

Evolution of Sustainability Reporting Frameworks

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Abstract

This research paper offers an extensive overview of the evolution of sustainability reporting practices, from the use of several frameworks by companies across the European Union, to the transition to a single regulation: the European Sustainability Reporting Standards. The article aims to expand the research conducted in sustainability reporting by narrowing and focusing only on a five-year time period.

The analysis encompasses a bibliometric examination of a sample of more than 1,000 articles from Web of Science over a time-horizon of five years using VOSviewer software. The keywords selected as relevant for this research included phrases such as "sustainability reporting", "ESG reporting", "Corporate Social Responsibility Reporting" and "European Sustainability Reporting Standards".

The results of this research show a clear interest for sustainability information on all three components, E, S and G, but an insufficient number of articles on the transition to ESRS, its requirements and assurance practices regarding the accuracy and completeness of these reports.

Possible limitations of this research may include the exclusion of other academic writing beyond the established time-horizon and utilization of only articles from only one database, Web of Science.

Despite the abundance of research in the sustainability domain, this paper contributes to a clearer understanding of ESRS data-points and topics to be addressed by the companies that fall under the umbrella of the CSRD requirements.

Key words: reporting; sustainability; ESG; Corporate Social Responsibility Reporting; European Sustainability Reporting Standards;

JEL Classification: M14, Q01, Q56

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Introduction

In the context of an emerging economy, every company seeks to remain competitive by delivering quality products and services, as well as adapting to the new trends in sustainable processes. Through sustainability reporting, undertakings can demonstrate that they are environmentally and socially responsible and they can also improve communication with various stakeholders (Manes-Rossi et al., 2018). Some of the key features that any sustainability statement must take into consideration are transparency, value creation, performance improvement, reputation, accountability and stakeholder engagement. A broader image of impacts, risks and opportunities that companies are facing can be disclosed through three main components: environment, social and governance (ESG). The environmental part relates to the utilization of energy, greenhouse gas emissions (GHG), waste management, biodiversity, water consumption and pollution. Social components encompassed in ESG reporting may refer to the relationship between the company and its own workforce, the society around the business, health and safety policies, diversity and inclusion issues. The governance elements include organizational practices, ethical policies, risk management and so on (Filho et al., 2025).

During the last decades, several reporting frameworks were established in an effort to support companies in their journey of transition to sustainability practices. Such examples of standards include the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), the Taskforce on climate-related Financial Disclosure (TCFD), the International Integrated Reporting Council (IIRC) and the Sustainable Development Goal Disclosure Recommendations (SDGD).

However, in order to ensure comparable and more reliable information, a transition to a unified reporting framework has been long awaited. Thus, the European Commission laid the foundation for a new set of regulations in 2023, the European Sustainability Standards (ESRS) which are effective as of 1 January 2024. The first set of sustainability statements are published in 2025 for the financial year 2024, as part of the management report. As Parrondo (2024) states, the ESRS regulations align with the United Nations' SDGs and are also applicable across all environmental, social and governance sectors. Throughout this approach, the ESRS require a full-spectrum disclosure on impacts, risks and opportunities,

also creating long-term value for companies. The impact of this transition is also reflected in the EU stock market, with a reported 25% increase in the share of total prices made up of non-fundamental components. Investors' focus is slowly shifting towards sustainable objectives that can be measured by ESG scores (Alessi et al., 2022).

This research aims to examine the stages of the sustainability reporting over the past five years, with focus on the ESRS regulations. A detailed description on the topics is provided in the literature review chapter, in order to emphasize the rigorosity of the standard on every ESG matter. Moreover, the paper presents the development and evolution of non-financial reporting, up until the establishment of the Corporate Sustainability Reporting Directive (CSRD). A more in-depth research is performed with the help of a bibliometric analysis on keywords occurrence, co-authorship by country and bibliographic coupling of articles. The research conducted aims to highlight a gap in literature regarding the transition to ESRS, but an increased interest for sustainability reporting per general.

The results of this research paper may be valuable for any user that wants to understand how sustainability reporting has evolved during the past five years and what are the new uncertainties that companies are facing nowadays. Furthermore, the study contributes to academic research in the sustainability field, offering a clearer point of view over the topics and requirements addressed by the ESRS.

The paper is split in four sections: 1 - Introduction, 2 - Literature Review, where the evolution of the sustainability reporting is described in a step-by-step manner and the transition to ESRS is highlighted, 3 - Research Methodology section which presents the refining approach chosen for the bibliometric analysis, 4 - Results and Discussions chapter which supports through several maps the literature review and finally, 5 - Conclusions based on the whole research.

1. Literature Review

1.1 Developments and evolution in sustainability reporting

For the last few years, sustainability reporting has been playing a major role in influencing how companies communicate with stakeholders and how they operate across the industries. This current trend is more significant in Europe, as the European firms started to report

sustainability information annually. From less than 10% of companies in 2006, an impressive increase took place in Europe, to more than 80%. The percentage growth was due to the publication of the Global Reporting Initiative (GRI) guidelines in 2007 (Stolowy & Paugam, 2018). Tsang et al. (2023) state that the companies' main goals are to maximize the shareholders' wealth and to provide benefits to society. Several benefits of sustainability reporting identified by the same author as mentioned prior, are lower cost of capital, increased satisfaction among customers and employees, access to better finance and a better brand image.

However, there are still many overlapping definitions related to sustainability. The majority of them contain notions about corporate social responsibility, integrated reporting, non-financial reporting and, of course, environmental, social and governance issues (Stolowy & Paugam, 2023). To illustrate the existing diversity in definitions, Durand et al. (2022) analyzed a sample of 5,411 corporate reports that were referring to sustainability topics. The findings of the research showed that the sustainability reporting topics have different names, but contain similar information. The list consists of several titles, such as: annual review, global responsibility report, environmental report, non-financial statement, sustainability report and so on.

Furthermore, the diversity of wording when it comes to sustainability is also demonstrated by Fometescu and Hategan (2023), who have conducted a bibliometric analysis over non-financial information reports covering the period 2002 - 2022. The findings show a strong relationship between sustainability-related keywords, categorized in four clusters. Among the most relevant ones, we can identify: "CSR", "non-financial information", "non-financial performance", "sustainability reporting", "cost", "performance", "indicators", "environmental disclosures" and so on.

Sustainability and non-financial reporting have been in the spotlight for several organizations that have proposed frameworks or standards in order to facilitate the presentation of environmental, social and governance topics. Before the European Sustainability Reporting Standards (ESRS), the most relevant frameworks applied by the companies across the world were: the Global Reporting Initiative (GRI), the Task Force on Climate-related Financial Disclosure (TCFD), the International Integrated Reporting Council (IIRC), the Sustainability Accounting Standards Board (SASB) and the Sustainable

Development Goal Disclosure Recommendations (SDGD).

The GRI was the first standard at global level that provided guidelines for sustainability reporting, with a percentage of 96% of the world's largest companies to apply it. The Standards contain three categories: Universal Standards, which set the general principles, Sector Standards, which include industry-specific requirements and Topic Standards, which focus on GHG emissions or energy issues. The TCFD's goal is to emphasize the ability of different investors to understand the business and to highlight the climate related risks and opportunities. It is structured on four key disclosures: governance, strategy, risk management and metrics and targets. The IIRC established the concept of integrated reporting, meaning that a document must contain both financial and sustainability information. The framework was based on the six capitals model, presented in a holistic manner: natural, financial, manufacturing, intellectual, human and social. SASB was a framework that provided industry-specific standards that were mainly focused on the financial impact that sustainability issues could have on the business. Currently, IIRC and SASB have been consolidated under the International Financial Reporting Standards Foundation (IFRS). Last but not least, the SDGD are based on three fundamental concepts: "Long term value creation for the organisation and society", "Sustainable development context and relevance" and "Materiality". These create the foundation of the framework's 17 Goals, the Sustainable Development Goals which address issues related to environment, social and governance (Cooper & Michelon, 2022).

In the context of unclear and non-comparable sustainability reporting standards, The European Union released the Corporate Sustainability Reporting Directive (CSRD). It was adopted on 14th of December 2022 and entered into force on 5th of January 2023, replacing the Non-Financial Reporting Directive (NFRD). Stolowy & Paugam (2018) summarized the key aspects that the new Directive highlights:

- sustainability reporting is extended to large companies and companies listed on regulated markets;
- reports will require external limited assurance;
- preparing the information in a digital format for better comparability and transparency;

- prepare the sustainability statement in accordance with the requirements of the European Sustainability Reporting Standards (ESRS).

As indicated in CSRD, Article 5, point 2 (a)-(c), the timeline for implementation is the following:

- In 2024 (for FY 2023): large companies that have already been subject to NFRD;
- In 2025 (for FY 2024): large companies which meet two out of three criteria (50mil. EUR turnover, 25mil. EUR assets, 250+ employees)
- In 2026 (for FY 2025): small and medium-sized companies (SMEs) which are listed on public-interest and some financial entities;

- In 2028 (for FY 2027): also including non-EU companies with 150mil. EUR turnover in EU countries. Alongside CSRD, there are also new regulations on ESG topics that require companies to disclose significant sustainability information: Regulation (EU) 2020/852 of the European Parliament and of the Council (EU Taxonomy), Corporate Sustainability Due Diligence Directive (CSDDD), Sustainable Finance Disclosure Regulation (SFDR), EU Regulation on Deforestation-Free Products (PwC, 2021). Moreover, there are both internal and external benefits that the CSRD brings to the companies and their stakeholders (**Table no. 1**).

Table no. 1. Benefits

| Internal benefits | External benefits |
|--|--|
| Better overview of sustainability-related impacts, risks and opportunities | Help the external users to understand the business's true value |
| Positive impact on management strategy and policy | ESG factors incorporated in external ratings |
| Correlation between financial performance and sustainability-related actions | Sustainability indicators offer the stakeholders a more robust image of the company's future performance |
| Monitorization of the company's development compared to peer competitors | Demonstrate how sustainability practices of a company can impact the environment |
| Avoid ESG conflicts that might damage the company's reputation | Improve the company's reputation, brand power and increase the stakeholders' trust |

Source: <https://www.pwc.com/sk/en/environmental-social-and-corporate-governance-esg/esg-reporting.html>, 2021

Table no. 2. KPMG survey of sustainability reporting

| Key findings | World's largest 250 companies | All 5,800 companies in the survey |
|---|-------------------------------|-----------------------------------|
| Report on sustainability | 96% | 79% |
| Publish a carbon target | 95% | 80% |
| Have a sustainability leader | 56% | 46% |
| Consider sustainability in leadership pay | 41% | 30% |

Source: <https://kpmg.com/dk/en/home/insights/2024/11/survey-of-sustainability-reporting-2024.html>, 2024

According to KPMG survey (2024), sustainability reporting is being integrated as part of the businesses' usual practices. The research included 5,800 companies, out of which 250 are the world's largest ones. The key findings of the survey are presented in **Table no. 2**.

However, the four most powerful economies in Europe – Germany, France, Italy and Spain – are divided over the

implementation of the CSRD. Germany and France called for a two-year delay in CSRD implementation which could affect more than 13,000 companies, and France insisted on delaying indefinitely the due diligence rules. Meanwhile, Italy requested the EU not to delay the CSRD implementation, as there are thousands of Italian companies which will report under the legislation. Also,

Spain demands that the CSRD should be detailed only when addressing smaller companies, but after that, it should be mandatory, adding pressure on Brussels not to comply with the requests of Germany or France (Abnett, 2025).

1.2 An overview of the European sustainability reporting standards

The Corporate Sustainability Reporting Directive (CSRD) was created by the European Union, replacing the Non-Financial Reporting Directive (NFRD). The scope of the new directive is to expand and strengthen the requirements regarding sustainability reporting, also improving some key characteristics of any reporting documents: transparency, comparability, consistency and accountability. Moreover, CSRD is applicable to a larger range of companies, including listed small and medium-sized companies (SMEs) and non-EU companies that have significant EU operations. The concept of double materiality is another key aspect of the CSRD that requires companies to evaluate their impact from two points of view: financial materiality and impact materiality. Last but not least, when reporting on non-financial matters, companies must apply the European Sustainability Reporting Standards - ESRS (Faqih & Kramer, 2024).

Starting on 1 January 2023, the sustainability reporting has been elevated to the same level of scrutiny as the financial reporting due to the establishment of the Corporate Sustainability Reporting Directive (CSRD). The number of companies impacted from various industries across the European Union is over 42,500 firms. Member States from Europe had to transpose the Directive into their national law by 6th of July 2024. However, several countries failed to comply with the deadlines imposed by the European Union, but managed to transpose the CSRD regulations by the end of 2024. As of 28 January 2025, 6 Member States had introduced a draft proposal, 3 Member States have consultations in progress and 20 Member States fully transposed the regulations (Accountancy Europe, 2025). **Table no. 3** presents the countries which have adopted the CSRD and the number of companies impacted by this legislation in financial year 2024 and 2025.

Table no. 3. List of CSRD transposition by countries and number of affected companies

| | |
|----------------|---------------|
| Belgium | 4,880 |
| Bulgaria | 800 |
| Croatia | 520 |
| Czech Republic | 2,000 |
| Denmark | 2,472 |
| Finland | 1,270 |
| France | 4,600 |
| Hungary | 429 |
| Ireland | 1,500 |
| Italy | 4,000 |
| Lithuania | 300 |
| Norway | 1,250 |
| Romania | not specified |
| Slovakia | not specified |
| Slovenia | 170 |
| Sweden | 2,240 |

Source: Accountancy Europe,
<https://accountancyeurope.eu/publications/csr-transposition-tracker/>, 2025

As per European Union (2022, article 19a, pts. 1-2), the sustainability statement should be included in a dedicated section of the management report, making it clearly identifiable for any type of stakeholder. The information reported should include the following aspects, in short:

- A description of the business model, including its resilience in relation to impacts, risks and opportunities, plan and financial investments to limit the global warming to 1,5 Celsius degrees as per Paris Agreement;
- Time-bound targets related to sustainability goals, including the reduction of greenhouse gas emissions by 2030 and by 2050;
- An explanation of the roles that administrative, management and supervisory bodies have regarding sustainability matters;
- Policies adopted by the company regarding sustainability;
- Details about the incentive scheme linked to sustainability that addresses the administrative, management and supervisory bodies;

- Key points of due diligence processes implemented that are related to the undertakings' own operations, upstream or downstream value chains;
- A summary of the principal sustainability risks a company is exposed to and how it manages these risks.

As the CSRD mandates a more detailed reporting regarding sustainability issues, the European Sustainability Reporting Standards (ESRS) provide the framework for the companies on which topics and sub-topics should be included depending on the materiality assessment. The ESRS were developed by the European Financial Reporting Advisory Group (EFRAG) in 2022, and adopted on the 31st of July 2023 by the European Commission through a Delegated Act. Under the ESRS, sustainability reports should include the following information, which closely aligns with the requirements set by EU Directive 2022/2464:

- a) a summary of the strategy and business model adopted by the company;
- b) company's targets within its time frames;
- c) the roles of administrative, management and supervisory bodies alongside their expertise, skills and capabilities;
- d) indicate if there are incentive programs connected to sustainability topics;
- e) a description of the company's policies regarding environmental, social and governance matters;
- f) risks linked to company's own operations or its value chain and other sustainability-related risks;
- g) relevant metrics for the data-points that are mandatory to be presented. (Bataleblu et al., 2024)

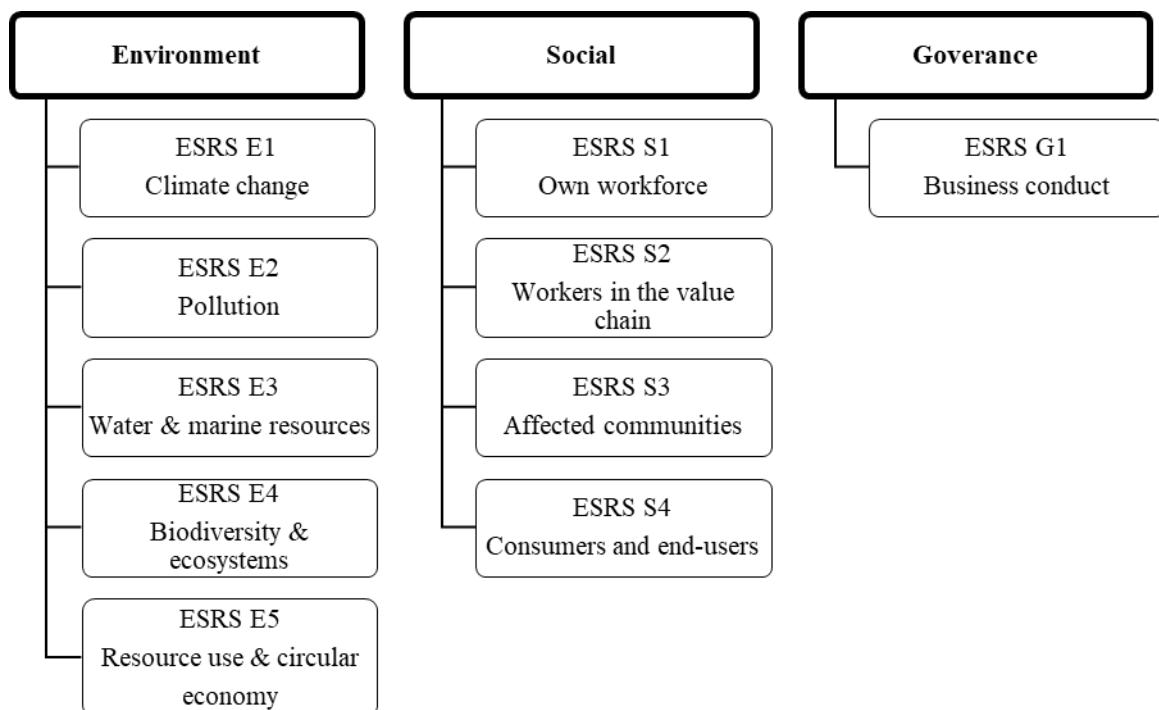
As demonstrated in **Table no. 3**, Romania is among the countries that have transposed Directive 2013/34/EU (CSRD) through OMFP no. 85/2024. The new Order became applicable in the beginning of year 2025, for the financial year of 2024. Also, along the implementation of the new regulations, OMFP no. 1802/2014 and OMFP no. 2844/2016 are updated with the statements from Article 1 of the CSRD Directive (CECCAR Business Magazine, 2024). OMFP No. 85/2024 mentions that there are three types of sustainability reporting: individual, consolidated or related to third party countries. Individual sustainability reporting is related to medium-sized and large entities that, at the balance sheet date, exceed at least two of the

three stipulated criteria: total assets – 25.000.000 RON, net turnover - 50.000.000 RON or average number of employees during the financial year - 50. On the other hand, in the case of a group consisting of a parent company and subsidiaries, two of the three criteria need to be met for reporting: total assets – 125.000.000 RON, net turnover – 250.000.000 RON or average number of employees during the year - 250. Finally, third party countries prepare and publish sustainability statements through the medium or large-sized subsidiary based in Romania, or through a branch in Romania. In both cases, the entity must have generated a net turnover of more than 150 million EUR on the territory of the European Union for the last two consecutive financial years. The sustainability statement must be included in the management report, providing relevant information for a better understanding of how sustainability practices impact the companies' performance, development, operation or financial position.

The structure of the ESRS consists of three important categories: cross-cutting standards, topical standards and sector-specific standards. The cross-cutting standards contain general reporting requirements explained in section ESRS 1 and general disclosures presented in ESRS 2. On the one hand, in ESRS, valuable information is presented in order to facilitate the reporting process: qualitative characteristics, double materiality, due diligence, value chain, time horizons, the structure of the statement, basis for preparation, references to other parts of the reporting package, transitional provisions and several appendices. On the other hand, ESRS 2 disclosures are structured as follows for both topical and sector-specific standards: governance (GOV), strategy (SBM), impact, risk and opportunities (IRO), and, metrics and targets (MT). ESRS 2 also includes Minimum Disclosure Requirements regarding policies (MDR-P), actions (MDR-A), metrics (MDR-M) and targets (MDR-T) (European Commission, 2023).

As Hummel and Jobst (2024) explain, the topical standards are divided into three main topics: environmental (E1 to E5), social (S1 to S4) and governance (G1), which can be divided into sub-topics and even sub-sub-topics. Sector-specific standards are applied by companies that have identified material impact, risks and opportunities which are material for them, but are not covered by the topical standards (**Figure no. 1**).

Figure no. 1. ESRS Topics



Source: PwC, ESG in reporting and assurance, building trust and protecting reputation through responsible, transparent reporting, <https://www.pwc.be/en/challenges/esg/rep-assurance.html>, 2023

1.3 Key principles of ESRS topics and sub-topics

As the United States withdrew from the Paris Agreement in January 2025, the European Commission announced that it plans to ease the rules regarding the sustainability reporting that affect thousands of companies to make European industries more competitive against the United States and China. As of February 2025, the proposal is still in draft form, but it is designed to target only the companies with more than 1,000 employees and a net turnover which exceeds 50mil. EUR (Abnett, Furness, 2025).

Nevertheless, the European Commission presented on the 26th of February 2025 an Omnibus Package on sustainability matters: "Sustainability Reporting Simplification Proposal" and "Stop-the-clock Proposal". Some of the key simplification aspects of the proposal are presented in **Table no. 4**.

Creating a link between financial and non-financial reporting, the sustainability statement is integrated in the consolidated annual reporting package of companies. The

disclosure of the sustainability statement must be reported under the European Sustainability Reporting Standards (ESRS) starting on the 1st of January 2024. The ESRS are split in three main categories: cross-cutting standards (ESRS 1 and ESRS 2), topical standards (environmental, social and governance) and sector-specific standards. In some cases, certain aspects related to a company may not be sufficiently detailed in the standard, thus the additional information should be reported under the entity-specific information disclosures. The sector-specific standards are designed to provide a more comprehensive analysis, minimizing gaps that could potentially appear. However, it is extremely important that sustainability statements remain comparable across companies that operate in the same industry. A balance between specific details and consistency with the general requirements is required, as it ensures that the information is both comparable and relevant (Martinez-Torres, 2024).

According to the European Commission (2023, ESRS 1, Section 6.4, para. 77), the sustainability matters should be included in a dedicated section of the management report. The information in the statement could be sectioned in

three-time horizons. The first one is the short-term, limited at reporting period in financial statements. The second one is medium-term which begins from the end of the

short-term period, up to five years. The last one is the long-term horizon, which is more than five years long.

Table no. 4. Omnibus proposal for simplification of the CSRD

| CSRD | Proposed changes |
|--|--|
| Reduction of scope | |
| Wave 1: listed, +500 employees and either +50mil. EUR net turnover or +25mil. EUR assets | |
| Wave 2: +250 employees and either +50mil. EUR net turnover or +25mil. EUR assets | Threshold only applies to companies with +1,000 employees and either +50mil. EUR net turnover or +25mil. EUR assets. |
| Wave 3: Listed small and medium-sized companies | |
| Wave 4: Non-EU Groups | |
| Review of the ESRS | |
| Set of ESRS required after the Double Materiality Assessment | <ul style="list-style-type: none"> -Removal of 25% of data points -Prioritize quantitative data points over narrative fields -More clarity around nature of data points |
| The value-chain | |
| The maximum information that companies could collect from SMEs in their value chain | New information cap determined by a new set of voluntary standards for undertakings not subject to reporting |
| Assurance | |
| Limited assurance becomes reasonable assurance by 2028 | Limited assurance remains, reasonable assurance removed |
| Listed small and medium-sized companies (LSME) | |
| CSRD and ESRS required for LSME | Removed |
| Sector-specific standards | |
| Required as of July 2026 | Removed |

Source: Greenomy, Navigating the New Omnibus Proposal: Key Updates & Implications, <https://app.livestorm.co/greenomy/navigating-the-new-omnibus-regulation-key-updates-and-implications/live?s=49fb5313-1e04-4390-956d-5a8313a77139#/>, 2025

Alongside the targets disclosed, all the information that is presented in the sustainability statement must meet five qualitative characteristics, just as financial statements do. Firstly, the information should be relevant in order to impact the stakeholders' decisions and predictions. Secondly, the statement must faithfully represent all the impacts, risks and opportunities that a company is exposed to and also how it adapts the strategy to achieve its targets. Comparability is the third characteristic, meaning that the sustainability statement can be compared with the undertaking's prior period statements or with other undertakings from the same or similar industries. The fourth one is verifiability, which gives users confidence that the information is neutral, complete and accurate. Also, several observers could reach to a consensus on faithful representation of topics. Last but not least, sustainability statements must be understandable,

meaning that all the data presented shall be clear and concise (European Commission, 2023, ESRS 1, Appendix B).

Another important matter related to time horizons stated in the ESRS is the fact that companies should set short-term, medium-term and long-term targets, as well as disclose the actual progress made towards meeting them. Moreover, to ease the process of reporting sustainability information, the legislation accommodated transitional provisions for several matters:

- Transitional provisions related to entity-specific disclosures: transition phase is three years;
- Transitional provisions related to the value chain chapter: transition phase is three years;
- Transitional provisions related to presentation of comparative information: transition phase is one year;

- Transitional provisions related to Disclosure Requirements that are phased-in: transition phase is one or three years, depending on the Disclosure Requirement. (Bataleblu et al., 2024)

As stated by the European Commission (2023, ESRS 1, Section 1, para. 8), topical ESRS are structured in topics and sub-topics, but where necessary companies can also add sub-sub-topics. **Table no. 5** provides a table of all the sustainability matters covered by the topical ESRS.

Table no. 5. Topics and sub-topics

| Topical ESRS | Topic | Sub-topic |
|--------------|-----------------------------|--|
| ESRS E1 | Climate change | Climate change adaptation Climate change mitigation Energy |
| ESRS E2 | Pollution | Pollution of air Pollution of water Pollution of soil Pollution of living organisms and food resources Substances of concern Substances of very high concern microplastics |
| ESRS E3 | Water and marine resources | Water Marine resources |
| ESRS E4 | Biodiversity and ecosystems | Direct impact drivers of biodiversity loss Impacts on the state of species Impacts on the extent and condition of ecosystems Impacts and dependencies on ecosystem services |
| ESRS E5 | Circular economy | Resources inflows, including resource use resource outflows related to products and services Waste |
| ESRS S1 | Own workforce | Working conditions Equal treatment and opportunities for all Other work-related rights |
| ESRS S2 | Workers in the value chain | Working conditions Equal treatment and opportunities for all Other work-related rights |
| ESRS S3 | Affected communities | Communities' economic, social and cultural rights Communities' civil and political rights Rights of indigenous peoples |
| ESRS S4 | Consumers and end-users | Information-related impacts for consumers and/or end-users Personal safety of consumers and/or end-users Social inclusion of consumers and/or end-users |
| ESRS G1 | Business conduct | Corporate culture Protection of whistle-blowers Animal welfare Political engagement and lobbying activities Management of relationships with suppliers including payment practices Corruption and bribery |

Source: European Commission, European sustainability reporting standards, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022L2464#art_1, 2023

The nine disclosure requirements under ESRS E1 – Climate change (E1-1, E1-2, E1-3, E1-4, E1-5, E1-6, E1-7, E1-8, E1-9), should include several details that are related to the undertaking's efforts to align with the Paris Agreement, namely to contribute to the goal of limiting the increase in average temperature to 1.5°C above the pre-industrial level. The main Greenhouse gases addressed in this section are CO₂ – carbon dioxide, CH₄ – methane, N₂O – nitrous oxide, which are usually the ones that companies report on. The information required by these disclosure requirements is related to GHG emission targets, climate change mitigation actions through decarbonization levers, implementation of the company's transition plan and if the case, aligning economic activities (revenue, CapEx, OpEx) that are subject to Taxonomy Regulations (European Commission, 2023, ESRS E1).

In terms of pollution, there are six disclosure requirements that ESRS address: E2-1, E2-2, E2-3, E2-4, E2-5, E2-6. The sustainability matters that fall under ESRS E2 relate to pollution of air, soil, water and substances of concern. Usually, companies must display how pollution impacts them, what actions are being taken to prevent or mitigate negative impacts, how risks and opportunities are addressed and what are companies' plans to adapt their strategy and business model to pollution (European Commission, 2023, ESRS E2).

Water and marine resources are covered in five disclosure requirements, E3-1, E3-2, E3-3, E3-4 and E3-5 that address several matters, such as surface water and groundwater, entities' water consumption, water withdrawals or discharges. If this topic is material for a company, it should include in its sustainability statement information regarding positive and negative impacts on marine resources, plans for reducing water consumption, protection of aquatic ecosystems or restoration of freshwater and marine habitats (European Commission, 2023, ESRS E3).

ESRS E4 encompasses the biodiversity and ecosystem matters through six disclosure requirements that are related to the undertaking's relationship with freshwater, marine or terrestrial habitats and fauna or flora species (E4-1, E4-2, E4-3, E4-4, E4-5, E4-6). Moreover, the company must disclose how its business positively or negatively affects biodiversity and ecosystems, as well as plans and actions in order to prevent, mitigate and conserve them (European Commission, 2023, ESRS E4).

The last environmental disclosures focus on resource use and circular economy (E5-1, E5-2, E5-3, E5-4, E5-5, E5-

6). The standard includes requirements for companies to disclose details about their resource inflows, outflows and waste, throughout the entire business process. Minimizing waste, releases of hazardous substances, refurbishment, recycling processes and other matters are also significant parts of this topic (European Commission, 2023, ESRS E5).

As for the social part of the sustainability statement, companies must report on the impacts, risks and opportunities related to their own workforce, as stated in ESRS S1 (S1-1 to S1-17). A very wide variety of information is required with respect to own workforce, such as details about working conditions (working time, adequate wages, social dialogue, work-life balance), equal treatment and opportunities (gender pay-gap, hours of training, inclusion of persons with disabilities, cultural diversity, discrimination) or work-related rights (child labor, forced labor, privacy) (European Commission, 2023, ESRS S1).

Additionally to its own employees, a company could also include, if material, information about workers in the value chain. As stated in ESRS S2 (S2-1, S2-2, S2-3, S2-4 and S2-5), the objective of these disclosure requirements is to present material impacts, risks and opportunities related to value chain workers, such as how the undertaking affects them, the workers' conditions, if they benefit from equal treatment and so on. The value chain of a company is divided into two parts: upstream - suppliers of materials for manufacturing and downstream – customers and other third parties that get the products or services to the end consumer. Information about value chain workers is important because the undertaking should partner with responsible suppliers and customers in order to achieve its sustainability targets (European Commission, 2023, ESRS S2).

Another significant topic is presented in ESRS S3, through five disclosure requirement categories: S3-1, S3-2, S3-3, S3-4 and S3-5. Affected communities are tightly connected to the undertaking's own operations and value chain in both positive and negative aspects. Actual or potential impacts on affected communities can be communities' economic, social and cultural rights, civil and political rights, and the distinctive rights of indigenous people (European Commission, 2023, ESRS S3).

Consumers and end-users are a key component of the value chain for any business. Usually, undertakings with higher environmental risks should also report the actions taken to prevent, mitigate or remediate potential negative

impacts caused by their consumers and end-users. ESRS S4 comprises information about customers' or end-users' safety, inclusion, privacy, freedom of expression and so on through disclosure requirements S4-1, S4-2, S4-3, S4-4 and S4-5. It is important to highlight that these requirements are applicable to both the undertaking's own operations and its value chain practices (European Commission, 2023, ESRS S4).

Last but not least, governance is the main pillar for any successful business. Through six disclosure requirements G1-1, G1-2, G1-3, G1-4, G1-5 and G1-6, ESRS G1 addresses the undertaking's strategy and approach with respect to business conduct. The most relevant subject

matters that need to be disclosed are related to corporate culture, anti-bribery and anti-corruption policies, management of relationships with suppliers, lobbying activities, payment practices and so on (European Commission, 2023, ESRS G1).

All these topical disclosure requirements interact with one another and also with ESRS 2, General Disclosures. The ESRS 2 comprises four major categories which indicate the objectives of the Standard. Furthermore, in order to address specific subject matters for several types of industries, the four categories are split into more detailed disclosure requirements, as indicated in **Table no. 6**.

Table no. 6. ESRS 2, general disclosures

| | |
|---|---|
| Basic for preparation | BP-1 – General basis for preparation of sustainability statements |
| | BP-2 – Disclosures in relation to specific circumstances |
| Governance | GOV-1 – The role of the administrative, management and supervisory bodies |
| | GOV-2 – Information provided to and sustainability matters addressed by the undertaking's administrative, management and supervisory bodies |
| | GOV-3 - Integration of sustainability-related performance in incentive schemes |
| | GOV-4 - Statement on due diligence |
| | GOV-5 - Risk management and internal controls over sustainability reporting |
| Strategy | SBM-1 – Strategy, business model and value chain |
| | SBM-2 – Interests and views of stakeholders |
| | SBM-3 - Material impacts, risks and opportunities and their interaction with strategy and business model |
| Impact, risk and opportunity management | <ul style="list-style-type: none"> Disclosures on the materiality assessment process |
| | IRO-1 - Description of the processes to identify and assess material impacts, risks and opportunities |
| | IRO-2 – Disclosure requirements in ESRS covered by the undertaking's sustainability statement |
| | <ul style="list-style-type: none"> Minimum disclosure requirement on policies and actions |
| | MDR-P – Policies adopted to manage material sustainability matters |
| | MDR-A – Actions and resources in relation to material sustainability matters |
| | <ul style="list-style-type: none"> Metrics and targets |
| | MDR-M – Metrics in relation to material sustainability matters |
| | MDR-T – Tracking effectiveness of policies and actions through targets |

Source: European Commission, European sustainability reporting standards, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022L2464#art_1, 2023

2. Research Methodology

The process of preparing a bibliometric analysis consists of obtaining several scientific outputs resulting from various publications in specific fields, academic journals or databases with the help of statistics and numerical analysis. This review method adopts a macro-level approach, also revealing the dynamics of the selected

research fields which consist of hundreds or even thousands of academic papers. Moreover, bibliometric analysis provides objectivity within the examined sample of academic papers (Ozturk et al., 2024).

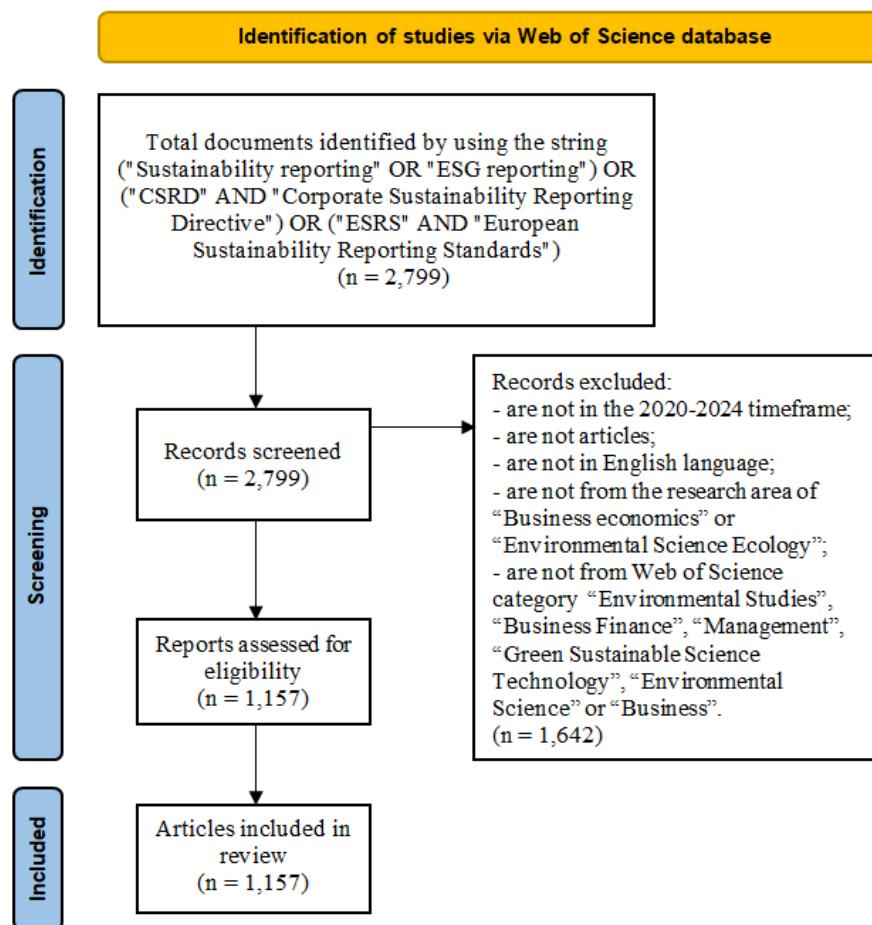
In order to identify pertinent literature on ESG reporting and the implementation of CSRD and ESRS in current reporting trends, the authors developed a research

strategy based on bibliometric analysis using version 1.6.20 of the VOSviewer software. As Van Eck and Waltman (2010) state, VOSviewer can be used to construct maps of keywords, authors, co-citations and so on, allowing the researchers to examine the data in full detail. Additionally, it is particularly effective when the sample size exceeds 100 items.

The database used in this research was Web of Science

(WoS) – Clarivate, because it is a platform that provides access to high-quality academic papers, ensuring credibility across a wide range of fields of study. Web of Science also allows different download formats which could be useful depending on the chosen software. For the purposes of this research, the "Tab delimited file" format was selected, saving the data as .txt files. The data were extracted from WoS on 24 March 2025.

Figure no. 2. Sampling process



Source: own data processed, 2025

To ensure a high-quality search in the sustainability reporting practices, using the CSRD and ESRS frameworks, a tailored Boolean string was established with the help of appropriate operators: ("Sustainability reporting" OR "ESG reporting") OR ("CSRD" AND "Corporate Sustainability Reporting Directive") OR

("ESRS" AND "European Sustainability Reporting Standards"). This string was used within the "topic" section of WoS search engine, which includes the title, abstract, keywords, and author keywords. Initially, we identified a number of 2,799 research papers (Figure no. 2). The timeframe was selected from 2020 to 2024 to reflect a

period of significant developments, changes and adaptations in the sustainability frameworks. The five-year time horizon was chosen to allow analysis of a complete and relevant period. Our database includes only articles as they are the most relevant category of academic writings that can also be helpful and understandable for users of the sustainability statements. To ensure consistency, English was the only language selected, to cover a broader range of articles. The results indicated a database of 1,421 articles.

Additionally, to further refine our research, we also selected the areas "Business Economics" and "Environmental Science Ecology". To finalize the refining process, we limited the articles to the following WoS Categories: "Environmental Studies", "Business Finance", "Management", "Green Sustainable Science and Technology", "Environmental Science", and "Business".

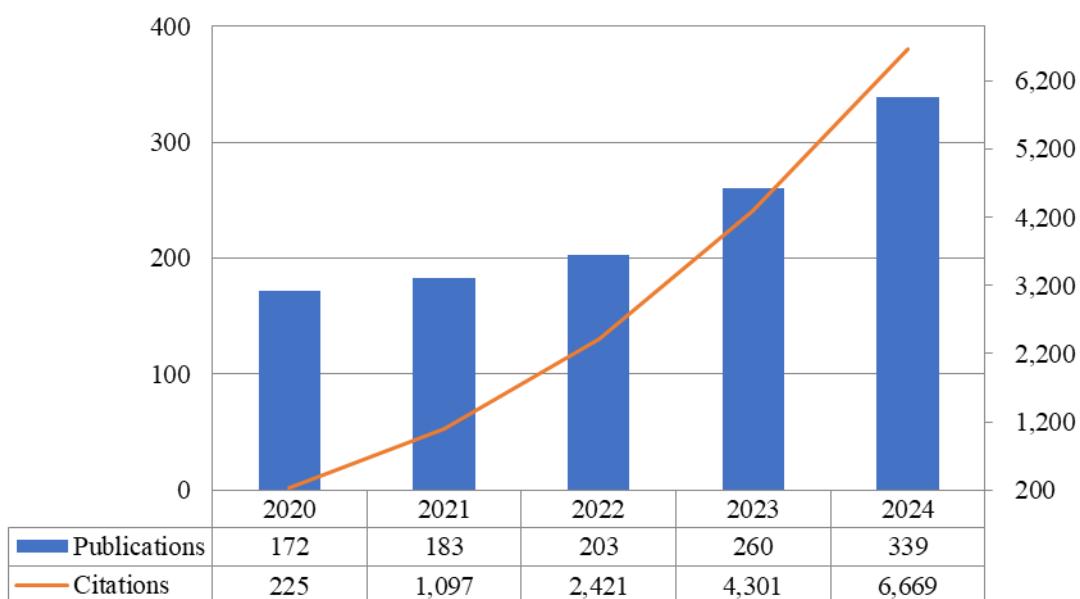
The final database comprises a number of 1,157 articles which were included in our analysis.

The final database was imported into VOSviewer software, using a thesaurus file to replace abbreviations with full phrases, convert plural words into their singular forms, and combine similar expressions into a single idiom.

3. Results and Discussions

The first step of the research conducted is a performance analysis emphasized in **Figure no. 3**. As shown in this graphic, the publications on ESG reporting and CSRD framework, have increased since 2020, from 172 to 339 publications. Moreover, the citations have grown exponentially from 255 in 2020 up to 6,642 in 2024.

Figure no. 3. Evolution of publications and citations by year



Source: own data processed, 2025

The increase in researchers' interest is due to the fact that in 2023, the new CSRD framework came into force, alongside the ESRS which is applicable from 1 January 2024. However, there had been several research papers conducted in the last five years which indicated an intense concern about sustainability and ESG reporting. As it is already known, financial information is no longer enough

to satisfy the needs of stakeholders, so sustainability statements have become essential in most reporting packages of undertakings. Of course, the peak of publications and citations occurred in 2024, as several entities became subject to reporting under the ESRS requirements. The phenomenon of adapting to sustainability practices and reporting is intensively studied in the academic sphere.

In terms of publication sources, **Figure no. 4** indicates top ten most relevant journals where researchers publish articles about sustainability reporting, CSRD and ESRS legislation. The horizontal axis shows the number of articles found in each of the most relevant journals. As it can be observed, the “Sustainability” Journal includes the most articles, as it covers a broader area regarding sustainability: corporate sustainability reporting,

sustainability science, reporting frameworks, sustainability in the supply chain and across several industries. In addition, the sustainability statement is a topic that can also be found in accounting and business journals, as it has gradually become an important section in the reporting packages over recent years. Therefore, the ESG topic is a subject of wide interest and can be found in multiple journals in the Web of Science database.

Figure no. 4. Top 10 most relevant journals in sustainability reporting research



Source: own data processed, 2025

Table no. 7. Top 10 most cited articles

| Title | Author(s) | Year | Citations | Journal | IF |
|--|---|------|-----------|--|------|
| New challenges for corporate sustainability reporting: United Nations' 2030 Agenda for sustainable development and the sustainable development goals | Tsalis, Thomas A.; Malamateniou, Kyveli E.; Koulouriotis, Dimitrios; Nikolaou, Ioannis E. | 2020 | 315 | Corporate Social Responsibility and Environmental Management | 8.3 |
| The impact of board composition on the level of ESG disclosures in GCC countries | Arayssi, Mahmoud; Jizi, Mohammad; Tabaja, Hala Hussein | 2020 | 218 | Sustainability Accounting Management and Policy Journal | 5.2 |
| Corporate ESG reporting quantity, quality and performance: Where to now for environmental policy and practice? | Arvidsson, Susanne; Dumay, John | 2022 | 216 | Business Strategy and the Environment | 12.5 |
| Corporate involvement in Sustainable Development Goals: Exploring the territory | van der Waal, Johannes W. H.; Thijssens, Thomas | 2020 | 208 | Journal of Cleaner Production | 9.8 |
| Organizations' engagement with sustainable development goals: From cherry-picking to SDG-washing? | Heras-Saizarbitoria, Inaki; Urbieta, Laida; Boiral, Olivier | 2022 | 176 | Corporate Social Responsibility and Environmental Management | 8.3 |

| Title | Author(s) | Year | Citations | Journal | IF |
|--|--|------|-----------|---------------------------------------|------|
| Environmental awareness, firm sustainability exposure and green consumption behaviors | Rustum, Adeela; Wang, Ying; Zameer, Hashim | 2020 | 161 | Journal of Cleaner Production | 9.8 |
| Connecting the COVID-19 pandemic, environmental, social and governance (ESG) investing and calls for 'harmonisation' of sustainability reporting | Adams, Carol A. A.; Abhayawansa, Subhash | 2022 | 155 | Critical Perspectives on Accounting | 8.3 |
| Do institutional investors drive corporate transparency regarding business contribution to the sustainable development goals? | Garcia-Sanchez, Isabel-Maria; Rodriguez-Ariza, Lazaro; Aibar-Guzman, Beatriz; Aibar-Guzman, Cristina | 2020 | 154 | Business Strategy and the Environment | 12.5 |
| What do we know about business strategy and environmental research? Insights from <i>Business Strategy and the Environment</i> | Kumar, Satish; Sureka, Riya; Lim, Weng Marc; Kumar Mangla, Sachin; Goyal, Nisha | 2021 | 117 | Business Strategy and the Environment | 12.5 |
| Green logistics performance and sustainability reporting practices of the logistics sector: The moderating effect of corporate governance | Karaman, Abdullah S.; Kilic, Merve; Uyar, Ali | 2020 | 109 | Journal of Cleaner Production | 9.8 |

Source: own data processed, 2025

Another analysis conducted over the sample of academic papers from Web of Science highlights the top ten most cited articles between 2020 and 2024. As demonstrated in **Figure no. 4**, there are certain journals that are more relevant in the sustainability subject. In **Table no. 7** we can identify four out of five journals that are also in top ten most significant journals in ESG research: "Business Strategy and the Environment", "Corporate Social Responsibility and Environmental Management", "Journal of Cleaner Production" and "Sustainability Accounting Management and Policy Journal". Also, a wide concern for sustainable development goals and sustainable practices can be observed in each of the articles' titles. These articles were published in between 2020 and 2022, but they do not mention the CSRD or ESRS frameworks. The lack of sufficient research in the new European reporting requirements is also indicated by the low citations of the existing papers and the relatively small number of articles in comparison to GRI or SDGD frameworks. Furthermore, **Figure no. 5** presents the interconnections between the articles. The most emphasized paper in this map is by the author Tsalis, Thomas A., also demonstrated in **Table no. 7** as the article with the most citations. Tsalis et al. (2020) conducted an empirical analysis on a sample of 48 sustainability reports from 20 Greek companies to highlight the strategies that each undertaking from

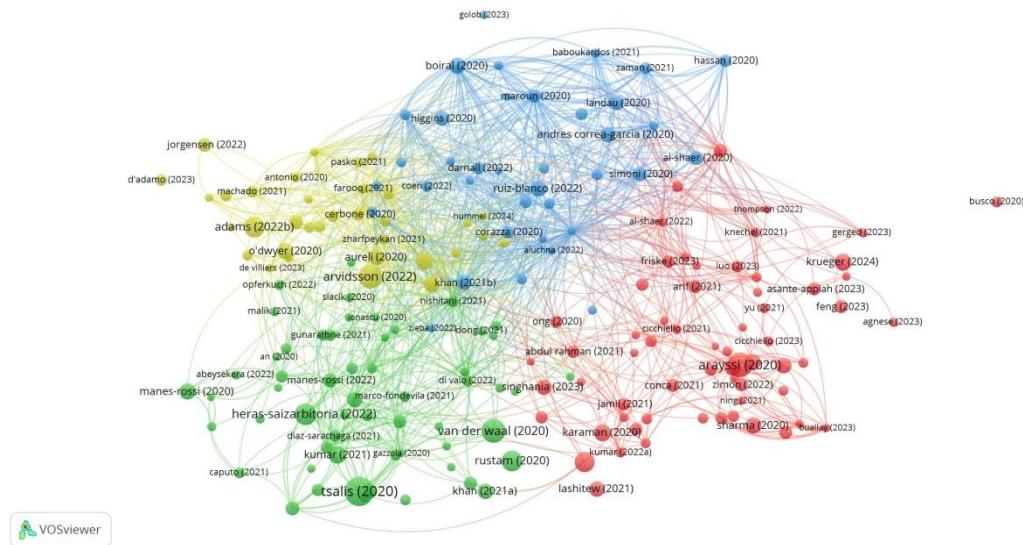
different industries tries to adapt to the United Nations' 2030 Agenda by applying the requirements of the Sustainable Development Goals (SDGs). Even if the article recalls practices in accordance with the Global Reporting Initiative (GRI), a framework that has been replaced by the ESRS nowadays, it still remains a highly relevant piece of research for understanding the evolution of sustainability reporting over the last decade. Other relevant linkages from different clusters could also be found in **Table no. 7**, such as Arayssi, Mahmoud (2020), Arvidsson, Susanne (2022), each with over 200 citations per article.

With regard to the countries that are concerned with sustainability reporting, we demonstrated in **Figure no. 6** that a wide variety of nations are conducting research on the latest ESG trends. In the first cluster, non-European countries with strong economies can be identified: The United States of America, Australia, New Zealand, Saudi Arabia, Canada and Malaysia. The second cluster is formed mainly by European countries which have more developed economies and powerful companies in industries such as energy, manufacturing, oil and gas: England, Italy, Germany, Spain, and Poland. Strong relationships between certain countries can be seen through the thicker lines connecting the dots. For example, researchers from England collaborate with

academics from Australia, Italy, the USA and even India or Pakistan. Another example is Italian and Malaysian or South African researchers who cooperate in their sustainability studies. Thus, sustainability is a worldwide concern that is rapidly increasing as all industries are switching their practices to more environmentally friendly

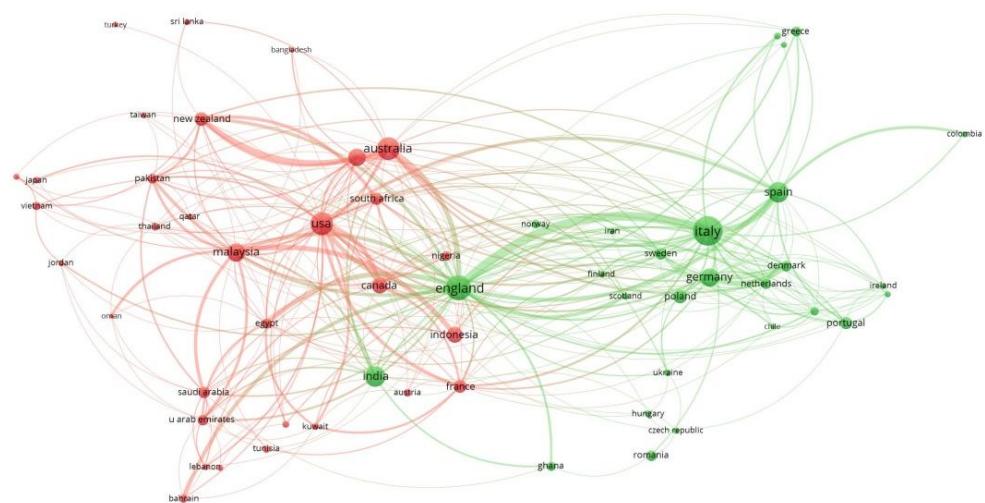
solutions in order to preserve natural resources. In **Figure no. 6** we can see that countries with strong economies are investing in more research on the ESG topic, forming relationships between each other without any nationalities or language barriers.

Figure no. 5. Bibliographic coupling of articles



Source: own data processed, 2025

Figure no. 6. Co-authorship by country



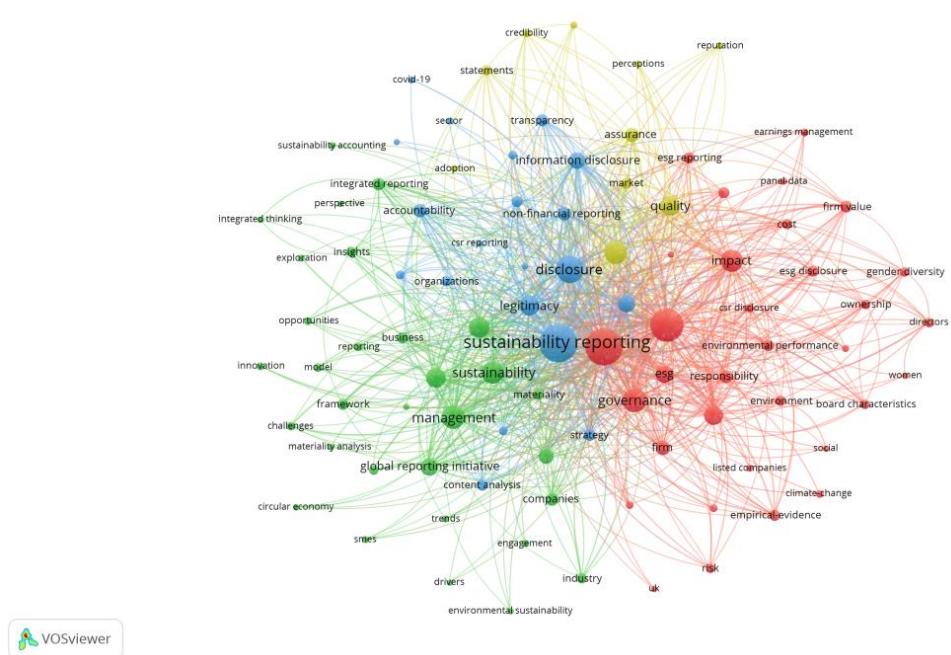
Source: own data processed, 2025

Another important part of the analysis consists of the map of the keywords that were found using the Boolean string ("Sustainability reporting" OR "ESG reporting") OR ("CSRD" AND "Corporate Sustainability Reporting Directive") OR ("ESRS" AND "European Sustainability Reporting Standards") and the thesaurus file, as mentioned in the "Research Methodology" chapter. The minimum number of occurrences of a keyword set was at 15 times. Out of 3,585 words, a number of 94 met the criteria. The threshold was set at a lower number as the sustainability topic encompasses an extensive number of

words related to various domains. For a more accurate research, the focus has been kept on the practices adopted by companies from different industries. As a result, the following words occupy the top positions: “corporate social responsibility”, “management”, “sustainability reporting”, and “determinants” (Figure no. 7).

Table no. 8 shows the keywords grouped in four clusters. Each cluster highlights a different point of view regarding sustainability reporting.

Figure no. 7. Keywords clusters related to sustainability, CSRD and ESRS



Source: own data processed, 2025

Table no. 8. Clusters of top five keywords

| Cluster 1 - RED | Cluster 2 - GREEN | Cluster 3 - BLUE | Cluster 4 - YELLOW |
|---------------------------------|-------------------------------|--------------------------|--------------------|
| Corporate social responsibility | Management | Sustainability reporting | Determinants |
| Performance | Sustainability | Disclosure | Quality |
| Governance | Stakeholder | Legitimacy | Assurance |
| Impact | Sustainable development goals | Environmental disclosure | Market |
| ESG | Global reporting initiative | Information disclosure | Statements |

Source: own data processed. 2025

Cluster 1 (red)'s most relevant word is "corporate social responsibility" with 544 occurrences, 93 links and total link strength of 3,375. Also, cluster 1 shows how corporate governance, CSR and ESG factors blend together in order to help a company develop responsible practices that lead to financial success. Cluster 2 (green) is related to the role of the management in coordinating responsible and sustainable practices, with 195 occurrences, 91 links and total link strength of 1,203. Moreover, as continuous practices of economic prosperity, the undertakings have integrated in their actions the sustainable development goals and consultations with their key stakeholders in order to identify the best sustainable practices. The third cluster (blue) focuses on some key characteristics of an ESG statement: "legitimacy", "accountability", "transparency", having as the strongest point "sustainability reporting" with 566 occurrences, 93 links and total linkage strength 2,964. The last cluster (yellow) pinpoints the idea of assurance over the sustainability statements, "quality", "assurance", "sustainability assurance", and "credibility". However, the word "determinants" has the most occurrences (92). It has 2,876 links and a total link strength of 1,496 and refers to different factors that could impact the reporting process, thus modifying the assurance opinion.

Previous research papers that include bibliometric analysis suggest as well, that there is a gap in the literature regarding reporting on environmental, social and governance aspects (Ellili, 2024). The same study mentioned earlier argues the importance of adapting to changes in reporting requirements, sustainability practices and economic growth. At the same time, Osobajo et al. (2022) state the importance of maintaining adequate relationships with companies' stakeholders in order to achieve a balance between economic prosperity, efficient environmental practices and social equity. The most relevant countries when it comes to sustainability research are represented by the Anglo-American and European areas (Teh, 2024), as it was also demonstrated in Figure no. 6 from this paper.

Conclusions

The literature review and the bibliometric analysis conducted in this research paper highlight the importance and imperative need for sustainability reporting for every major company. As undertakings are part of a circular economy, they all interact with one another, placing

environmental, social and governance topics at the center of attention for both own activities and stakeholders' decisions. The aim of this article is to emphasize the necessity of sustainability reporting as part of the management report and to also provide a clear view of the evolution of frameworks. Moreover, the focus is directed towards the implementation of ESRS through CSRD too.

Each of the three components of the acronym "ESG" plays a significant role for each undertaking, ensuring a smooth running of the business. The environmental aspect is arguably the most critical, as it relates to the potential for severe harm to natural resources. These marine, soil and air resources should always be preserved in order to benefit from them for an undefined period of time. The social aspect is related to both own employees and affected communities, which play crucial roles for companies. The more valued an employee feels, the more they benefit the firm by prosperous activities. Also, to show that safety and health of communities that are impacted by companies' activities, several policies have been implemented to preserve the nature and welfare. Nonetheless, all the policies and strategies could not be adopted and respected without efficient governance. Strong business conduct is embedded in every corporate culture and it is also spread among key stakeholders, such as suppliers or customers.

The first conclusion that can be drawn from this article is that the European Sustainability Reporting Standards are in a continuous change, hampering their users. For this reason, this year has brought up the idea of an updated set of regulations that can facilitate a smoother transition to CSRD requirements and adaptation to report on relevant ESG topics. As the current ESRS data-points are strict and at times ambiguous, the European Commission proposed an Omnibus alternative to simplify the requirements. Currently, the document is only at the proposal stage, creating even more uncertainty for companies which have already embarked in the sustainability reporting journey. Even if it was created to reduce requirements and the number of companies that fall under the CSRD reporting umbrella, the new simplification proposal has to pass several approvals from European Parliament and Council.

The second conclusion is supported by the bibliometric analysis conducted on 1,157 articles from Web of Science. The scientific maps showed an increased number of papers on sustainability reporting and ESG subject matters, but a lower interest granted for the new

regulations, CSRD or ESRS. This leads to a gap in the literature, which is also transposed in uncertainties in practice. Given the accelerated rhythm of the reporting requirements and the stakeholders' constant need of complete and transparent information, academic literature should adapt and offer more guidance for its users. Additionally, even if the collaborations between authors are strong, the number of countries in which sustainability is a crucial topic is reduced. Gradually, territories with lower economies should integrate in their practices the sustainability concept. This process is also outlined in the Sustainable Development Goals: SDG 10 - Reduced Inequalities and SDG 17 - Partnerships for the Goals. The limitations of this study are considered to be the refining methods used and the utilization of only one database source, Web of Science. Even if the WoS is the most complex and utilized database among the

researchers, it may not comprise all articles written on the selected topic. Besides this, the filters applied narrowed down even more the analysis, especially the timeframe chosen or the document type. The selected period might miss the latest research findings on ESRS requirements or other relevant opinions from stakeholders about the sustainability statement's content.

Future possible research directions for this study consist of extending the analysis on another database, such as Scopus, and combining the results. This method could ensure a more accurate conclusion over the reporting practices and overview of the companies. Moreover, the Boolean string can be improved by adding keywords related to assurance, which starting from this year, is a mandatory service for several undertakings. Relevant words include phrases such as "sustainability assurance", "sustainability audit", "limited assurance" or "ISAE 3000".

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