Journal of Information Systems Engineering and Management
2025, 10(3)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Mapping ESG Disclosure Regulations Globally: A Bibliometric Review

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ARTICLE INFO

Received: 24 Nov 2024
Revised: 26 Dec 2024
Accepted: 14 Jan 2025

ABSTRACT

Sustainability reporting is gaining global attention as stakeholders demand transparent non- financial disclosures for informed decision-making. This paper aims to provide insight into the adoption and development of regulations and reporting requirements for Environmental, Social, and Governance (ESG) disclosures like GRI, SASB, VRF, ISSB, CDSB, ESRS, and BRSR reporting across different nations and regions. This bibliometric study examines scientific contributions in the field of ESG reporting using Biblioshiny R studio. A total of 196 relevant documents were carefully selected from the Scopus database after applying multiple filtering criteria. This study presents an overview of the evolution of ESG disclosure regulations and related literature, highlighting key authors, countries, topics, and institutions. It also examines the connections between various research components, providing valuable insights for future studies to build upon this area.

Keywords: ESG, sustainability reporting, non-financial disclosures, ESG cross country, ESG regulatory reforms.

1. Introduction

In recent decades, the concept of ESG (Environmental Social Governance) has changed. All the stakeholders, i.e., investors, shareholders, consumers, and regulatory organizations, are concerned about the firm's sustainability and social responsibility- related issues. Furthermore, stakeholders also actively demand firms to become more conscious of the environmental and social consequences stemming from their operational activities. So that shareholders can judge business health by considering performance comprehensively, not just limited to financial metrics. As concern about ESG rises globally, security regulators increasingly establish guidelines and standards for environmental, social, and governance issues. And they are also working on setting certain norms for ESG ratings and scores so businesses can be more transparent in communicating their sustainability reporting. Even though the progression of ESG might seem superficial, but it truly is a crucial reform in creating a socially conscious business environment and for the structural advancement of the economy. (Hassani & Bahini, 2022). The implementation of global standards, such as ISO 26000, organizations like the Global Reporting Initiative (GRI) and the International Integrated Reporting Council (IIRC), offers enhanced insight and direction for corporate managers to develop the firms' non-financial information (NFI) disclosures (Arif et al.,2022).
Currently various sustainability guidance bodies and newly established standard setting organizations are delineating the demarcation between edges of voluntary and mandatory disclosure in this domain (Truant et al., 2017). Regulators are creating taxonomies that allow businesses to classify their operations as "sustainable" and ranking funds according on how well they incorporate ESG (Edmans, 2023). There are several excellent frameworks existing for sustainability reporting, which offer businesses a way to recognize, evaluate, and document sustainability-related issues that affect their day-to- day operations. Some of the renowned frameworks are: Global Reporting Initiatives (GRI), Sustainability Accounting Standards Board (SASB), International Integrated Reporting Council (IIRC), IFRS Sustainability Disclosure Standards, Carbon Disclosure Standards Board (CDSB), European Sustainability Reporting Standards (ESRS), and Business Responsibility and Sustainability Reporting (BRSR).

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Different sustainability reporting frameworks

Global Reporting Initiative (GRI) was initially launched in Boston USA facilitated by the partnership between CERES and Tellus, With the active involvement of the UN's Environment Programme in 1997. The most prominent current reporting guidelines are the GRI guidelines (Morhardt et al., 2002). GRI is an autonomous global standards- setting organization aiding businesses, governments, and diverse organizations in understanding and conveying their influence on issues like individual rights, fraudulent activities, climate crisis, and other ESG concerns (Luo & Tang, 2023). The GRI Standards have three distinct sets of standards: the GRI Universal Standards, the GRI Sector Standards, and the GRI Topic Standards, forming a modular system (GRI, 2023). The GRI framework stands out as the most widely employed framework worldwide, having garnered reports from over 10,000 organizations across more than a hundred countries (KPMG,2022).

The Accounting Standards Board (SASB) was created to offer industry-specific guidance on sustainability reporting to the 79 recognized industries within the Security Exchange Commission (SEC) registrant community (Rupley et al., 2017). On the other side, the formation of the International Integrated Reporting Council (IIRC) in 2010 has led to rapid development in the field of integrated reporting. But with passing time the landscape of corporate sustainability disclosure has become extraordinarily intricate and challenging to navigate. Along with this, many international businesses and financiers started demanding a clearer and simpler corporate sustainability disclosure framework. So, in response to this, the Sustainability Accounting Standards Board (SASB) and International Integrated Reporting Council (IIRC) announced their plans to merge and establish the Value Reporting Foundation (VRF), a formal entity that came into existence in June 2021 (SASB, 2023). The merger of these two entities showed a significant growth towards simplification of the landscape. The Value Reporting Foundation provides a complete set of tools, such as Integrated Thinking Principles, Integrated Reporting Framework and SASB Standards strategically developed to assist investors and firms to gain a coherent insight of enterprise value. After a few months of formation of the Value Reporting Foundation in November 2021 to satisfy investors' information needs, the IFRS Foundation declared its intention to create and set up the International Sustainability Standards Board (ISSB) and establish an all-encompassing global baseline of preeminent sustainability disclosure standards. Along with this, the IFRS Foundation disclosed its intention to merge with VRF and the Carbon Disclosure Standards Board (CDSB), and as a result, on 1st August 2022, VRF officially merged into the IFRS Foundation (SASB, 2023).

European Sustainability Reporting Standards (ESRS) is the latest among all sustainability reporting frameworks. The ESRS was developed by the EFRAG Project Task Force on European Sustainability Reporting Standards (EFRAG PTF-ESRS), and the first set of ESRS was adopted as a delegate act by the European Commission on July 31, 2023 (EFRAG, 2023). The ESRS applies to every company that falls under the Corporate Sustainability Reporting Directive (CSRD) of the European Union. The reporting requirements will be gradually implemented for various kinds of companies. For reports released in 2025, the first businesses must implement the standards in the financial year 2024. Listed SMEs will be required to start reporting in 2026, with an additional option to opt out voluntarily until 2028 (EFRAG,2023).

Business Responsibility and Sustainability Reporting (BRSR) is given by the Security Exchange Board of India (SEBI) as a component of its endeavors to foster sustainability reporting among listed companies in India. BRSR is a potent regulatory adherence and communication tool for a company's non-financial disclosures. And it's a crucial step in mandatory ESG reporting in India (PWC, July 2021). BRSR is not India's first step towards sustainability reporting. This BRSR framework originates from National Voluntary Guidelines (NVGs) on Corporate Social Responsibility which were initially introduced by the Ministry of Corporate Affairs in 2009. Since then, there has been a significant evolution in business responsibility reporting in India. After the introduction of NVGs in 2009, SEBI obliged that the top 100 listed companies determined by market capitalization should submit a Business Responsibility Report (BRR) aligned with NVGs, along with their annual report. Then in 2015, the limit extended to the top 500 listed companies. After that, in 2019, again, the limit was extended to the top 1000 listed companies. Then, SEBI introduced BRSR in 2021 and mandated BRSR disclosure for the leading 1000 listed firms, which was determined by market capitalization from fiscal year 2023. In 2023, SEBI introduced the BRSR Core, a subset of the BRSR that consists of key performance indicators (KPIs) categorized under nine ESG criteria, further solidifying the BRSR framework.

ESG disclosure requirements vary globally, with regulatory bodies playing a key role in enforcing compliance. They promote ESG adoption by incorporating national standards into policy frameworks (Singhania et al., 2024). The framework development from different countries reveals varying trends across developed and developing countries. Developed nations, particularly in the European Union, have made notable progress in ESG adoption with well-defined policies and reporting standards. Meanwhile, developing countries are

Journal of Information Systems Engineering and Management
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steadily advancing in this area, gradually strengthening their regulatory frameworks and enhancing awareness to foster ESG integration. This evolving landscape reflects ongoing efforts to align global sustainability practices.

2. Methodology and Data

Data Selection

For bibliometric analysis, relevant data is extracted from the Scopus database, which is considered a reliable and legitimate source for bibliometric analysis (M. A. Khan, 2022a), and it is also regarded as the greatest collection of reasonable-quality academic research papers and the most thorough summary of research outputs (Ellili, 2022). For this study, I used the keywords "ESG," "Sustainability Reporting," and "ESG Disclosure" in the article, as well as the title and abstract keywords. In this step, the initial result showed 236 documents published until 2023. (A. Khan et al., 2020; M. A. Khan, 2022b; Paltrinieri et al., 2023) the articles published in 2024 aren't considered for bibliometric analysis because they still need more citations to prove their authenticity. The documents extracted were also screened multiple times, as shown in Figure 1. After screening, the data was extracted in BibTeX format and uploaded to the Biblioshiny R studio.

Methodology

This research examines the prevailing patterns and the prospective advancements in the Environmental, Social, and Governance domains. For this study applied performance analysis and scientific mapping are the two stages of the analytical approach for bibliometric analysis proposed by (Donthu et al., 2021; Jain & Tripathi, 2023) where the performance analysis analyses the contribution of the authors, nations, topics, and institutions, whereas the scientific mapping analyses the relationship between the different components of the research. The analyses that have been conducted for the study are annual trend analysis, country-wise trend analysis, recent topic trends, keyword co-occurrence, and evolution analyses. The analysis is done using the biblioshiny R studio which is a widely used software for bibliometric analysis (Yan et al., 2024).

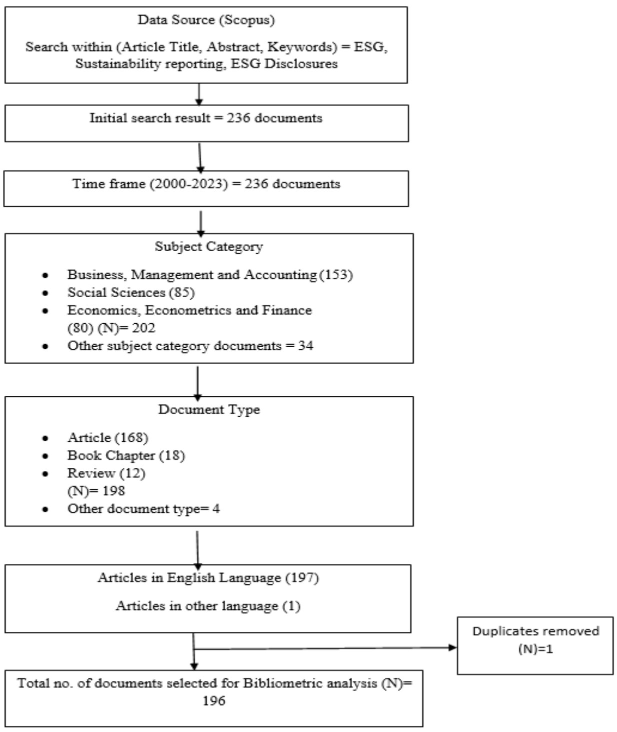

Table 1: Selected Studies on ESG, Sustainability reporting, ESG reporting

Sr.no.	Author/(Year)	Purpose	Findings

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1.	(Diwan & Amarayil Sreeraman, 2023)	Bibliometric analysis delves into the evolving trends of scholarly contributions in corporate reporting.	Sustainability is increasingly becoming a significant factor and a disruptive force that sets businesses apart in the corporate landscape.
2.	(Nieto & Papathanassiou, 2023)	Examines how the EU's banking regulations facilitate the transition to a low carbon economy through various channels.	Aligning regional taxonomy is crucial for fund mobilization, emphasizing the need to embed climate risks in prudential regulations.
3.	(Chung et al., 2023)	Investigates factors influencing ESG disclosure practices in Hong Kong, considering both voluntary and mandatory reporting frameworks.	Concentrated ownership adversely impacts ESG disclosure in voluntary regimes, larger firms, on the other hand, consistently display higher levels of SG information disclosure across both regimes.
4.	(Choy, 2023)	Analyze the GRI Standards' application level and the impact it has had on the quality of sustainability disclosures made by Hong Kong-listed companies.	Over five years, sample companies consistently applied GRI standards, with GRI-compliant firms outperforming non-compliant ones in sustainability reporting, influenced by company dynamics and government ownership.
5.	(Paridhi & Arora, 2023)	Discusses current state of sustainability reporting and identifies challenges, and cross-country evaluation.	Since 2017, there has been a thematic shift in sustainability reporting, accompanied by a significant increase in publications starting from 2018.
6.	(Nyantakyi et al., 2023)	Examines trends in sustainability reporting and ESG disclosure, investigating their impact on firm performance.	Since 2010, there's been a 50.43% annual growth rate in publications. Yet the study indicates a weak correlation among sustainability reporting and firm performance.
7.	(Rabaya & Saleh, 2022)	Examines the potential effect of embracing an Integrated Reporting (IR) framework regarding the connection among a company's ESG disclosure and its strategic advantage.	The relationship between competitive advantage and ESG disclosure is strengthened by putting in place an IR framework. ESG disclosure positively impacts firm- level competitive advantage.
8.	(Rezaee et al., 2023)	Compares the level of ESG disclosures between the US and EU.	EU firms surpass US firms in ESG disclosure, with the added impact of mandatory disclosure regulations in the EU contributing to improved ESG disclosures overall.
9.	(Kumar & Firoz, 2022)	Study investigates the kinds of firm- and industry-specific traits that encourage companies to disclose their ESG initiatives	Industry cross-border listing, and business size significantly influence how firms report on ESG factors, reflecting contemporary prioritization of sustainable ESG goals over profit maximization.
10.	(Sutikno et al., 2023)	Explore the extent of compliance among Indonesian companies with ESG standards and focuses on identifying variations in the	Categorizes companies based on industry specific ESG criteria and enabling tailored policies for each group's
		ease of reporting sustainability measures.	unique needs.
11.	(Sanseverino et al., 2024)	This study examines how investment decisions are influenced by ESG disclosures	No notable extra impact observed from reporting on ESG progress.
12.	(J. et al., 2023)	Explore the impact of GRI compliance on the connection between sustainability reporting and business value.	Sustainability disclosure demonstrates a favorable and significant correlation with business value, with the relationship influenced by GRI compliance.
13.	(Ngo et al., 2023)	Review the latest global studies on climate-related disclosures within the framework of the Taskforce on Climate-Related Financial Disclosures (TCFD).	Climate researchers require standardized global database for real firm-level climate proxies, surprising current reporting standards.

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14.	(Singhania & Saini, 2023)	Discussed ESG framework's significance in creating criteria for sustainable actions during the COVID-19 pandemic and aims to assess and compare ESG governance structures across advanced and emerging	ESG disclosures, whether voluntary or mandatory, is crucial for both advance and emerging markets, and emphasizing the importance of environmental commitment across industries in both advance and emerging markets.
15.	(An, 2023)	Review and discuss the 15-year sustainable reporting journey of City Developments Limited (CDL), which uses the GRI Standards as the foundation of its integrated reporting methodology	Sustainability reporting is essential for business to incorporate sustainability into their strategy, with GRI standards serving a valuable framework for reporting ESG performance.
16.	(Balp & Strampelli, 2022)	Limitations and challenges faced by institutional investors in effectively engaging in ESG issues in Europe.	European asset managers demonstrate superior performance in responsible investing, yet the study underscores the imperative for more reliable ESG rating and disclosure standards.
17.	(Yadav & Jain, 2023)	Examines the link between board structure characteristics and sustainability disclosures in Indian companies.	Board structure minimally affects sustainability disclosure in Indian firms whereas mandated CSR committees facilitate the promotion of sustainability initiatives.
18.	(Pratama et al., 2022)	Analyses the gaps in sustainability disclosure in Southeast Asian companies based on (IFRS) S1.	Most companies provide comprehensive disclosure on governance, strategy, and risk but the variation in quality of disclosure exist across countries and industries.
19.	(Zaid & Issa, 2023)	The paper proposes a roadmap for establishing global ESG disclosure standards based on stakeholder engagement and lessons from the IFRS foundation	A persistent and contentious debate continues regarding ESG disclosure standards.
20.	(Monteiro et al., 2023)	Investigate the factors influencing social performance disclosures in European companies.	The transparency of business is influenced by the legal framework of the nation, while social performance disclosure is improved by board diversity and personnel development, although board disputes have a negative impact on it
21.	(Sehgal et al., 2023)	Assessing how sustainability performance and reporting impact a company's status.	Sustainability reporting exhibits positive impact on a companies' reputation over the longer term, whereas the effect is not immediate in the short term.
22.	(Hoang et al., 2023)	Explore how a country's SDG progress relate to corporate involvement in ESG reporting.	Countries SDG progress positively influences firms' ESG disclosure in light industry, notably with increased CSR engagement and women on board.
23.	(Gutiérrez-Ponce, 2023)	Investigates how corporate sustainability reporting in Spanish stock index align with (SDGs) and impact performance.	companies in Spanish stock index provide verified sustainability report rich in ESG details, adhering to GRI standards. On average, they disclose 75% of information on all 17 SDG's, indicating a positive correlation b/w GRI ESG disclosure and SDG/ESG
24.	(Jílková & Kotěšovcová, 2023)	Analyses composite indicators measuring ESG aspects to keep track of conditions for sustainable growth in the EU-27.	A composite index combines several variables into a single score to provide a more thorough understanding of sustainable growth.
25.	(De Silva Lokuwaduge et al., 2022)	Analyses the risk and opportunities of ESG practices and emphasizes the responsibilities of businesses and global leaders to deliver sustainable outcomes.	The growing demand for ESG disclosure has driven an uptick in sustainability reporting, fostering transparent ESG information to facilitate meaningful stakeholder engagement.
26.	(Goswami et al., 2023)	Article compares sustainability disclosure of four companies each adhering different reporting frameworks: GRI, IR, SASB, CDP.	GRI-based reporting is the most thorough, catering to the information expectations of all stakeholders.
27.	(Salo-Lahti et al., 2023)	How AI tools like GPT-3 can help transform sustainability reporting	GPT-3 has the capability to bring a transformative change to sustainability reporting., investment disclosure, and contract drafting, enhancing comprehension of rights, obligations, and sustainability principles

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28.	(Belinky et al., 2022)	Discusses the challenges of assessing sustainability using current frameworks and highlights the potential of big data and the SDGs in reshaping the field.	BDAI shows considerable potential in bolstering sustainability assessments, although its effectiveness is contingent upon various influencing factors.
29.	(Fluharty-Jaidee & Neidermeyer, 2023)	Possible influence of AI on measuring ESG and the setting of regulations for ESG disclosures.	AI can enhance the accuracy of ESG scoring systems and forecast deficiencies in sustainability reporting practices.
30.	(Singhania & Saini, 2022)	Compare global ESG regulations, spotlighting best practices for developing countries to incorporate into their policies.	Countries with low overall scores tended to perform less in environmental and governance factor, while their social factor score were relatively high.
31.	(Mishra & Sant, 2024)	Evaluate ESG indicator adoption in India and its utilization by financial institution, assessing the extent of integration in the sector.	Environmental indicators are typically disclosed more frequently than the other dimensions, and private companies tend to excel in ESG indicator disclosure compared to their public counterparts.
32.	(Calvin & Street, 2020)	Investigate the disclosure of Global Core Indicators (CGIs) among US DOW 30 companies and its link to ESG ratings.	DOW 30 companies aligned their GCI disclosure with US capital market reporting expectations, with higher levels observed when addressing financially relevant ESG issues.
33.	(Lai et al., 2016)	Explore whether organization adopt Integrated Reporting (IR) in reaction to legitimacy threat.	IR adoption is neither a reaction to deficient sustainability reporting nor a strategy for legitimization.
34.	(Vyas & Oza, 2022)	Discusses the representation of gender in sustainability communication of Indian companies.	Women in sustainability communication encounter gender stereotypes and paradoxes, but their representation can be enhanced through equality and inclusion.
35.	(Camilleri, 2019)	Explores the theoretical foundations shaping the emergence of integrated reporting.	Integrated Reporting provides a complete outlook of a company's holistic business performance, considering various value creating capitals in their reports.
36.	(Camilleri, 2015)	Explores the EU's recent ESG disclosure regulations, focusing on member states' adoption of thoughtful and substantial measures based on EU commission directives	The EU Commission's ESG reporting directive is being adopted by EU member states, yet there is no explicit mandate for non-financial indicators in annual reports.
37.	(Camilleri, 2017)	Provide an evaluative analysis of fundamental theoretical foundations and IIRC's Framework for integrated reporting of financial, social and sustainability capitals	The evolution of <IR> can benefit from establishing connections with stakeholders, recognizing knowledge gaps in organizations' integrated reporting of capitals.
38.	(Davies et al., 2020)	Explore the evolving landscape of ESG reporting regulation, forecasting substantial changes in the year ahead.	To reduce the current disarray and ambiguity in reporting, a global ESG reporting standard must be established.
39.	(Bose, 2020)	Discusses the evolution of sustainability accounting frameworks in reaction to investors demand for non-financial data from firms.	ESG reporting frameworks offer standardized information for investors, yet those seeking alpha must extend their analysis beyond standardized data.
40.	(De Silva Lokuwaduge & De Silva, 2022)	Discusses the need for transparent measurement and disclosure of ESG risk to prevent greenwashing.	There is a need for global framework and integrated reporting to prevent greenwashing.
41.	(Cort & Esty, 2020)	Discusses the state of ESG standards and challenges & pathways forward for ESG standards.	Standardization and harmonization of ESG standards is needed.
42.	(Al Hawaj & Buallay, 2022)	Investigates impact if sustainability reporting on companies' performance across diverse global sector.	Sustainability reporting positively influence overall firm performance, with varying sector-specific impacts.
43.	(Camilleri, 2016)	Explores EU's strategic, guidelines and principles guiding CSR reporting.	Regular stakeholder engagement and strategic communications can promote responsible organizational behavior, while the involvement of proactive European governments is vital in addressing environmental, societal, governance and

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44.	(Camilleri, 2018)	Examines the theoretical foundations and objective of Integrated Reporting, encompassing the incorporation of capitals other than financial ones in corporate disclosures	Integrated Reporting enhances corporate legitimacy and stakeholder communication, signaling a novel dimension in corporate responsibility and sustainable practices.
45.	(Oncioiu et al., 2020)	Highlight how ESG plays an integral task in financial transparency by serving as a mean of communication with stakeholders and achieving transparency in a firm's financial performance	ESG reporting is important for financial transparency, as ESG disclosures serve as a conduit for conveying financial information.
46.	(Siri & Zhu, 2019)	Discusses the challenges and weakness in integrating sustainability risk as well as elements within the EU investor	EU reform proposals may oversimplify the complexity of the issue at hand, requiring careful considerations of their real-world consequences on financial
47.	(Conca et al., 2021)	Analyze how listed European agri-food companies' financial performance and	Enhanced transparency and accountability seem to boost profitability of business.
48.	(Mgbame et al., 2020)	How well the ESG framework promotes sustainability.	Study advocates for an integrated system merging measurable ESG disclosures with financial reporting by leveraging the of ESG indices.
49.	(Strauss & Saad, 2020)	Outlines new legal frameworks in the US and Europe aiming for comprehensive ESG reporting and investor protection from misleading sustainability disclosures.	Regulators, courts, and financial markets minimize the gap between corporate statements and actionable step should be taken for implementation which results in trustworthiness of corporate ESG statements
50.	(Grewal et al., 2019)	Investigates how the stock market reacts to incidents tied to the European Union's directive mandating increased nonfinancial disclosure.	Adverse market response heightens the probability of regulatory passage for approved measures, while firms with superior nonfinancial performance receives positive market reaction.
51.	(Murphy & McGrath, 2013)	Enhance our comprehension of the reason behind corporate ESG reporting.	Class action civil suits pressure corporations to improve ESG behavior, leading them to produce ESG reports to avoid legal action.

3. Data analysis and results

Broadly, the investigation reveals that from a limited emphasis on environmental effect to a more comprehensive strategy which considers the social and governance concerns, this change indicates sustainability reporting evolved over time (Paridhi & Arora, 2023). These days, the concept of ESG is prevalent, and numerous researchers and academicians are expounding upon the concept in various ways (Steblianskaia et al., 2023). This bibliometric analysis shed light on trends in annual scientific production, country wise trend analysis, most cited countries and analyses the trends in topic and cooccurrence network of author's keywords.

Year wise Trend Analysis

The trend in the no. of publications each year reflects the growth of the research field. Fig.2 depicts the distribution of ESG-related publications over time. This study covers the period from 2013 to 2023. However, the trend shows a very rapid growth in publication after 2018 to present. As the figure.2 shows that the no. of publication from 2013 to 2018 lies between 1 to 4 or 6 documents only, but after that, it grew from 13 publications (in 2019) to 65 publications (in 2023), showing increased interest and awareness among researchers and policymakers for this domain.

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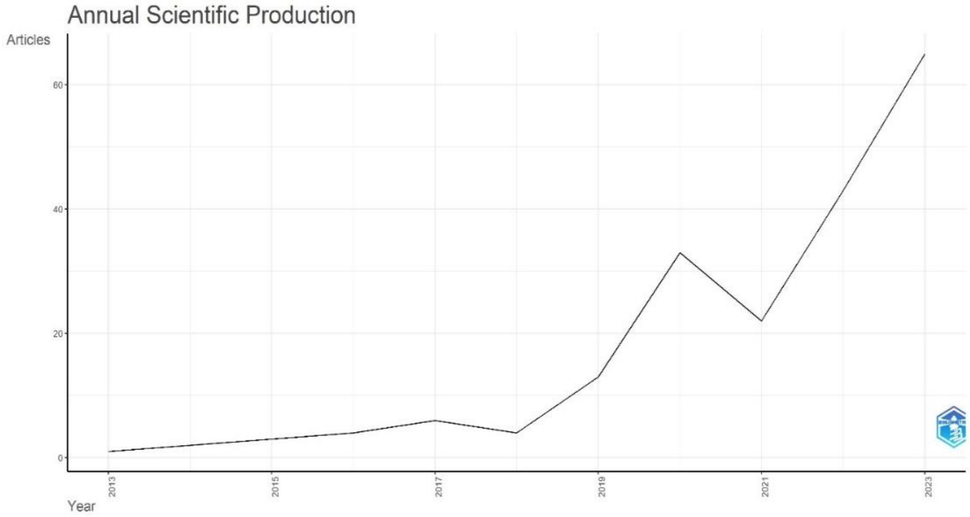
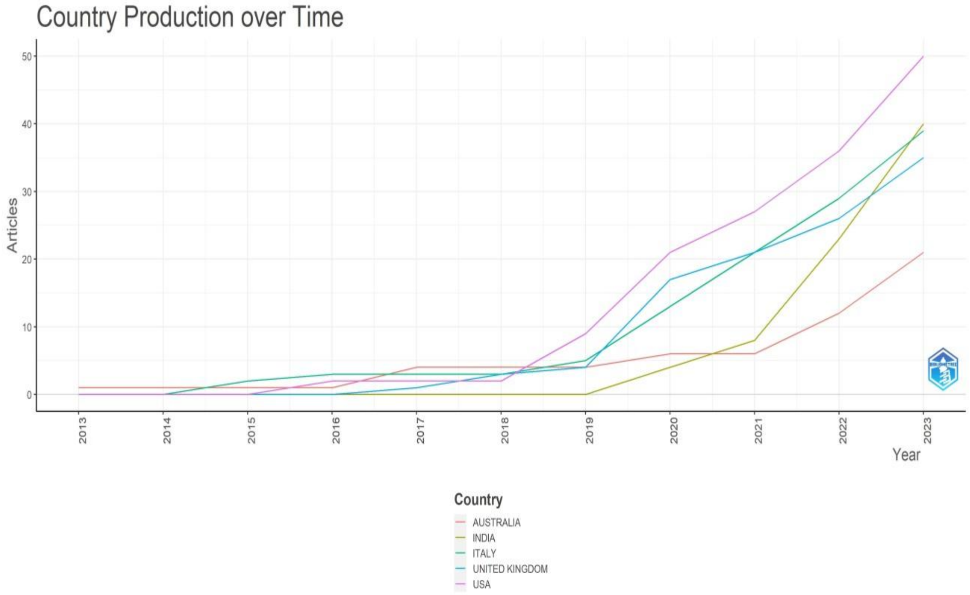


Fig.2: Graphical representation of annual scientific production Country wise Trend analysis

In this section, we analyzed two parameters. First is the country's publishing over time (Figure 3) and which countries are most cited by the researchers (Table 2). So, figure.3. shows in 2013, the first paper published in this domain was by Australia, and following this, Italy and the USA entered the field in 2016. The rest of the countries, like the UK and India, started showing their increased interest in the area after 2019, but after 2019, each country is growing in this field rapidly. If we talk about the citation trends of the countries, the top 10 most cited countries are shown in Table 2. The U.K., USA, and Italy are on top. The table also depicts the growth of sustainability reporting among the listed countries and the increased interest of the researchers in the domain.



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Country	TC	Average Article Citations
UNITED KINGDOM	582	41.60
USA	432	22.70
ITALY	419	27.90
SPAIN	322	40.20
LEBANON	280	93.30
AUSTRALIA	268	33.50
MALTA	236	47.20
CANADA	230	25.60
INDIA	169	8.40
GERMANY	137	17.10

Fig.3: Graphical representation of country Scientific production over time Table 2: Most cited countries

Recent Trend Topics

The figure.4. and figure.5. clearly shows the increased trend of researchers choosing sustainable development and sustainability topics. As regulatory organizations worldwide have started setting and evolving standards for sustainable development, it will attract many more future researchers to the domain. The word cloud in Figure 5 comprises the authors' keywords, which presents the authors' preference to keep these words as key for their research.

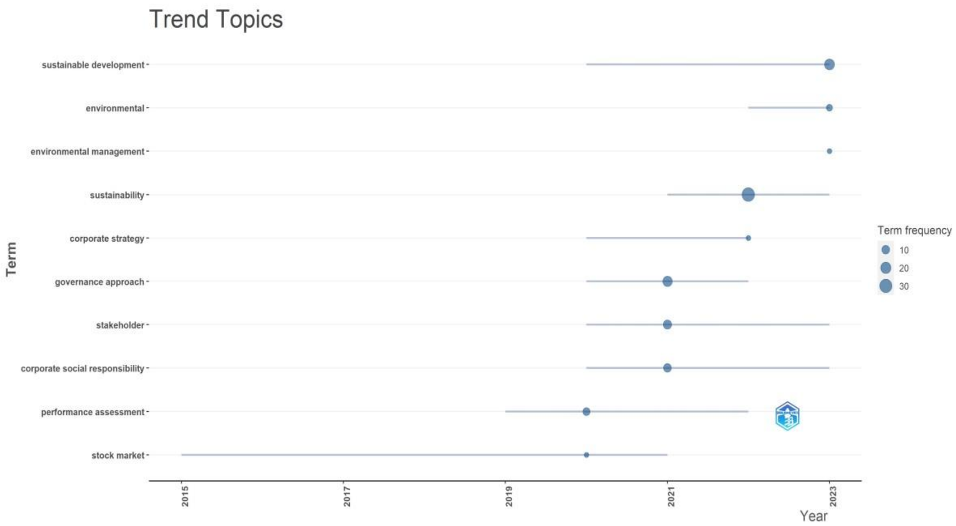

Fig.4: Recent trend topics

Fig.5: Word Cloud

Keywords Co-occurrence

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A keywords co-occurrence analysis was conducted to outline the evolution and expansion of ESG research. The review's central theme is strongly tied to the keywords' co- occurrence in the chosen research articles. There are three clusters in the given co- occurrence network: Cluster 1 is a red cluster including sustainability reporting, ESG disclosure, CSR disclosure, and ESG score; Cluster 2 is a blue cluster including ESG and sustainability, corporate social responsibility, climate change, and stakeholders' engagement, then there is cluster 3 which is green cluster including environmental, governance, social governance, firm value, and corporate sustainability. So, this figure.6. demonstrate the popularity of emerging themes in the field, and this co-occurrence network also shows a strong interlinkage of these themes.

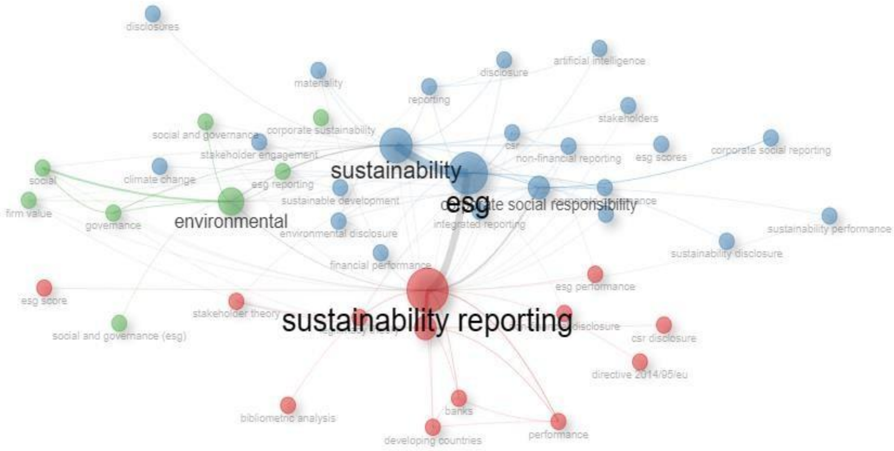

Fig.6*: *Co-occurrence network

We quested to delve into the recurring trends and motifs within the realm of ESG disclosures and sustainability reports, thereby enhancing our comprehension of the contemporary panorama surrounding these matters. The common theme found in all the examined articles emphasizes the growing importance of sustainability reporting, emphasizing the critical functions of frameworks and standards, the necessity of international standardization, and the revolutionary potential of technology in supporting ESG assessment and reporting procedures. There is a call for a global ESG reporting standard to reduce ambiguity and prevent greenwashing (Davies et al., 2020). Because the lack of standardized regulations for ESG reporting could hinder the ability to effectively measure and track corporate ESG performance, which is crucial for creating corporate value and assessing overall performance (Frecautan & Nita (Danila), 2022). And current mandatory corporate disclosure lacks comprehensive coverage of ESG risks and opportunities. Additionally, the timing disparity between ESG information and financial statements hampers their seamless integration (Oliver Yébenes, 2024). Which clearly shows that ESG metrics and standardized regulations for ESG reporting require ongoing refinement and enhancement. Moreover, ESG reporting frameworks are evolving with a move towards consolidation. Private rating and score providers like MSCI, Refinitiv, S&P Global, and Sustainalytics are in competition to provide standardized and insightful measures of ESG performance (Pérez et al., 2022).
We also observed the trend of how mandatory ESG regulations evoke diverse responses in developing and developed nations, underscoring the differences in disclosure requirements. While disclosure regulations are well-established in developed markets, developing markets are still in the early stages of regulation development.

4. Conclusion and scope for future research

This study conducts a comprehensive analysis of ESG disclosure papers indexed in Scopus to evaluate their contributions to existing ESG literature. It aims to identify key themes, concepts, and ideas that have shaped this research domain. Additionally, the study offers insights and recommendations to guide future research efforts in the field of ESG disclosures. As the dimensions of ESG reporting are changing progressively, it becomes essential to know the key factors that affect the domain and contribute to its development. So, this bibliometric review attempts to analyze the development and adoption of ESG regulations across different nations and how and why these frameworks evolved over time. The bibliometric analysis conducted on articles spanning the period from 2013 to 2023 reveals a progression delineated into three distinct phases: an inception phase, spanning from 2013 to 2017 marked by initial groundwork; a subsequent phase of accelerated growth between 2018 and 2020; and transitioning into a next phase of development commencing in 2021 and extending thereafter. This proliferation in articles related to the ESG and ESG disclosure in recent years indicates a clear upward trend in the field's popularity and relevance. We thoroughly studied the most prominent frameworks like GRI, SASB, IIRC, IFRS Sustainability Disclosure Standards, CDSB, ESRS, and BRSR. And we can observe that the legal, social, and environmental framework of a nation not only changes the corporate practices and beliefs directly (Ortas et al., 2015; Baldini et al., 2018; Singhania & Saini, 2023) but also influences investors to adopt the ESG criteria in their investment strategies to stimulate ESG adoption process by the firms (Dyck et al., 2019). Based on sets of data that were obtained from bibliometric analysis (Diwan & Amarayil Sreeraman, 2023) it has been observed that in recent years, there has been a noticeable upswing in the attention and focus dedicated by researchers and scholars in the sustainability reporting domain. After extensive review, several recurring themes and patterns have emerged from the articles. The regulatory initiatives, such as directives and standards for reporting, have a substantial impact on shaping ESG disclosure practice, with notable impacts observed in various regions including the European Union. However, we can also observe that developed nations like the UK, USA, and Italy have led in advancing standards within the ESG. These countries exhibit an advanced understanding of ESG principles and top the charts regarding prolific paper publications and citations in this field. One plausible explanation for the same could be that these developed countries were the ones that first introduced several obligatory and optional ESG-related laws and policies (Singh et al., 2023).

Further, the study contributes by identifying the word cloud, topic trends, and cooccurrence network which represents the current state of the domain (i.e., sustainability, sustainable development, and governance approach are the most relevant themes in the present scenario) and suggests a plausible roadmap for the future. Among the author's keywords, co-occurrence network ESG, sustainability reporting, sustainability, and environmental represent the primary nodes, each node encapsulating distinct yet interconnected dimensions of responsible business practices.

One another trend we can observe is that European firms lead in ESG disclosure, global harmonization of standards is deemed essential to prevent greenwashing and enhance transparency. Overall, there is growing recognition of the importance of ESG transparency for financial markets, corporate legitimacy, and sustainable business practices. While progress has been made in ESG reporting, challenges such as standardization, data gaps, and greenwashing persist, highlighting the need for further reforms and improvements in reporting frameworks. Even though an increasing number of countries are prioritizing disclosures, it is still insufficient to address the ESG-related issues comprehensively, so it is essential to introduce and gradually standardize the ESG principles worldwide. This global adoption would promote transparency, accountability, and responsible business practices. Most regulatory organizations mandated sustainability reporting to big firms only. Many articles have addressed the influence of sustainability reporting on these firms, but the literature about the effect of sustainability reporting on smaller firms is limited. So, researchers and academicians can also look forward to this domain.

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2025, 10(3)
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