
Water supply	36	2	0.80	2	0.84	2	1.09
Construction	42	2	0.80	2	0.84	2	1.09
Retail	46–47	4	1.60	4	1.68	4	2.17
Transportation and storage	49–52	5	2.00	5	2.1	4	2.17
Information and communication	58–62	22	8.80	21	8.82	20	10.87
Financial and insurance	64–66	22	8.80	21	8.82	13	7.07
Professional and other services	82, 93, and 70–74	32	12.80	26	10.92	9	4.89
Total		**250**	**100**	**238**	**100**	**184**	**100**

Source: Elaborated by the authors

To collect information about CS reporting, we first identified where each company had published information about their CS practices in 2021 (except for six companies, for which we used the 2020 report, as it was the most recent one available). We found a lack of homogeneity in CS reporting, specifically, in how companies publish CS information (i.e. integrated with financial information versus published in a separate report) and in the titles of reports. Table 3 illustrates the differences in CS reporting. First, we found that 61.35% of the companies published CS information in specific CS reports, separated from financial information, whereas only 38.66% integrated CS and financial information in a single report. However, some companies among the 61.35% that published separate reports also published an integrated report with CS and financial performance information. In these cases, we selected the specific CS reports if they were more detailed and complete than the integrated report. On the contrary, when the companies developed only partial reports about a particular CS aspect (e.g. biodiversity report or climate change report), we used the integrated report instead because it provided a more holistic picture of all the activities executed in terms of sustainability. After searching for CS information, 12 companies were removed from the sample because no report with CS information was found. Thus, our sample was reduced to 238 EU companies.

Second, in addition to differences in terms of integrating CS with financial information, we found great heterogeneity in the names used to coin reports. For example, for CS-related reports, we found the most

common title to be 'Sustainability Report', used in 29.41% of the cases. Approximately 7.56% of the companies titled these as 'Non-financial Reports', using the nomenclature of the NFRD. Other alternatives include the 'ESG report' and 'CSR report' (Corporate Social Responsibility report). The different nomenclatures of CSR, ESG, and sustainability demonstrate the lack of homogeneity when referring to these topics; similar concepts exist but have different connotations (Antolín-López and Ortiz-de-Mandojana, 2023). We also found a few companies coining their CS-related report as 'People and Planet Report', 'Tomorrow Report', or 'Sustainability Day Report', among others.

We also identified many variations in the naming of integrated reports. The most commonly employed terms were 'Integrated Annual Report' and 'Annual Report', used by 11.76% and 12.61% of the companies in the sample, respectively. 'Universal Registration Document' was used by 4.52% of the companies. We found other companies using names such as 'Annual and Sustainability Report' or other less intuitive names such as 'Group Report' or 'Consolidated Management Report'. In these cases, we checked whether the company also included information on sustainability, even though it was not referred to in the name of the report.

Table 3. Name heterogeneity in CS-related reports

Type/name of CS-related reports	Number of companies	%
Separate CS reports	**146**	**61.35**
Sustainability Report	70	29.41
Sustainability Progress Report	5	2.10
ESG Report	7	2.94
ESG overview/supplement/reporting	3	1.26
Corporate responsibility report	8	3.36
CSR Report, brochure/publication	5	2.10
Non-Financial Report	18	7.56
Others (e.g. People and planet report, sustainability day report, etc.).	30	12.61
Economic and CS-integrated reports	**92**	**38.66**
Integrated Annual Report	28	11.76
Annual Report	30	12.61
Universal Registration Document	11	4.52
Annual and Sustainability report	9	3.78
Others (e.g. Group Report, Consolidated Management Report, Global report, etc.)	14	5.88
Total number of CS-related reports	**238**	**100**

Source: Elaborated by the authors

Regarding the CS metrics, we searched the companies in the Refinitiv ESG Scores database, Sustainalytics' ESG Risk Ratings, and S&P Global Sustainability Yearbook. We supplemented the sample with information from the RRI, 2021 Global 100 Index, and Top 100 World's Most Ethical Companies in 2021. The lack of information about CS metrics for some companies reduced the initial sample size of 250 to 184 European companies. Except for the RRI, all other data are currently available free of charge on the websites of rating agencies and other providers. In the case of the RRI, the data were obtained from Bureau van Dijk's Orbis database belonging to Moody's analytics.

The Refinitiv ESG database covers over 12,000 public and private companies globally. The Refinitiv ESG Score results are from the collection of over 630 ESG indicators by independent analysts, which represent 10 key sustainability aspects, such as resource use, emission, human rights, and product responsibility. Companies' scores are contrasted with those of their industry peers.

Sustainalytics' ESG Risk Ratings comprise a universe of more than 14,000 publicly listed companies. The ESG Risk Ratings are created with publicly reported data covering approximately 350 indicators that represent 30 ESG criteria. The ratings consist of a quantitative aggregated score that serves to group companies into five risk categories according to the risk that key ESG factors pose for companies, from negligible (enterprise value has a Negligible Risk of material financial impacts driven by ESG factors) to severe.

Being listed in the S&P Global Sustainability Yearbook is a distinction earned by companies that excel in sustainability performance, assessed using the S&P Global ESG score tool, among a range of approximately 8,000 publicly listed companies. Companies with the best ESG scores are distinguished within the Gold, Silver, and Bronze classes. The remaining companies that do not receive a medal distinction are still listed as sustainability yearbook members if they are among the top 15 in their industry (S&P Global, 2022).

The RRI dataset includes more than 210,000 companies associated with risk incidents. The RRI captures company-specific reputational risks related to ESG issues. The RRI of a company depends only on its risk incidents; thus, it reflects a company's actual risk management instead of its communicated goals and policies. The RRI ranges from zero (lowest) to 100 (highest), with higher values indicating higher risk exposure (RepRisk, 2022).

The Global 100 Index, developed by Corporate Knights, ranks the world's 100 most sustainable corporations annually. Their assessment included nearly 7,000 public companies, with revenues of over 1 billion US dollars. The assessment is based on data for 23 KPIs, such as clean investment, representation of female directors, and carbon emissions.

The Top 100 World's Most Ethical Companies is a list developed yearly by Ethisphere. The rating system is rooted in more than 100 multiple-choice and text questions aimed at capturing a company's performance, grouped into five categories: governance, leadership and reputation, culture of ethics, ethics and compliance programs, and environmental and societal impacts. Companies with the best results are included as honourees for the corresponding year.

2.2 Data analysis

To analyse differences in CS reporting, we performed text analysis using the analytical software Nvivo. This statistical tool is commonly used in qualitative analysis, and it allows performing frequency counts of words and short terms, along with other functions (QSR International, 2022). The first step in text analysis is to develop dictionaries of terms for the aspects of interest. For this purpose, we relied on an extensive literature review on measuring and disclosing ESG information and performance elaborated by Antolín-López and Ortiz-de-Mandojana (2023). Specifically, we developed different dictionaries for CS terminology, EU regulations, international sustainability frameworks, ESG ratings and indices, KPIs, and different materiality approaches currently used in business.

The analysis of differences in the analysed CS metrics is mostly descriptive, paying special attention to the best-positioned companies in each case. To complement this analysis, we also used some basic descriptive measures, such as means, standard deviations, and comparison tests carried out with Stata statistical software. However, this study did not aim to conduct an exhaustive analysis of the differences and causes that lead to different CS valuations.

3 Text analysis of CS reporting

In this section, we present and discuss the results of the text analysis performed using the statistical software Nvivo. Specifically, we analysed the differences in terms of (1) the types of terms used to refer to CS activities, (2) EU regulations, (3) international sustainability frameworks, (4) ESG ratings and indices reported, (5) KPIs included, and (6) the types of materiality approaches.

3.1 CS terminology heterogeneity in CS reporting

One of the most frequently acknowledged problems in CS measurement and reporting is the existence of many related but differing terms to refer to sustainability aspects (Antolín-López et al., 2016). For example, Antolín-López and Ortiz-de-Mandojana (2023) provided an overview of the heterogeneity of terms used to refer to CS issues, such as CS, CSR, ESG, and SDGs. Although these terms have some aspects in common, they also involve definitional nuances since they focus on the relationship between business and society. Table 4 summarises the main characteristics of these terms.

Table 4. CS terminology frequency counts

Concept	Definition	Main dimensions	Main objective
CS	Corporate action that simultaneously promotes economic prosperity, social equity, and environmental integrity.	Economic, social, and environmental	Identify and mitigate business-related sustainability impacts and their interrelations.
CSR	Corporate action that promotes moral/social responsibility behaviours.	Social (and environmental)	Identify and mitigate business-related social harm or irresponsible behaviours in society.
ESG	The collection of environmental, social, and governance factors that can materially affect a business.	Environmental, social, and governance	Identify ESG-related risks and opportunities for companies' financial performance.
SDGs	A complete set of goals that needs to be achieved to ensure sustainable development at a global level.	Environmental, social, economic, and governance	Highlight urgent global sustainability challenges and ensure a sustainable future for all.

Source: Antolín-López and Ortiz-de-Mandojana (2023)

Table 5 presents the frequency of use of these terms in the reports we analysed of the European companies. The results of our text analysis illustrated that the term 'SDG' was used most frequently in the 2021 reports, followed by the term 'ESG', as 87.82% and 83.19% of the documents referred to the two terms, respectively. Surprisingly, the most traditional term, 'CS', was mentioned in only 41.60% of the documents. These terms seem to confirm the increasing popularity of SDGs as the main framework of action to integrate sustainability at the firm level (Delgado-Ceballos et al., 2023, Montiel et al., 2021). This also indicates the prominence gained by the term 'ESG', which was originally coined by finance academics and practitioners, the use of which has recently extended to the business field to refer to sustainability actions and performance (Antolín-López and Ortiz-de-Mandojana, 2023).

Table 5. Frequency counts of most commonly used CS terms

CS terms	Abbreviations	Citing documents		Number of citations
		N	%	
Environmental, Social, and Governance	ESG	198	83.19	7,298
Corporate social responsibility	CSR	141	59.24	3,452
Corporate sustainability	CS	99	41.60	353
Sustainable Development Goals	SDGs	209	87.82	2,908

Source: Elaborated by the authors

3.2 EU regulations referred to in CS reporting

Understanding the regulatory environment is important when discussing CS measurement and reporting. The regulatory environment in the EU is very large and complex and has come a long way in the last few years,

although Antolín-López and Ortiz-de-Mandojana (2023) identified a few key milestones of vital importance. Specifically, among these milestones, we can highlight the NFRD, which has been enforced since 2018 on large public-interest companies with more than 500 employees, including listed companies, banks, insurance companies, and other companies designated by national authorities as public-interest entities. This regulation requires companies to disclose non-financial information such as measures taken regarding environmental and social matters, treatment of employees, respect for human rights, anti-corruption and bribery, and diversity on company boards (Directive 2014/95/EU). Another milestone is the sustainable finance disclosure regulation (SFDR), which was established in 2021 as sustainability-related disclosure requirements for financial market participants, financial advisers, and financial products (Regulation EU 2019/20881). This regulation is completed with the regulatory technical standards set out in the Delegated Regulation to be used by financial market participants when disclosing under the SFDR. Additionally, we can mention the proposal of the Corporate Sustainability Reporting Directive (CSRD), which is enforced on all large companies and all companies listed on regulated markets (except listed micro companies). This newly proposed directive is a response to some of the problems detected in the NFRD in its extension of the scope of its application and introduction of more detailed reporting requirements and mandatory reporting. Finally, we highlight the EU Taxonomy Regulation (Regulation (EU) 2020/852) and the EU Taxonomy Climate Delegated Act, which are related to a classification system based on scientific criteria establishing a list of environmentally sustainable economic activities. The aim is to provide companies, investors, and policymakers with appropriate and clear definitions of the economic activities that can be considered environmentally sustainable.

We focus on the text analyses of these EU regulatory milestones. Table 6 shows the frequency with which the companies refer to each regulation. The EU Taxonomy is receiving special attention in CS reporting, with 66.39% of the companies including references to it in their 2021 reports. For the text analysis, we searched for 'EU taxonomy' and 'taxonomy', as it is sometimes referred to in this simplified way, but in reference to EU regulation. It is also noteworthy that 14.29% of the companies named the CSRD, as this is still at the proposal stage. This shows the proactivity of some companies in the sample.

Table 6. Frequency counts of types of EU regulations

EU regulations	Abbreviations	Citing documents		Number of citations
		N	%	
The Non-Financial Reporting Directive	NFRD	30	12.61	95
The Sustainable Finance Disclosure Regulation	SFDR	13	5.46	133
Regulatory technical standards		15	6.30	21
The Corporate Sustainability Reporting Directive	CSRD	34	14.29	87
EU Taxonomy or Taxonomy		158	66.39	4,055
The EU Taxonomy Climate Delegated Act		10	4.20	20

Source: Elaborated by the authors

3.3   International sustainability frameworks mentioned in CS reporting

International sustainability frameworks are standards that provide guidelines for best-in-class sustainability practices (Siew, 2015) and conventions for measuring and disclosing sustainability impacts (Escrig-Olmedo et al., 2010). Many approaches have been proposed to measure and report aspects of CS. Antolín-López and Ortiz-de-Mandojana (2023) provided an overview of existing general and specific international sustainability frameworks to measure and disclose relevant CS aspects. The international sustainability frameworks were divided into general international frameworks, which jointly address sustainability dimensions, and specific international frameworks, which only focus on a specific sustainability issue or dimension. Table 7 illustrates the number of times most EU innovative companies reference each of the main international sustainability frameworks.

Regarding general international sustainability frameworks, the most referenced in the CS reports are the SDGs, with 87.82% of the analysed documents referencing this framework. The Global Reporting Initiative (GRI) framework is also frequently referenced (by 73.11% of the companies), which is understandable because it is a well-accepted approach that specifically guides companies in reporting. Meanwhile, 61.34% of companies

reference the United Nations Global Compact (UNGC), and 47.90%, the Sustainability Accounting Standards Board (SASB) standard.

Table 7. Frequency counts of international sustainability frameworks

Abbreviations	Sustainability frameworks	Citing documents		Number of citations
		N	%	
General sustainability frameworks				
GRI	Global Reporting Initiative	174	73.11	13,608
IFC performance standards	International Finance Corporation performance standards	5	2.10	7
IIRC	International Integrated Reporting Council	30	12.61	90
IRIS+		13	5.46	32
ISO 26000	International Organization for Standardization 26000	23	9.66	69
OECD Guidelines	Organisation for Economic Co-operation and Development Guidelines	93	39.08	172
SASB	Sustainability Accounting Standards Board standard	114	47.90	1,277
SDGs	Sustainable Development Goals	209	87.82	2,908
UNGC	United Nations Global Compact	146	61.34	982
PRI	Principles of Responsible Investment	37	15.55	106
Specific environmental frameworks				
CDP	Carbon Disclosure Project	157	65.97	1,521
GHG	Greenhouse Gas Protocol	161	67.65	759
SBTi	Science-Based Targets	146	61.34	1,366
TCFD	Task Force on Climate-Related Financial Disclosures	149	62.61	1,773
Specific social frameworks				
ILO standards	International Labour Organization	10	4.20	15
UDHR	Universal Declaration of Human Rights	89	37.39	139

Source: Elaborated by the authors

Therefore, this text analysis draws attention to the fact that although there is a lot of freedom in the frameworks to be used in reporting, most companies focus on a few international frameworks (i.e. SDGs, GRI, UNGC, and SASB). Additionally, we found that specific environmental frameworks were more commonly used than social frameworks.

Regarding the specific frameworks, Table 7 shows that those related to the environment were cited much more frequently than those related to the social dimension. Frameworks related to the environment were referenced at a similar level, with approximately 65% of the companies using each framework. Regarding the social dimension, references to the Universal Declaration of Human Rights (UDHR) (37.39%) far exceeded references to the International Labour Organization (ILO) (4.20%). These results might indicate that many companies still associate sustainability with environmental issues and not so much with social issues, which have been traditionally more associated with CSR.

3.4 ESG ratings and indices included in CS reporting

Rating agencies have played a significant role in the development of CS measures, especially ESG measures. However, as we can see in Table 8, references to rating agencies, their metrics, and their indices are still scarce in the CS reports of companies.

Among the ESG ratings, the most referenced was Moody's ESG (or Vigeo-Eiris) but only 12.61% of the analysed companies cited it. The most referenced indices are FTSE4Good with 23% of companies referencing it in their reporting followed by the 'Dow Jones Sustainability Indices' (or DJSI) with 7.14% and the 'STOXX Global ESG Leaders' with 5.46%.

Table 8. Frequency counts of ESG ratings and indices

ESG ratings and indices	Citing documents		Number of citations
	N	%	
ESG rating			
Moody's ESG (or Vigeo-Eiris, as formerly known)	30	12.61	59
Bloomberg ESG	1	0.42	1
Refinitiv ESG	0	0.00	0
FTSE Russell ESG	1	0.42	1
Sustainalytics ESG Risk	10	4.20	11
MSCI ESG	10	4.20	13
S&P Global ESG (or Corporate Sustainability Assessment)	14	5.88	31
ISS ESG Corporate	10	4.20	10
ESG indices			
ESG Euronext	2	0.84	2
Ethibel Sustainability Index	4	1.68	4
Bloomberg MSCI Socially Responsible	0	0.00	0
Bloomberg MSCI Sustainability	0	0.00	0
Bloomberg MSCI ESG	0	0.00	0
Bloomberg MSCI Green Bond	1	0.42	1
Bloomberg SASB ESG Corporate	0	0.00	0
Bloomberg SASB ESG Equity	0	0.00	0
Bloomberg Goldman Sachs Global Clean Energy	0	0.00	0
Bloomberg Rockefeller US All Cap Multi-Factor ESG Improvers	0	0.00	0
Refinitiv Eurozone ESG Select	0	0.00	0
Refinitiv/S-Network ESG Best Practice	0	0.00	0
Refinitiv IX Global ESG High Dividend Low Volatility Equal Weighted	0	0.00	0
Refinitiv Global Resource Protection Select	0	0.00	0
FTSE4Good	55	23.11	109
FTSE ESG	1	0.42	1
Jantzi Social Index (or JSI)	0	0.00	0
Global Sustainability Signatories (or GSS)	1	0.42	1
STOXX Global ESG Leaders	13	5.46	14
MSCI KLD 400 Social Index	0	0.00	0
MSCI Fixed Income ESG (or CALCOR)	0	0.00	0
The Calvert US Large-Cap Core Responsible	0	0.00	0
Calvert International Responsible Index	0	0.00	0
Dow Jones Sustainability Indices (or DJSI)	17	7.14	24
ISS ESG EVA Leaders Index	0	0.00	0
S&P Global Sustainability Yearbook	2	0.84	2
Global 100 Index	2	0.84	2
World's Most Ethical (or WME)	8	3.36	39

Source: Elaborated by the authors

3.5 KPIs included in CS reporting

The inclusion of KPIs in CS is of particular significance. In fact, the Guidelines on Non-Financial Reporting, which specify the methodology for reporting non-financial information, highlight that companies can improve their comparability by disclosing high-quality and broadly recognised KPIs, such as metrics that are widely used in a sector or for specific thematic issues (European Commission, 2017). The importance of KPIs is illustrated by the fact that this document introduces many examples of KPIs along with the guidelines.

To analyse the most frequently used KPIs, we first developed a dictionary of possible KPIs and then analysed the occurrence frequency of these indicators. This dictionary was compiled after an extensive review of the literature, although we recognise that other frequent indicators may not be included in this analysis. We divided the analysis into indicators or concepts related to ESG issues.

Table 9 lists the environmental KPIs. The most frequently mentioned KPIs are those related to 'emissions', with 96.64% of the documents mentioning the general term, 62.18% mentioning 'carbon emissions', and 78.57% referring to 'GHG emissions'. Additionally, there is a predominance of indicators related to 'energy', such as 'energy efficiency' (84.45% of the documents) and 'renewable energy' (86.55%). 'Climate change' has also been indicated multiple times, with 95.80% of companies including references to this term. These figures might be explained by the prominence these terms have gained in the media and institutional environments worldwide with regard to other environmental aspects in recent years. In fact, these are the main indicators addressed by the environmental agendas of EU governments. While both emissions and energy use are clear and highly representative indicators of the company's impact on the environment, we recognise that the reference to climate change is much more global and difficult to judge since this term represents a category of indicators (i.e. those related to the company's impact on climate change) rather than an indicator or KPI.

Table 9. Frequency counts of environmental KPIs in CS reporting

Terms	Citing documents		Number of citations
	N	%	
Pollution	162	68.07	834
Emissions	230	96.64	22,099
Carbon emissions	148	62.18	1,128
GHG emissions	187	78.57	2,771
Environmental products	3	1.26	9
Green products	19	7.98	32
Product stewardship	40	16.81	587
Environmental innovation	3	1.26	3
Sustainable innovation	38	15.97	141
Climate change	228	95.80	6,234
Water security	39	16.39	100
Water efficiency	33	13.87	67
Waste management	159	66.81	752
Hazardous waste	154	64.71	1,039
Renewable energy	206	86.55	2,138
Energy efficiency	201	84.45	2,172
Biodiversity	162	68.07	2,498
Resources efficiency	8	3.36	8
Resources use	22	9.24	27
Environmental incidents	27	11.34	104
Environmental fines	8	3.36	9

In relation to the least frequently occurring KPIs, it is worth noting the negligible presence of innovation-related indicators, such as 'environmental innovation', 'environmental products', 'green products', 'product stewardship', and 'sustainable innovation'. Since these are among the top 250 companies in the EU R&D Scoreboard, we expected to find more indicators related to proactive CS practices. Finally, we note the infrequency with which the CS reports allude to negative events related to environmental management, such as environmental incidents and environmental fines, with only 11.34% and 3.36%, respectively, of the documents mentioning them. These results align with scholars' claims of companies reporting only positive actions related to the natural environment while omitting their negative environmental impacts, which is termed as greenwashing (e.g. Wang et al., 2018).

Table 10 lists the social KPIs. In this case, the most common KPIs are those related to employees, such as 'health' (99.58%), 'health and safety' (91.60%), 'working conditions' (73.53%), and 'diversity' (97.06%). Furthermore, references to 'human rights' (92.86%) are very common, which is reasonable, as this reflects the company's respect towards all stakeholders.

Table 10. Frequency counts of social KPIs in CS reporting

Terms	Citing documents		Number of citations
	N	%	
Health	237	99.58	16,062
Health and safety	218	91.60	6,558
Working conditions	175	73.53	829
Human rights	221	92.86	8,371
Labour rights	38	15.97	147
Labour standards	36	15.13	98
Gender equality	140	58.82	749
Diversity	231	97.06	8,004
Product safety	107	44.96	727
Customer responsibility	0	0.00	0
Supply chain labour standards	0	0.00	0
Community relations	17	7.14	30
Philanthropy	1	0.42	2
Bottom of pyramid	2	0.84	2

Finally, Table 11 includes corporate governance KPIs. Of the KPIs analysed, the most frequently occurring one is 'risk management', with 92.02% of the companies including this expression in their reports. This indicates the general inclination of companies to pay attention to those ESG aspects that have a particular risk of impact on the company. References to 'anti-corruption' (83.61%) and 'ethics' (90.34%) are also very common in the analysed reports.

Table 11. Frequency counts of corporate governance KPIs in CS reporting

Terms	Citing documents		Number of citations
	N	%	
Anti-corruption	199	83.61	1,787
Tax transparency	25	10.50	44
Corporate governance	200	84.03	7,435
Risk management	219	92.02	6,698
Ethics	215	90.34	5,659

Greater standardisation in the use of KPIs would be beneficial in advancing the quality of CS reporting. Although we detected a clear trend in the presence of important indicators such as those related to a company's impact on climate change, health, diversity, and human rights, there is still too much diversity in CS reporting. In the following years, thanks to EU Taxonomy, it will probably become easier to find more general and homogeneous indicators, which will enable comparability among companies in terms of their CS actions and performance.

3.6 Materiality approaches in CS reporting

Materiality refers to issues that are important for a company or business sector because they can have major effects on corporate financial and economic performance, reputation, and relationships with internal and external stakeholders (Jebe, 2019). Many ESG investors in financial markets are interested in the financial materiality of ESG factors, as they are attracted by evidence suggesting that integrating ESG factors can improve shareholder returns (Eccles et al., 2020; Van Duuren et al., 2016). This approach differs from sustainability materiality, in which focus is placed on the negative or positive impact that companies have on society and the natural environment (Antolín-López and Ortiz-de-Mandojana, 2023). In contrast, double materiality refers to the dual consideration of financial and sustainability materiality (European Commission, 2019).

Table 12 shows the analysis results of the materiality approaches mentioned in CS reporting. The expression 'materiality' appears with great frequency (87.45% of the documents), usually in connection with the expression 'materiality analysis'. We also analysed whether the company pays attention to 'financial materiality' or 'sustainable materiality'. To do so, we created a dictionary of terms to capture one or the other. We see that 'financial materiality' has a greater presence than 'sustainable materiality' (21.34% versus 12.97%). Among the different expressions related to financial materiality, the most frequently used is 'material risk'. This approach is similar to that followed by ESG rating agencies in creating their ESG scores, as they commonly emphasise ESG aspects that represent greater financial risks or opportunities for the company as a means to increase the profitability of investment portfolios. This contrasts with the definition of CS, which centres on identifying the sustainability impacts of companies and the company's efforts to mitigate them.

Finally, Table 12 shows that the expression 'double materiality' appears only in 15.90% of the documents. This is noteworthy because of the prominence of double materiality in the Guidelines on Reporting Climate-related Information published in 2019 to clarify the application of the NFRD. Specifically, this document established that the double materiality perspective included in the essence of the NFRD means that reporting must reference both 1) the company's 'development performance [and] position', which indicates financial materiality in the broad sense of affecting the company's value; 2) the 'impact of [the company's] activities', which indicates environmental and social materiality (European Commission, 2019).

Table 12. Frequency counts of materiality terms

Materiality-related terms	Citing documents		Number of citations
	N	%	
Materiality	209	87.45	3,117
ESG materiality	8	3.35	23
Sustainable materiality			
Sustainable materiality	1	0.42	2
Sustainably material	0	0.00	0
Impact materiality	4	1.67	8
Stakeholders' materiality	22	9.21	33
Environmental and social materiality	2	0.84	3
Social and environmental materiality	1	0.42	1
Social materiality	2	0.84	2
Socially material	0	0.00	0
Environmental materiality	1	0.42	1
Environmentally material	0	0.00	0
Total number of documents citing any form of sustainable materiality	31	12.97	50
Financial materiality			

Financial materiality	13	5.44	27
Financially material	18	7.53	21
Economic materiality	1	0.42	3
Material sustainability risk or 'material risk' or 'material environmental risk' or 'material social risk' or 'material ESG risk'	29	12.13	48
Total number of documents citing any form of sustainable financial materiality	51	21.34	99
Double materiality			
Double materiality	38	15.90	96

Source: Elaborated by the authors

Clear references to double-materiality CS should be made in reporting. Using SDGs as a reporting framework can help cover sustainability materiality by connecting the activities of companies with specific global sustainability goals (Delgado-Ceballos et al., 2023). However, using only the sustainability materiality approach is insufficient, as it is also important that companies connect their CS measurement and reporting with financial materiality because this approach helps ensure that social and environmental issues are not considered ancillary to company activities, but as part of its main valuation (Jebe, 2019). Therefore, the use of a double materiality approach is required in CS reporting since it can ensure that companies pay attention to and communicate those aspects of CS that could affect the company financially and also consider and communicate their roles in global sustainability.

4 Analysis of the divergences in measuring CS

In this section, we describe the comparison results of different CS metrics from a sample of the top 250 companies in the EU R&D Scoreboard. Specifically, we analysed two different quantitative ESG ratings: the Refinitiv ESG Scores and the Sustainalytics' ESG Risk Ratings. We also analysed listing in the S&P Global Sustainability Yearbook, a distinction granted to companies with the best performance in each industry, and the RRI, a measure of ESG risk exposure in the media. Finally, we supplemented the analyses with two corporate sustainability indices: the Global 100 Index and the Top 100 World's Most Ethical Companies. The following analyses are mostly descriptive, paying special attention to the best-positioned companies in each case and describing some basic descriptive measures, such as means, standard deviations, and comparison tests conducted using Stata statistical software.

4.1 Description of the main analysed CS metrics

When comparing different CS metrics, we must consider that they are constructed using different methodologies and have different scales and qualitative meanings. We begin this section with a brief description of the different CS metrics included in these analyses and an explanation of how rating agencies interpret them. Table 13 summarises the meanings of the different levels of these CS metrics. For a more extensive review of the differences in methodology, see Antolín-López and Ortiz-de-Mandojana (2023).

Table 13. ESG metrics and other indicators levels and qualitative meanings

Refinitiv ESG Score		Sustainalytics' ESG Risk Ratings		The S&P Global Sustainability Yearbook		RepRisk Index (RRI)	
Scores	Meaning	Scores	Meaning	Scores	Meaning	Scores	Meaning
0 to 25	Poor relative ESG performance and insufficient degree of transparency in reporting material ESG data publicly.	0 to 9.99	Negligible Risk	Gold	A minimum total score of 60, with the score falling within 1 of the top-performing company's score in their industry.	0 to 25	Low Risk Exposure
> 25 to 50	Satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.	10 to 19.99	Low Risk	Silver	A total score of at least 57, with the score falling within a range of 1 to 5 of the top-performing company's score in the industry.	26 to 49	Medium Risk Exposure
> 50 to 75	Good relative ESG performance and above average degree of transparency in reporting material ESG data publicly.	20 to 29.99	Medium Risk	Bronze	A score of at least 54, with the score falling within a range of 5 to 10 of the top-performing company's score in the industry.	50 to 59	High Risk Exposure
> 75 to 100	Excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.	30 to 39.99	High Risk	Member	Did not receive a medal distinction, but they are still among the top 15 in their industry.	60 to 74	Very High Risk Exposure
		40 to 100	Severe Risk			75 to 100	Extremely High Risk Exposure

Source: Adapted from Refinitiv (2022), Sustainalytics' ESG Risk Rating (2022), S&P Global (2022), and RepRisk (2022)

The Refinitiv ESG Score comprises a subset of 186 metrics (from more than 630 company-level ESG metrics) used to create an ESG assessment for a company. The selected metrics are stated as the most comparable and material per industry. A materiality matrix was built for environmental and social factors based on the relative proportion of a particular sector's contribution to the overall gross number of this factor in the complete ESG universe. This methodology enables Refinitiv to produce an ESG score between 0 and 100, with high values indicating a good ESG situation.

Sustainalytics' ESG Risk Ratings are underpinned by three main dimensions known as the building blocks: corporate governance, material ESG issues (MEIs), and idiosyncratic ESG issues. The final ESG risk rating is created as the aggregation of the unmanaged risk scores of individual material ESG issues (the difference between a company's exposure and its managed risks). Sustainalytics' ESG Risk Ratings are exclusively rooted in financial materiality, as an issue is regarded as being material when it has a potentially significant impact on the economic value of a company. This methodology enables Sustainalytics to produce risk ratings between 0 and 100, with high values indicating bad ESG risk situations.

Listing in the S&P Global Sustainability Yearbook is a distinction achieved by companies that stand out for their sustainability performance, determined using the S&P Global ESG score tool, which ranges from 0 to 100. The S&P Global Sustainability Yearbook evaluates the best-performing companies in each industry and simultaneously requires a minimum level of performance to assign different distinctions (Gold, Silver, and Bronze) or at least consider the company a member of the sustainable yearbook.

The RRI reflects the current level of media and stakeholder attention on companies' ESG performance on ESG (RepRisk, 2022). RepRisk bases its analysis on media exposure, not on performance analysis, unlike previously described metrics. RepRisk analyses documents for relevancy and sentiment scoring as well as entity detection and issue classification, based on proprietary machine-learning models. The RRI requires no weighting of ESG issues (e.g. by sector or country), and it does not change depending on whether an issue is an environmental, social, or governance issue (RepRisk, 2022). The RRI produces an ESG score between 0 and 100, with low values indicating a good ESG situation.

The Global 100 assessment is an index based on data for 23 KPIs, such as clean investment, female directors' representation, and carbon emissions. In short, 12 possible categories are identified, from the best companies, with scores of up to 75 points, to the worst, with 25–30 points. However, for this analysis, we focus only on whether the company is included in the Global 100.

Finally, the rating system of the Top 100 World's Most Ethical Companies is an index rooted in more than 100 multiple-choice and text questions aimed at capturing a company's performance. These questions are grouped into five distinct categories: governance (15 of the weight), leadership and reputation (10), culture of ethics (20), ethics and compliance program (35), and environmental and societal impact (25). Companies with the best results are included as honourees for the corresponding year.

As this study aims to understand the differences in CS metrics for the companies ranked best in the 2021 EU R&D Scoreboard, Table 14 lists the CS metrics for the top 10 companies in this ranking.

Table 14. ESG indicators of the 10 best ranked European companies in the 2021 EU R&D Investment Scoreboard

EU top-ranked R&D	Company	Country	NACE	Industries	Refinitiv ESG Scores	Sustainalytics' Risk Ratings	S&P Global Sustainability Yearbook	RepRisk Index (RRI)	Global 100 Index	Most Ethical Companies
1	Volkswagen	Germany	2910	Motor vehicles and other transport	85	29.7	-	58	-	-
2	Daimler	Germany	2910	Motor vehicles and other transport	93	11.2	-	53	-	-
3	Bayer	Germany	2120	Pharmaceuticals	90	29.9	-	61	-	-
4	Bayerische Motoren Werke (BMW)	Germany	2910	Motor vehicles and other transport	89	22.9	Silver	41	-	-
5	Robert Bosch Gmbh	Germany	2932	Motor vehicles and other transport	61	14	-	26	-	-
6	Sanofi	France	2120	Pharmaceuticals	90	22.3	Silver	27	65	-
7	Siemens	Germany	2811	Manufacture of machinery and equipment	86	30.1	Gold	51	25	-
8	Sap	Germany	5829	Information and communication	94	10.8	Gold	23	84	-
9	Ericsson	Sweden	2630	Computer, electronic, and optical products	87	17.8	Bronze	26	89	-
10	Stellantis	Netherlands	2910	Motor vehicles and other transport	90	24	-	56	-	-

Source: Elaborated by the authors

Table 14 illustrates that the Refinitiv ESG Scores are very high for the top 10 ranked companies in the EU R&D Scoreboard. In fact, excluding Robert Bosch, to which Refinitiv assigns a rating of 'good', all the companies are evaluated as having excellent relative ESG performance and a high degree of transparency in publicly reporting material ESG data. Regarding the Sustainalytics' metric, the ESG Risk Rating of all top-ranked companies ranged between low and medium risk. Notably, none of the best-positioned companies had a rating of 'negligible', which would be the best evaluation. The RRI ranges between medium and high for the top 10 companies; this is not a significantly positive evaluation. Finally, only five of these companies are included in the S&P Global Sustainability Yearbook, four in the Global 100 Index, and none among the World's Most Ethical Companies. Therefore, although these companies have received high Refinitiv ESG Scores, their evaluations with regard to the other metrics are not significantly positive.

As a representative example, we can focus on Volkswagen, a top R&D investment company. Table 14 shows that while Refinitiv evaluates the company as having excellent performance and transparency in their reporting, Sustainalytics evaluates the company as having a medium risk level and issues it an intermediate rating on its financial risk scale (see Table 13). S&P Global does not evaluate Volkswagen as one of the best-performing companies in its industry, as it has been excluded from the Sustainability Yearbook. Meanwhile, in terms of the RRI, the company receives a high-risk exposure rating owing to ESG factors. Finally, neither of the two analysed indices, the Global 100 Index and the World's Most Ethical Companies, includes Volkswagen in their rankings. Therefore, Volkswagen's final position with regard to these CS metrics is not easy the following sections, we try to better understand the differences between CS metrics.

4.2 Comparison between the Refinitiv ESG Score and Sustainalytics' ESG Risk Ratings

In this section, we compare the two quantitative CS metrics included in this analysis: the Refinitiv ESG Score and Sustainalytics' ESG Risk Ratings. First, for each CS metric, we explain which of the 250 top-ranked companies in the 2021 EU R&D Scoreboard are ranked best by each rating agency and how alternative ESG rankings rate the same companies. Second, we compare both metrics based on percentiles to draw more generalisable conclusions about the differences between the two CS metrics.

Table 15 shows the companies ranked best within the sample according to the Refinitiv ESG Scores. Most of these top-ranked firms coincide with the top-ranked companies in the EU R&D Scoreboard. In fact, excluding the Italian company Snam, all the top-ranked companies according to Refinitiv ESG Score are among the top 100 in the EU R&D Scoreboard (of the 250 included in the initial sample).

Table 15. Refinitiv ESG Best Companies

Rank	Name	Country	NACE	Industries	Refinitiv ESG Scores	EU R&D	Sust. ESG Risk Ratings
1	Sap Se	Germany	5829	Information and communication	94	8/250	10.8
2–4	Daimler	Germany	2910	Motor vehicles and other transport	93	2/250	11.2
2–4	Intesa Sanpaolo	Italy	6419	Financial and insurance	93	48/250	15.4
2–4	Snam	Italy	4950	Transportation and storage	93	155/250	15.9
5–6	STMicroelectronics	Netherlands	2611	Computer, electronic, and optical products	92	36/250	18.2
5–6	Signify	Netherlands	2740	Electrical equipment	92	95/250	12.6
7–10	Nokia	Finland	2630	Computer, electronic, and optical products	91	11/250	12.2
7–10	Basf	Germany	2059	Chemicals	91	18	28.3
7–10	Volvo	Sweden	2910	Motor vehicles and other transport	91	24	22.3
7–10	Alstom	France	3020	Motor vehicles and other transport	91	87	19.0

Additionally, the top seven companies are also companies that have been evaluated as low risk by Sustainalytics' ESG Risk Rating. However, companies such as Basf and Volvo are considered medium risk in Sustainalytics' ESG Risk Ratings but are evaluated very positively by Refinitiv, specifically, as have excellent relative ESG performance and a high degree of transparency in reporting material ESG data publicly.

Table 16 shows the best-ranked companies in Sustainalytics' ESG Risk Ratings (i.e. those with the lowest risk). As shown in this table, there is less overlap with the best-positioned companies in the EU innovation ranking. A clear case of divergence is seen with the company Cimpress, ranked 241 out of 250 in the 2021 EU R&D Scoreboard. Sustainalytics evaluates this company very positively, considering it negligible risk, while Refinitiv considers its situation only as satisfactory relative to ESG performance and moderate relative to transparency in reporting material ESG data publicly.

Table 16. Best firms in Sustainalytics' ESG Risk Ratings

Rank	Company	Country	NACE	Industries	Sust. ESG Risk Ratings	EU R&D	Refinitiv ESG Score
1	Linde Group	Ireland	2011	Chemicals	8.2	198/250	87
2	Cimpress	Ireland	1812	Paper	8.5	241/250	34
3	Schaeffler	Germany	2932	Motor vehicles and other transport	8.8	53/250	80
4	Accenture	Ireland	7490	Professional and other services	9.3	55/250	82
5	Vivendi	France	6190	Information and communication	9.8	217/250	83
6	Valeo	France	2932	Motor vehicles and other transport	10.6	25/250	77
7–9	Worldline	France	6619	Financial and insurance	10.8	135/250	86
7–9	Pirelli	Italy	2211	Rubber, plastics, and other	10.8	142/250	69
7–9	Sap Se	Germany	5829	Information and communication	10.8	8/250	94
10–11	Faurecia	France	2932	Motor vehicles and other transport	10.9	31/250	66
10–11	ASML Holding	Netherlands	2611	Computers and electronics	10.9	19/250	79

Although Tables 15 and 16 show some illustrative examples of divergences between these two CS metrics, we present some descriptive statistics considering the entire sample to draw more generalisable conclusions about the differences between these metrics. Tables 17 and 18 present the primary statistics. In Table 17, it can be seen that the range of Refinitiv ESG Scores for the companies in the sample is between 30 (the worst) and 94 (the best). Sustainalytics' ESG Risk Ratings range between 42 (the worst) and 8.20 (the best). These metrics also differ widely in mean value and standard deviation, with a mean of 73.58 for the Refinitiv ESG Scores versus 21.11 for Sustainalytics' ESG Risk Ratings. Therefore, according to Refinitiv, on average, companies are in a good (almost excellent) position. However, in terms of Sustainalytics' ESG Risk Ratings, companies are, on average, at an intermediate-risk position.

Considering that both indicators differ in terms of methodology and interpretation of values, we can complete the comparison between these two quantitative CS metrics based on percentile scores calculated as:

$$\frac{\text{Number of companies with a worse value} + (\text{number of companies with the same value}/2)}{\text{Number of companies with a value}}$$

We need to consider that, according to the interpretation of Sustainalytics' ESG Risk Ratings, companies with low-risk values are positioned as the best, while in terms of the Refinitiv ESG Scores, lower values indicate companies with lower performance and less transparency. Therefore, to improve compatibility, we assign the best positions to companies with the lowest risk scores when calculating the percentile positions for Sustainalytics' ESG Risk Ratings. With Refinitiv, higher values denote better positions; consequently, we assigned the highest percentiles to

companies with the highest score. Once the percentiles were constructed, we calculated the divergence measure as the difference in the absolute value of a company's position in each ranking. Thus, we ensured a more homogeneous comparison. Overall, there was a 29.14 percentile difference in the percentile positions of Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings.

Table 17. Basic statistics of CS measures and divergence

Measure	Mean		Std. Dev.	Min.	Max.
Refinitiv ESG Score	73.58	Good	13.63	30	94
Sustainalytics' ESG Risk Ratings	21.11	Medium Risk	6.78	8.20	42
Divergence	29.14		22.92	0.27	97.82

Source: Elaborated by the authors

Table 18 summarises the correlations between the top 250 EU R&D Scoreboard, the two CS metrics, and the variable created to capture the divergence. Companies better positioned in the EU R&D Scoreboard have significantly higher values according to Refinitiv (negative correlation, as in the R&D ranking; 1 refers to the best position and 250, the worst). However, there does not appear to be a significant correlation between the R&D Scoreboard and Sustainalytics' ESG Risk Ratings, nor does there seem to be a correlation between the position of a company in the EU R&D Scoreboard and the existence of greater divergences between the CS measures of Sustainalytics and Refinitiv.

Table 18. Correlations among the 250 top-ranked companies in the EU R&D Scoreboard, CS measures, and divergence

		Refinitiv ESG Scores	Sust. ESG Risk Ratings	Divergence
EU R&D	Correlation	−0.343***	0.105	−0.092
	p-value	0.000	0.149	0.213

Source: Elaborated by the authors

We also analysed whether there are greater divergences between Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings for companies in some industries. Table 19 shows the means of the divergences and average percentile positions of the companies by industry.

Table 19. Percentiles and divergences by industry

Industries	Freq.	Mean of divergence	S.D.	Refinitiv ESG Scores percentiles	Sust. ESG Risk Ratings percentiles
Computers, Electronics, and optical	23	26.01	22.14	54.61	61.61
Motor vehicles and other transportation	22	38.12	24.38	59.50	47.79
Information and communication	20	35.20	22.56	38.75	70.53
Pharmaceuticals	18	26.93	21.40	46.36	36.07
Chemicals	13	27.38	25.61	64.92	45.99
Financial and insurance	13	29.24	22.93	54.79	53.22
Machinery and equipment	13	24.16	18.65	48.54	40.51
Electrical equipment	8	19.81	16.61	59.07	59.99
Professional and other services	9	10.23	9.00	26.00	34.36
Electricity, gas, and steam	6	16.40	14.19	42.66	37.32
Metals	5	34.51	20.98	45.98	23.86
Retail	4	42.87	29.64	37.97	73.51
Textiles, leather, and footwear	4	44.50	29.69	33.76	75.00
Transportation and storage	4	16.65	16.67	52.99	36.35
Food and beverages	3	11.96	7.31	55.71	43.75
Mining	3	52.26	18.00	69.20	16.94
Rubber, plastics, and other non-metallic minerals	5	38.37	24.18	64.08	66.68
Agriculture	2	26.91	1.92	29.08	2.18
Construction	2	34.24	0.39	61.69	27.45

Other manufacturing	2	51.77	42.08	39.68	69.43
Water supply	2	12.91	0.20	45.66	45.51
Wood and paper	3	37.49	52.55	31.43	59.15

Source: Elaborated by the authors

As we can see in this table, according to Sustainalytics' ESG Risk Ratings, agriculture is the most financially risky industry, although only two companies from this industry are included in our sample. In terms of Refinitiv ESG Scores, inferior companies in terms of ESG performance and transparency are those in professional and other services, followed by agriculture. According to Sustainalytics' ESG Risk Ratings, the less risky companies are those in textiles, leather, and footwear; the Refinitiv ESG Scores suggest that the companies with better ESG performance and transparency are those in the mining industry. However, only three companies represent this industry in our sample. Therefore, these data should be interpreted with caution, as there are only a small number of companies representing each industry. Regarding the analysis of the differences between the two metrics, if we focus on the industries most represented in the sample (at least 10 companies in the sample), we see that the greatest differences are for motor vehicles and other transportation because companies in these industries vary on average by 38 in percentile positions between measures.

Finally, Table 20 includes the companies with the largest divergence in their percentile positions between Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings. As can be seen, the largest difference is for the company Cimpress, which is at the top in terms of possible positive evaluations showing negligible risk (percentile 99.18) according to Sustainalytics' ESG Risk Ratings but is among the inferior companies in terms of its Refinitiv ESG Score, showing only a satisfactory level of performance and transparency (percentile 1.3). In contrast, Bayer is relatively well ranked in Refinitiv (percentile 93.48) but is poorly ranked in Sustainalytics' ESG Risk Ratings (percentile 10).

These differences are unsurprising since Refinitiv ESG Scores aim to measure a firm's ESG performance and degree of transparency in reporting material ESG data publicly, while Sustainalytics' ESG Risk Ratings are created as the aggregation of the unmanaged risk scores of individual material ESG issues with a potentially significant impact on the economic value of a company. Therefore, while the Refinitiv ESG score focuses on ESG performance (the impact of the company on the natural environment and society), Sustainalytics is centred on the impact of ESG issues on the company's economic performance. The two metrics are very different in their conceptualisation and the aim they pursue, so the differences in the positioning of the companies analysed are logical.

Table 20. Largest divergences in relative positions between Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings

Company	Country	NACE	Industries	Divergence	Refinitiv ESG Score			Sustainalytics' ESG Risk Ratings			EU R&D
					Value	Percentile	Legend	Value	Percentile	Legend	
Cimpress	Ireland	1812	Paper	97.82	34	1.36	Satisfactory	8.5	99.18	Negligible	241/250
Hexagon	Sweden	4690	Retail	82.88	53	10.33	Good	11.7	93.21	Low	63/250
Bayer	Germany	2120	Pharmaceuticals	82.88	90	93.48	Excellent	29.9	10.6	Medium	3/250
CD Projekt	Poland	3240	Other manufacturing	81.52	40	2.99	Satisfactory	14.1	84.51	Low	220/250
Basf	Germany	2059	Chemicals	79.62	91	95.65	Excellent	28.3	16.03	Medium	18/250
Ubisoft Entertainment	France	6201	Information and communication	72.55	56	13.32	Good	13.8	85.87	Low	33/250
Siemens	Germany	2811	Machinery and equipment	72.02	86	82.07	Excellent	30.1	10.05	High	7/250
Faurecia	France	2932	Motor vehicles and other transport	71.74	66	22.83	Good	10.9	94.57	Low	31/250
KBC Groep	Belgium	6420	Financial and insurance	72.20	63	19.02	Good	12.8	91.03	Low	111/250
Barco	Belgium	2630	Computers, electronics, and opticals	72.20	62	17.66	Good	13.2	89.67	Low	227/250

Source: Elaborated by the authors

4.3 Divergences and other CS metrics

Having detected the differences between the two quantitative CS metrics (Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings), in this section, we analyse the extent to which these two quantitative measures converge with other CS metrics. Specifically, on one hand, we examined how these two CS metrics relate to media exposure of ESG issues measured with the RRI. On the other hand, we checked if the companies included in the S&P Global Sustainability Yearbook, Global 100, and World's Most Ethical Companies (for 2021) had better Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings than those excluded from these indicators and indices.

First, focusing on RRI media exposure, Table 21 presents the top 10 companies with greater ESG risk exposure according to the RRI and their position in the 2021 EU R&D Scoreboard. We can highlight that most of the companies with a higher risk of media exposure are among the top 100 companies in the EU R&D Scoreboard, including Volkswagen, which is ranked first, and Bayer, which is ranked third.

By analysing the Refinitiv ESG Scores, it is possible to notice in this table that the companies with higher ESG risk exposure in the media are evaluated as excellent by Refinitiv. This trend can be rationalised if we consider that companies that receive more ESG attention are also those that pay more attention to their ESG performance and reporting transparency. In fact, the probability of the financial impact of ESG factors is greater for these companies; in other words, the financial materiality of the ESG factors is higher. This finding aligns with previous studies showing a positive correlation between media or stakeholders' exposure and CS performance and disclosure (e.g. Michelon, 2011).

Finally, Table 21 illustrates that the top-ranked companies according to the RRI coincide with those that have a medium risk of ESG issues according to Sustainalytics' ESG Risk Ratings.

Table 21. Top-ESG attention, RRI (higher risk)

Rank	Company	Country	NACE	Industries	RepRisk Index (RRI)	EU R&D	Refinitiv ESG Scores	Sust. ESG Risk Ratings
1–2	Electricite de France	France	3511	Electricity, gas, and steam	61	56/250	75	20.3
1–2	Bayer	Germany	2120	Pharmaceuticals	61	3/250	90	29.9
3–4	TotalEnergies	France	0610	Mining	59	52/250	85	29.1
3–4	Deutsche Bank	Germany	6419	Financial and insurance	59	41/250	82	28.6
5	Volkswagen	Germany	2910	Motor vehicles and other transport	58	1/250	85	29.7
6	Stellantis	Netherl.	2910	Motor vehicles and other transport	56	10/250	90	24
7	Iberdrola	Spain	3511	Electricity, gas, and steam	55	103/250	86	20.5
8–11	Philips	Netherl.	2751	Electrical equipment	54	2/250	86	23.4
8–11	Basf	Germany	2059	Chemicals	54	18/250	91	28.3
8–11	Ahold Delhaize	Netherl.	4711	Retail	54	98/250	80	20.8
8–11	Eni	Italy	0610	Mining	54	161/250	84	27.5

Source: Elaborated by the authors

Table 22 presents the bivariate correlations for a more general difference analysis. The positive and significant correlation between the CS metrics of Refinitiv and Sustainalytics and the RRI confirms that companies with a higher ESG performance score and higher level of risk coincide with those that receive more media risk exposure. In addition, the divergence between the two metrics was greater for companies that received more media exposure. We also found an interesting relationship between the RRI and the position of companies in the 2021 EU R&D Scoreboard; specifically, we noticed that media exposure was higher for companies ranked at the top of the R&D Scoreboard (first positions in the rankings).

Table 22. Correlations between RRI and other CS metrics

		Refinitiv ESG Score	Sustainalytics' ESG Risk Ratings	Divergence	EU R&D
RepRisk Index (RRI)	Correlations	0.39***	0.14*	0.17*	−0.38***
	p-value	0.000	0.049	0.023	0.000

Source: Elaborated by the authors

Finally, we checked whether the companies included in the S&P Global Sustainability Yearbook, Global 100, and the World's Most Ethical Companies received consistently better evaluations according to their Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings. We used the Kruskal-Wallis test, which provides a nonparametric alternative to one-way ANOVA, as the variables analysed do not validate the assumption of equal variances. The Kruskal-Wallis test checks the null hypothesis of equal population medians (Hamilton, 2006). Table 23 summarises the means and sum rank used to perform the Kruskal-Wallis tests for the included and excluded companies.

Regarding the S&P Global Sustainability Yearbook, 54 of the 184 companies in the sample were included in the yearbook. Both the Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings show congruent average values for the companies included in the S&P Global Sustainability Yearbook. Specifically, companies included in the S&P Global Sustainability Yearbook have higher performance and transparency scores in Refinitiv (81.05 for included companies vs. 70.48 for excluded companies) and lower financial risk (18.78 for included companies vs. 22.07 for excluded companies). In both cases, the Kruskal-Wallis test indicated that the difference in medians between the companies included and excluded in these indices was significant.

Table 23. Refinitiv ESG Score, Sustainalytics' ESG Risk Ratings, S&P Global Sustainability Yearbook, Global 100, and the World's Most Ethical Companies

CS measure		Refinitiv ESG Scores		Sust. ESG Risk Ratings	
	Freq.	Mean	Rank sum	Mean	Rank sum
S&P Global Sustainability Yearbook					
Included	54	81.05	6,711.50	18.78	4,064.50
Excluded	130	70.48	10,308.50	22.07	13,890.50
Sig. Kruskal-Wallis test			0.000		0.002
Global 100 index					
Included	23	81.87	2881.50	17.78	1,507.00
Excluded	161	72.4	14,138.50	21.69	15,513.00
Sig. Kruskal-Wallis test			0.002		0.009
The World's Most Ethical Companies					
Included	8	80.75	965.00	16.63	475.50
Excluded	176	73.26	16,055.00	21.31	16,544.50
Sig. Kruskal-Wallis test			0.127		0.073

Source: Elaborated by the authors

In the case of the Global 100 Index, only 23 of the 184 companies were included in the ranking. Like with the companies included in the S&P Global Yearbook, the evaluation in terms of both the Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings of companies included in the Global 100 shows congruence, as companies included in the Global index have better performance and transparency and less financial risk associated with ESG. In both cases, the Kruskal-Wallis test indicated that the difference in medians between the companies included and excluded in these indices was significant.

Finally, the World's Most Ethical Companies shows little similarity in terms of the ranking of the top-ranked European companies in R&D, as it includes only eight out of the 184 companies analysed. Although very few of the top EU R&D companies were included in this index, there is congruence with both measures, as companies

included in this index show higher performance and transparency and less financial risk. However, in this case, the differences in medians between the included and excluded firms are not significant for the Refinitiv ESG Scores and have less significance than the other index for Sustainalytics' ESG Risk Ratings.

Therefore, we can conclude that for the sample, both the Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings show consistency in their valuations with the S&P Global Sustainability Yearbook, the Global 100 Index, and the World's Most Ethical Companies. Such consistency might be explained by the fact that the indices consider good performance and transparency in ESG factors, as does Refinitiv, as well as the company's level of risk, which is the main measurement factor of Sustainalytics' ESG Risk Ratings.

5   Discussion and conclusions

This study aimed to contribute to greater homogenisation in the measurement and reporting of CS practices. First, we attempted to understand the current trend in CS reporting among the most innovative companies in the EU. Specifically, we performed text analyses to identify trends in terms of the use of terminology to refer to CS issues, EU regulations acknowledged, most cited international sustainability frameworks, ESG ratings and indices mentioned, the ESG KPIs used, and the CS materiality approaches adopted. Furthermore, we analysed the most popular metrics to measure CS performance by assessing their similarities and differences for the most innovative EU companies. The comparative analysis of the Refinitiv ESG Scores, Sustainalytics' ESG Risk Ratings, S&P Global Sustainability Yearbook, RRI, Global 100 Index, and the Top 100 World's Most Ethical Companies enabled us to draw interesting conclusions about the diversity and incongruencies that currently exist in CS metrics.

First, focusing on the most interesting aspects related to trends in CS reporting, we can draw the following conclusions:

- In 2021, there was great diversity in terms of how companies reported their CS information (integrated with financial information, in separate documents, or both) and how companies named these reports. Our text analysis illustrates that CS information is most commonly presented in a separate document. The most commonly used title for this document is 'sustainability report', although it was only used by 29.41% of the companies, which indicates great levels of heterogeneity.

- SDGs was the most common term used in the 2021 reports to refer to CS aspects, followed by the term ESG. Surprisingly, the most traditional and academic term, CS, was not referenced as much. This trend seems to confirm the increasing popularity of SDGs as the main framework of action to integrate sustainability at the firm level (Delgado-Ceballos et al., 2023; Montiel et al., 2021). It also indicates the prominence gained by the term ESG, which was originally coined by finance academics and practitioners and later extended to the general business field to refer to sustainability actions and performance (Antolín-López and Ortiz-de-Mandojana, 2023).

- Among EU regulations, the EU Taxonomy is receiving significant attention in the CS of companies, with 66.39% of the companies including references to it in their 2021 report. Notably, 14.29% of the companies mentioned the CSRD. This finding foresees great relevance of the EU Taxonomy in the business field, given that it is still a proposal in the development stage. This finding also shows the proactivity of some of the companies in the sample.

- Regarding the general international sustainability frameworks, we observe a similar trend with regard to the CS terminology, since SDGs were the most referenced framework in the analysed CS reports of the companies. The GRI was the second most frequently referenced framework, which is understandable since it is an international standard specifically developed for corporate reporting and disclosure of companies' sustainability actions. The other two frameworks with a notable presence in the CS reports were the UNGC and SASB. Hence, although there is much freedom in the selection of sustainability frameworks to disclose CS information, most companies focus only on a few international frameworks (i.e. SDGs, GRI, UNGC, and SASB). Regarding specific sustainability frameworks, those related to the environment (i.e. CDP, GHG, SBTi, and TCFD) are cited more frequently than frameworks related to the social dimension. The number of references among sustainability frameworks related to the environment was very similar. Regarding the social dimension, references to the UDHR exceed references to the ILO in number.

- Unexpectedly, although rating agencies have played a very relevant role in the development of CS measures, references to rating agencies and their metrics and indices are scarce in companies' CS reporting.

- Among the most used environmental KPIs, the most common are the references to 'emissions'. Additionally, indicators related to energy, such as 'energy efficiency' and 'renewable energy', are referenced frequently. There are also numerous allusions to the broader but related concept of 'climate change'. However, considering our sample of innovative firms, it is worth noting the negligible presence of innovation-related indicators, such as 'environmental/sustainable innovation' and 'green products'. Regarding the social KPIs, the most common indicators are those related to employees, such as 'health', 'health and safety', 'working conditions', and 'diversity'. This might be explained by the importance health and well-being has gained recently owing to the Covid-19 pandemic. References to 'human rights' are also very common, which is reasonable because they reflect a general perspective of the

company's respect for all stakeholders, and it is one of the most deeply rooted CSR aims. Finally, of the governance KPIs analysed, the most frequently occurring one is 'risk management', which indicates the general inclination of companies to pay attention to ESG aspects that have a particular risk of impact on the company. This finding aligns with the growing presence of financial materiality in both finance and business fields (Antolín-López & Ortiz-de-Mandojana, 2023). References to more traditional governance terms, such as 'anti-corruption' and 'ethics', are also very common in CS reporting.

- Although references to materiality are still limited, companies reference 'financial materiality' more than 'sustainable materiality' (21.34% vs. 12.97%). This finding is supported by the fact that the concept of materiality first appeared in the finance field (Jebe, 2019). The expression 'double materiality' only appears in 15.90% of the documents, which is striking, given the prominence and urgency granted to double materiality in the Guidelines on Reporting Climate-Related Information (2019) to clarify the application of the NFRD.

Second, with respect to the analysis of the CS metrics for top-ranked companies in the EU R&D Scoreboard, we can draw the following conclusions:

- Companies better positioned in the EU R&D Scoreboard are evaluated significantly higher according to their Refinitiv ESG Scores. However, there does not seem to be a significant correlation between the top 250 companies in the EU R&D Scoreboard and Sustainalytics' ESG Risk Ratings.

- The metrics, Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings differ in how they evaluate companies and their CS performance. Therefore, each rating agency places different companies in the top positions, i.e. the best ranked companies according to these two CS metrics differ greatly. This result might be explained by the fact that while the Refinitiv ESG Score evaluates ESG performance and the degree of transparency in reporting material ESG data publicly, Sustainalytics' ESG Risk Ratings only focus on the evaluation of the financial risk associated with the company's ESG factors. Both measures are very different in their conceptualisation; therefore, the differences in positioning are reasonable. These differences are not greater for companies that are better or worse positioned in the EU R&D Scoreboard.

- Companies most exposed to the media, as measured by the RRI, are evaluated as excellent by Refinitiv (the highest score category). This may be because companies that receive more ESG attention are under major public scrutiny and care more about their ESG performance and the transparency of their ESG reporting. Using correlations, we confirmed that companies with a higher Refinitiv ESG Score and a higher Sustainalytics' ESG Risk Rating coincide with those that receive more media exposure. We also found a very interesting relationship between companies' RRI and their position in the 2021 EU R&D Scoreboard. Companies ranked at the top of the R&D Scoreboard faced greater media exposure.

- Not many of the top-ranked companies in the EU R&D Scoreboard are included in the S&P Global Sustainability Yearbook, the Global 100, or the World's Most Ethical Companies.

- Although there are divergences between Refinitiv ESG Scores and Sustainalytics' ESG Risk Ratings, these two metrics separately show congruence with the three indices analysed (S&P Global Sustainability Yearbook, the Global 100, and the World's Most Ethical Companies). This finding can be explained by the fact that these indices are constructed based on companies' ESG performance and their level of transparency in ESG reporting (the two measurement pillars of Refinitiv) as well as their level of risk (the main aim of Sustainalytics' ESG Risk Ratings).

This study has some limitations. First, the sub-samples included only 238 and 184 companies. This is because part of the analysis required a manual and detailed data search. We focused on highly innovative companies that can present a good image in terms of openness to the environment and change. However, future work could include larger sample sizes, including less recognised or less scrutinised companies. In addition, together with EU companies that can be considered pioneers in the field of measuring and reporting CS, companies from other geographical contexts could be incorporated to obtain a more global picture of the situation. Second, the objective of this work was mainly descriptive, and more complex methodologies should be designed and applied to investigate the causality of many of the results, trends, and other uncovered effects found in this report. Furthermore, this study focused on the year 2021. However, in the coming years, we expect important advances in terms of CS measurement and reporting, given the global changes occurring in terms of regulations, ratings, and so on. Therefore, these analyses should be repeated in the future to evaluate progress.

Despite these limitations, we believe that this study has enabled us to learn about some of the current trends in corporate reporting and to identify and justify some of the divergences that occur when measuring CS. However, the most important trends detected refer to the lack of homogeneity in the naming of the documents that present and integrate CS information, which can easily be solved by establishing clearer recommendations and global standards. This would enable stakeholders to locate this information more easily, thereby improving access and transparency in terms of CS reporting and the benchmark of companies. We also believe that despite great flexibility, only a few international sustainability framework standards have significant prominence, as they favour standardisation. KPIs are a key aspect in advancing quality in reporting and should be more standardised, at least the most relevant ones. Additionally, it is important to differentiate between the levels of different KPIs and make KPIs more actionable for measurement (for example, emissions vs. climate change). EU regulations such as the EU Taxonomy will help achieve this goal. Companies must understand and clarify the double materiality of their activities, i.e. their CS measurement and reporting must allow for the identification of not just the impacts social and environmental issues may have on their financial aspects, but also the impact the company has on global sustainability. Finally, there are many measures for assessing the CS performance of companies, each constructed using a different methodology and set of assumptions. The value of these tools depends on whether the stakeholder uses them to gain a thorough understanding of the assumptions on which each CS measure is built and what each measure represents. Some CS metrics can be used in a supplementary manner, given that the approach and focus of existing CS metrics differ considerably. We hope that in the future, greater standardisation will be developed in measurement and reporting. This could translate into greater clarity and standardisation in CS measurements, allowing for more effective comparison between companies and improvement of their monitorisation and evolution. Eventually, it could ensure greater sustainability in companies.

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List of abbreviations and definitions

CS   Corporate Sustainability

CSR   Corporate Social Responsibility

CSRD   Corporate Sustainability Reporting Directive

DJSI   Dow Jones Sustainability Indices

ESG   Environmental, Social, and Governance

EU   European Union

GRI   Global Reporting Initiative

KPIs   Key Performance Indicators

ILO   International Labour Organization

MEIs   Material ESG Issues (MEIs),

NFRD   Non-Financial Reporting Directive

RRI   RepRisk Index

SASB   Sustainability Accounting Standards Board

SDGs   Sustainable Development Goals

SFDR   Sustainable Finance Disclosures Regulation

S&P   Standard & Poors

UNGC   United Nations Global Compact

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