



Mapping the Global Research on Environmental, Social, Governance (ESG): A Bibliometric Analysis

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Abstract

In the contemporary business landscape, firm evaluation increasingly extends beyond traditional financial indicators to encompass environmental sustainability, social responsibility, and governance practices. Environmental, Social, and Governance (ESG) factors have emerged as fundamental drivers of corporate values and sustainable financial performance, introduced through the UN Global Compact initiative's Who Cares Wins report, and are now considered central to global corporate strategies, shaping accountability, transparency, and ethical business conduct. This study conducts a comprehensive bibliometric analysis to map the global ESG research landscape, examining the current state of knowledge, key trends, and future directions. Data were extracted from the Scopus database, comprising 3,177 articles published between 2008 and 2026, and analyzed using VOSviewer and Biblioshiny (R). The performance analysis evaluated annual scientific production, leading sources, authors, affiliations, countries, and most cited documents, while science mapping examined keyword occurrence, word clouds, co-authorship networks, thematic mapping, and thematic evolution. Results indicate that annual scientific production peaked in 2025 with 1,305 publications, with Sustainability emerging as the most influential journal. China (1,629 publications) and the USA (605 publications) led in productivity, while China (15,062 citations) and the USA (10,035 citations) dominated in citation impact. Keyword analysis identified "ESG," "Sustainability," and "Responsible Investment" as the most prominent themes. Overall, this study provides a structured overview of global ESG research, identifies influential contributors and sources, and highlights emerging thematic areas, offering a roadmap for scholars, practitioners, and policymakers aiming to advance ESG-focused research and implementation worldwide.

Introduction

Over the past decade, environmental, social, and governance (ESG) considerations have become a central pillar of contemporary business research, reflecting a shift in how corporate performance and value creation are conceptualized. Firm valuation and stakeholder decision-making increasingly extend beyond traditional financial metrics to incorporate sustainability-related dimensions (Arsenos, 2024; Fülbier & Sellhorn, 2023; Skordoulis



et al., 2022). As societies confront escalating challenges, businesses face growing scrutiny regarding their responsibilities in addressing climate change, socioeconomic inequality, and ethical governance practices (Kateb & Alahdal, 2024; Mishra et al., 2025a). Within this context, ESG has evolved into an integrated framework that captures firms' accountability toward a broad range of stakeholders, positioning sustainability performance as a strategic driver of long-term competitiveness rather than a peripheral concern (Kateb & Alahdal, 2024; Mishra et al., 2025a). Consequently, ESG-oriented research has expanded rapidly, underscoring its relevance for corporate transparency, investment evaluation, and societal impact.

Conceptually, ESG comprises three interrelated pillars. The environmental dimension assesses a firm's ecological impact and sustainability initiatives, including resource efficiency, energy use, and emissions management (Economidou et al., 2023). The social dimension focuses on stakeholder relationships, emphasizing employee well-being, diversity, equity, human rights, and fair labor practices (Mishra et al., 2025b). The governance dimension addresses internal control systems, board composition, risk management, transparency, and ethical decision-making structures (Economidou et al., 2023; Mishra et al., 2025b). Collectively, ESG encompasses a wide spectrum of corporate issues, including governance integrity such as board independence, anti-corruption measures, disclosure practices, and investor protection; environmental practices related to climate change, water and energy consumption, and carbon emissions; and social responsibilities such as fair trade, gender equality, product safety, and societal well-being (Galbreath, 2013). In the modern business landscape, firms are therefore evaluated not only on financial outcomes but also on their environmental stewardship, social commitment, and governance quality (Atif & Ali, 2021). The primary objective of ESG integration is to enhance firm performance while improving portfolio outcomes for investors and generating mutual benefits for stakeholders (De Spiegeleer et al., 2023). Emphasizing sustainability-oriented corporate practices contributes positively to societal development and organizational resilience, reinforcing the link between financial robustness, sustainable growth, and ESG principles (Janah & Sassi, 2021; Pathan & Mohanty, 2025; Senadheera et al., 2022). As a result, ESG factors have emerged as key determinants of corporate value in contemporary markets (Rahman, 2021).

The Sustainable Development Goals (SDGs) formulated by the United Nations are grounded in three interconnected dimensions—environmental, social, and economic—and are intended to be achieved by all countries through coordinated global efforts by 2030 (Hieu & Hai, 2023). The adoption of environmental, social, and governance (ESG) principles aligns closely with this agenda and generates multidimensional benefits for firms, investors, and society. ESG-oriented practices support long-term financial growth, enhance risk identification and management, strengthen consumer trust and loyalty, and ultimately contribute to sustainable national economic development (Kampoowale et al., 2025). The SDGs were designed to address pressing global challenges, including poverty, climate change, environmental degradation, inequality, peace, and justice, all of which are reflected within ESG indicators. Consequently, ESG has evolved into a fundamental benchmark for evaluating the overall performance of both firms and nations, playing a critical role in advancing sustainability initiatives and attracting increasing attention from scholars, practitioners, and policymakers (Sahu & Mishra, 2024).

Existing bibliometric evidence demonstrates a sustained and accelerating growth in ESG-related research over time. Kansal and Malhotra (2024), analyzing 701 articles published across 221 Scopus-indexed journals between 2008 and 2022, observe limited growth prior to 2015, followed by an exponential increase driven by heightened interest in socially responsible investment, institutional investors, corporate social responsibility, corporate governance, sustainability, and, after 2020, COVID-19-related themes. Similarly, Senadheera et al. (2022), based on 981 ESG-related articles published between 2001 and 2021, report rapid expansion during the 2010s, with research leadership concentrated in the United States, Canada, and Europe, and more recent contributions emerging from the Asia-Pacific region. Research linking ESG to firm performance has gained particular prominence. Park and Jang (2021), examining 262 articles published between 2013 and 2022, and Marzuki et al. (2023) identify ESG–financial performance as a central research theme, while noting mixed and sometimes contradictory empirical findings that warrant further synthesis. Pathan and Mohanty (2025) further confirm a sharp surge in ESG–financial performance studies during 2020–2022, alongside expanding international collaboration networks. Cai et al. (2024), analyzing 478 Scopus-indexed articles, emphasize the value of keyword co-occurrence and thematic development analyses for identifying emerging research directions in ESG scholarship.

Against this backdrop, the present study aims to conduct a comprehensive bibliometric analysis of the academic literature on ESG. Specifically, it examines publication trends and growth patterns; identifies the most influential authors, journals, institutions, and countries; maps key thematic clusters and intellectual structures; and explores collaboration and knowledge networks within ESG research. Furthermore, the study seeks to identify existing research gaps and emerging themes to inform future research directions. Accordingly, this study addresses the following research questions: (RQ1) What are the publication trends, growth patterns, and overall statistical profile of ESG literature? (RQ2) Which journals, authors, countries, affiliations, collaborations, and institutions have made significant contributions in terms of productivity and citation impact? (RQ3) What are the dominant keywords, themes, and evolving research topics in ESG research? (RQ4) What intellectual and conceptual structures emerge from co-citation, bibliographic coupling, and thematic clustering analyses? (RQ5) What patterns of scholarly collaboration exist across authors and countries, and what research gaps and future directions can be identified?

Methodology and Data

This study employed bibliometric analysis to address the research questions outlined earlier. Bibliometric analysis is a quantitative and systematic research approach that applies statistical techniques and network analysis to large-scale bibliographic data in order to examine the evolution, structure, and dynamics of a scientific field (Basnet et al., 2024; Joshi, 2016). It enables the identification of publication trends, influential authors and journals, thematic developments, and collaboration patterns within a body of literature (S. Gao et al., 2021; Sahu & Mishra, 2024). The bibliographic data were extracted from the Scopus database, which is widely recognized for its extensive coverage and reliability in academic research (Joshi, 2016). Scopus was selected because it is one of the most frequently used databases in bibliometric studies and offers broad multidisciplinary coverage, indexing over 100 million documents supported by approximately 2.4 billion cited references (Basnet et al., 2024; Joshi, 2016; Sahu & Mishra, 2024).

The article selection process followed a structured three-phase procedure; identification, screening, and selection; based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. In the identification phase, 26,708 records were retrieved using the keywords “ESG,” “Environmental,” “Social,” and “Governance.” From these, 8,670 non-article documents were excluded. During screening, 12,690 articles outside the relevant subject areas were removed, leaving 5,348 records. After excluding 890 non-English publications, 4,458 articles were assessed for eligibility, of which 1,281 were excluded following title and abstract review. Ultimately, 3,177 articles were selected and formed the final dataset for analysis. These data were analyzed using Biblioshiny (R) and VOSviewer. Biblioshiny was used to conduct descriptive and performance-based analyses, while VOSviewer facilitated the visualization of bibliometric networks such as co-authorship, co-citation, and keyword co-occurrence. The analysis is further structured into two components: performance analysis and science mapping. Performance analysis assesses the productivity and citation impact of key research actors, whereas science mapping reveals the intellectual, conceptual, and social structures of ESG research through network visualization, enabling a deeper understanding of knowledge development and emerging research directions (Basnet et al., 2024).

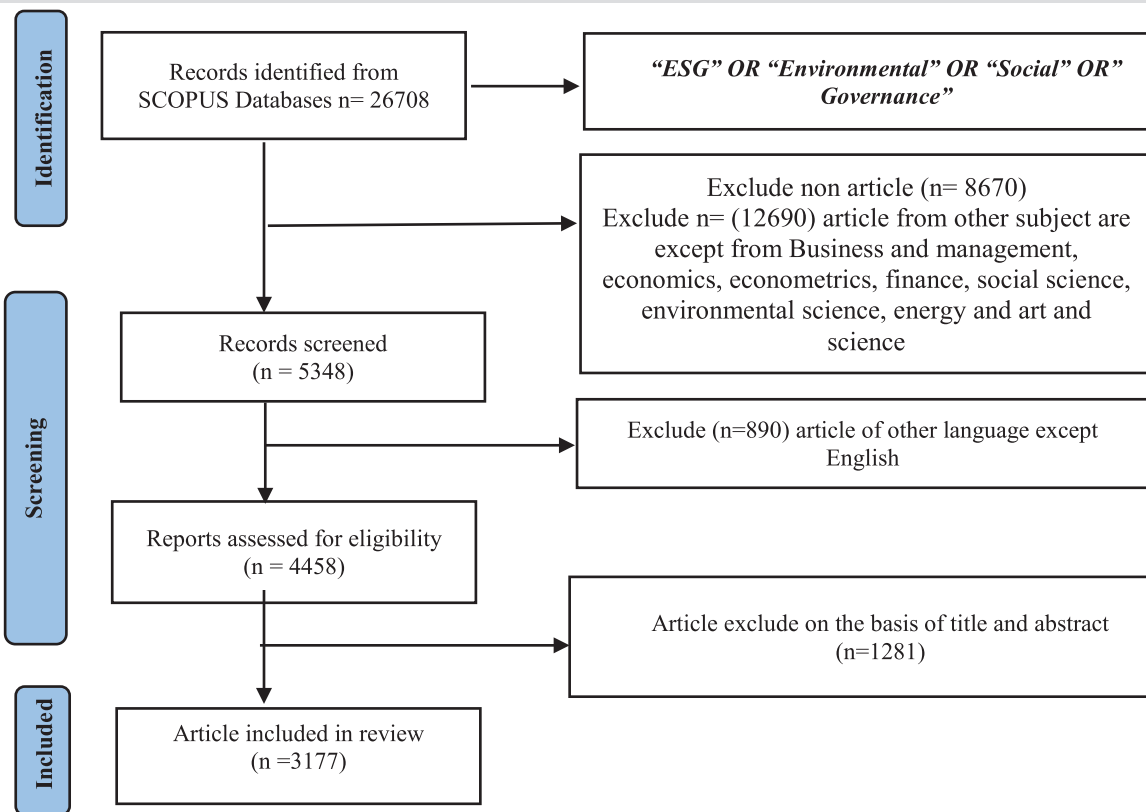


Figure 1: PRISMA flowchart of document selection
 Source: PRISMA chart representing Scopus document collection

Results and Analysis

Performance Analysis

Performance analysis investigates the contributions of research constituents to a specific field (Basnet et al., 2024; Cobo & Herrera, 2011). It mainly depends on the quantitative measures such as number of publications, number of citation count, the most productive authors, the most influential journals, and the most powerful countries and all these indicator helps to assess growth and influence of research domain and identify key contributor to knowledge development (Tiberius et al., 2020). In the context of ESG research, performance analysis provides insight into publication trends over the period of time and highlight the most impactful sources and contributor that shaped the field.

Main information of Data

The descriptive statistics of the selected dataset are presented in Table 1. The final sample comprises 3,177 journal articles published between 2008 and 2026 across 795 distinct sources, reflecting the breadth and maturity of ESG-related scholarship. The literature demonstrates rapid expansion, with an annual growth rate of 20.09%, indicating a sustained and accelerating research interest in ESG themes. The average age of the documents is 1.25 years, suggesting that the dataset is largely composed of recent publications and highlighting the contemporary relevance and evolving nature of ESG research. In terms of scholarly impact, the articles exhibit a strong citation profile, with an average of 21.56 citations per document and a total of 17,871 cited references, underscoring the academic influence and integration of ESG studies within the broader literature. Authorship analysis reveals that 6,762 authors have contributed to this body of research, with 381 single-authored articles produced by 381 authors, indicating that collaborative research predominates in this field. This is further supported by an average of 3.03 authors per document and an international co-authorship rate of 29.9%, reflecting a high level of cross-border scholarly collaboration. Additionally, the dataset includes 3,135 Keywords Plus and 6,335 author-provided

keywords, signifying substantial thematic diversity and a wide range of research foci within ESG scholarship. Moreover, all analyzed documents are classified as journal articles, confirming peer-reviewed journals as the primary and most influential channel for disseminating ESG-related research.

Table 1: Descriptive statistics of the selected dataset

DESCRIPTION	RESULTS
MAIN INFORMATION ABOUT DATA	
Timespan	2008:2026
Sources (Journals)	795
Documents	3177
Annual Growth Rate %	20.09
Document Average Age	1.25
Average citations per doc	21.56
References	17871
DOCUMENT CONTENTS	
Keywords Plus (ID)	3135
Author's Keywords (DE)	6335
AUTHORS	
Authors	6762
Authors of single-authored docs	341
AUTHORS COLLABORATION	
Single-authored docs	381
Co-Authors per Doc	3.03
International co-authorships %	29.9
DOCUMENT TYPES	
Article	3177

Source: Generated by Author using Biblioshiny(R)

Annual scientific production

Annual scientific production refers to the number of scholarly publications produced each year within a specific research field and is commonly used to assess the growth and maturity of that field over time (Basnet et. al., 2024; Joshi, 2016). The annual scientific review of this study shows that ESG research remained relatively underexplored during the initial period from 2008 to 2017, with only 52 publications recorded (Figure 2). From 2018 onward, the volume of publications increased gradually, followed by a sharp and sustained rise after 2020, indicating a significant acceleration in scholarly attention. The highest number of publications was recorded in 2025, with 1,305 articles, while publications for 2026 have not yet been fully indexed in the database. This pronounced upward trend clearly reflects the rapidly growing global interest in ESG research and its increasing importance across academic and policy-oriented domains.

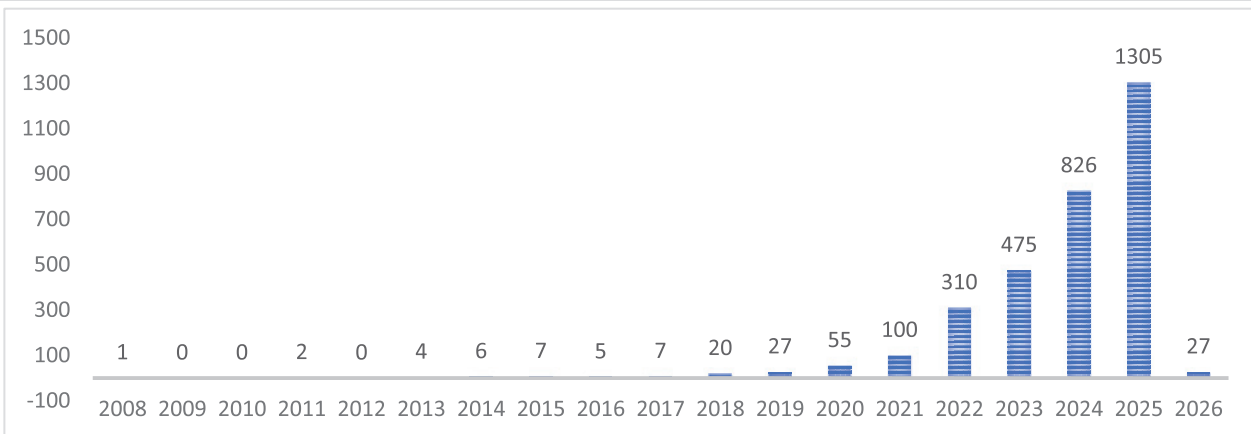


Figure 2: Annual scientific production
 Source: Author's Own Elaboration

Most Relevant Sources

The most relevant sources refer to journals that contribute the highest number of publications within a research field, indicating their influence and centrality (Sahu & Mishra, 2024). As shown in Figure 3, *Sustainability* (Switzerland) leads ESG research with 290 publications, followed by *Finance Research Letters* (161), *Corporate Social Responsibility and Environmental Management* (114), and *Business Strategy and the Environment* (88), collectively highlighting the strong intersection of sustainability, finance, and corporate responsibility in the field. Other notable sources include *International Review of Financial Analysis* (74), *Journal of Sustainable Finance and Investment* (64), *Research in International Business and Finance* (58), and *International Review of Economics and Finance* (53). Environmental- and sustainability-oriented journals, such as *Journal of Risk and Financial Management* (48), *Journal of Environmental Management* (43), and *Journal of Cleaner Production* (42), also play significant roles. Additional contributions are distributed across journals like *Applied Economics Letters* (30), *Frontiers in Environmental Science* (29), *Applied Economics* (28), and *Energy Economics* (27), with the remaining publications scattered among other sources, reflecting a long-tail distribution and confirming the interdisciplinary nature of ESG research.

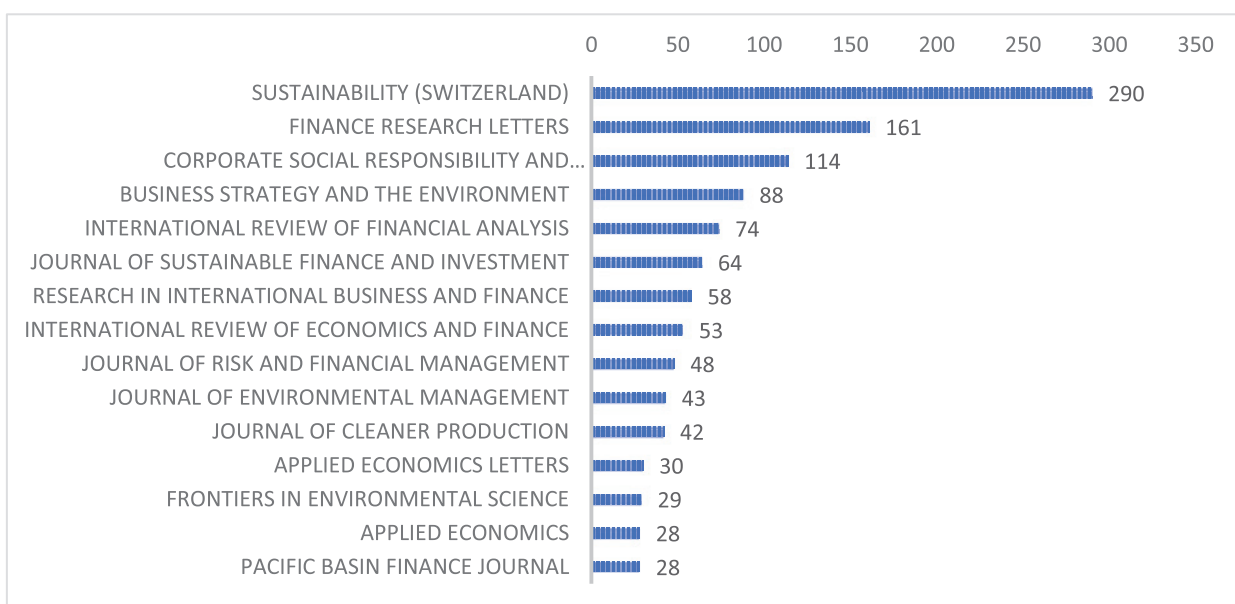


Figure 3: Most Relevant Sources
 Source: Generated by Author using Biblioshiny(R)

Most Relevant Author

Another important aspect of bibliometric analysis is identifying the most relevant authors, which refers to those who have made the highest scholarly contributions and shaped the development of a research field (Basnet et al., 2024; Cobo & Herrera, 2011). In this study, Li Y emerges as the most influential author with 33 publications, followed by Wang Y (31) and Zhang X (26). Several other authors have also contributed significantly, including Li J, Liu Y, and Zhang Y (24 each) and Wang J (23). Additional notable contributors are Li X and Wang X (21 each), Lu W-M (18), and Lee J (17), with further input from Chen Y and Wang S (16 each) and Li S and Wang L (15 each). Collectively, these contributions highlight the expanding global research community driving the growth and advancement of ESG scholarship.

Table 2: Most Relevant Author

Authors	Articles	Articles Fractionalized
LI Y	33	10.40
WANG Y	31	9.59
ZHANG X	26	8.91
LI J	24	7.87
LIU Y	24	6.48
ZHANG Y	24	8.48
WANG J	23	7.62
LI X	21	7.01
WANG X	21	6.60
LU W-M	18	4.77
LEE J	17	5.56
CHEN Y	16	4.74
WANG S	16	4.43
LI S	15	5.67
WANG L	15	4.58

Source: Generated by Author Using Biblioshiny (R)

Most Relevant Affiliation

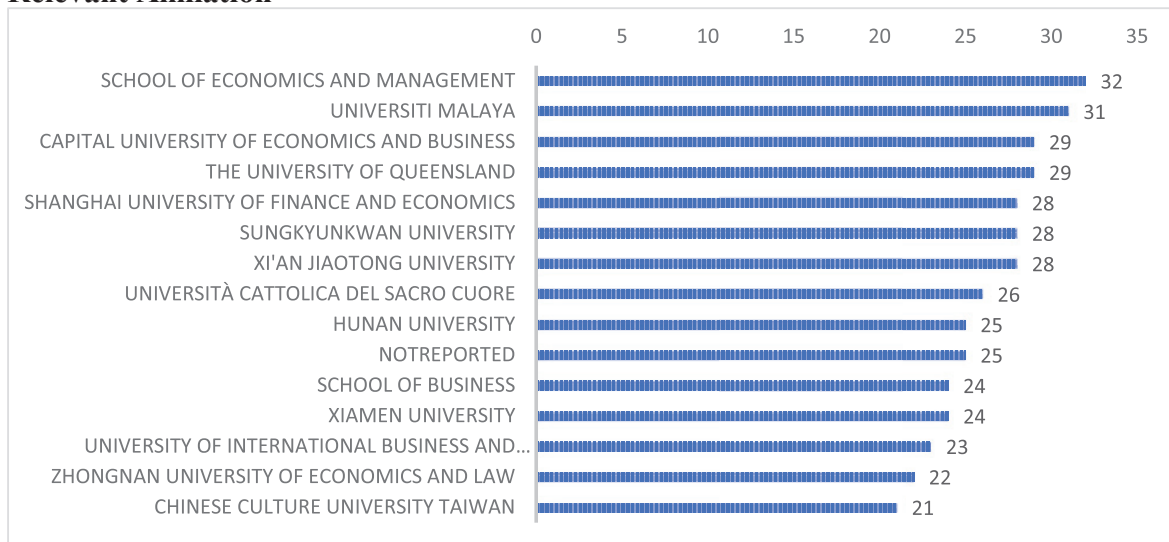


Figure 5: Most Relevant Affiliation

Source: Generated by Author using Biblioshiny(R)

Another important aspect of bibliometric analysis is the identification of the most relevant affiliations, which refers to institutions that contribute most substantially to knowledge production in a research domain, reflecting patterns of institutional productivity, collaboration, and influence (S. Gao et al., 2021; Sahu & Mishra, 2024). As shown in Figure 5, the analysis highlights institutions whose researchers have made the highest contributions to ESG scholarship. The School of Economics and Management leads with 32 publications, followed closely by Universiti Malaya with 31, and both Capital University of Economics and Business and the University of Queensland with 29 articles each. Shanghai University of Finance and Economics, Sungkyunkwan University, and Xi'an Jiaotong University each contributed 28 articles. Other notable affiliations include Università Cattolica del Sacro Cuore (26), Hunan University and Not Reported (25 each), School of Business and Xiamen University (24 each), University of International Business and Economics (23), Zhongnan University of Economics and Law (22), and Chinese Culture University, Taiwan (21). Overall, these findings indicate that global ESG research contributions are concentrated among leading business, management, and economics institutions worldwide.

Countries Authors' Corresponding

Table 3: Countries Authors' Corresponding

Country	Articles	Articles %	SCP	MCP	MCP %
CHINA	690	21.7186025	534	156	22.61
USA	229	7.20805792	155	74	32.31
ITALY	184	5.79162732	135	49	26.63
INDIA	153	4.81586402	132	21	13.73
KOREA	151	4.75291155	118	33	21.85
UNITED KINGDOM	131	4.12338684	55	76	58.02
MALAYSIA	95	2.99024237	42	53	55.79
GERMANY	89	2.80138495	62	27	30.34
SPAIN	78	2.45514636	57	21	26.92
AUSTRALIA	74	2.32924142	51	23	31.08
FRANCE	56	1.76266918	21	35	62.50
POLAND	53	1.66824048	40	13	24.53
INDONESIA	50	1.57381177	36	14	28.00
CANADA	48	1.5108593	31	17	35.42
SAUDI ARABIA	38	1.19609695	22	16	42.11
TURKEY	38	1.19609695	25	13	34.21
THAILAND	37	1.16462071	21	16	43.24
BRAZIL	35	1.10166824	30	5	14.29
NETHERLANDS	30	0.94428706	15	15	50.00
GREECE	29	0.91281083	21	8	27.59

Source: Generated by Author Using Biblioshiny

Countries of authors' corresponding represent an important dimension of bibliometric analysis, as they indicate the geographical distribution of scholarly contributions and highlight national research capacity, international collaboration patterns, and regional dominance within the studied research field (S. Gao et al., 2021; Sahu & Mishra, 2024; Joshi, 2016). Figure 6 illustrates the distribution of corresponding authors' countries in ESG research, revealing a clear geographic concentration of contributions. China leads substantially with 690 articles (21.72%), primarily through single-country publications (SCP), although cross-country collaboration is also notable (MCP = 22.61%). The United States (7.21%), Italy (5.79%), India (4.82%), and South Korea (4.75%) follow, with India and China displaying a stronger domestic orientation, as reflected in their lower shares of multi-country publications. In contrast, European and other developed countries, including the United Kingdom (58.02% MCP), France (62.5%), Malaysia (55.79%), and the Netherlands (50%), exhibit higher levels of international collaboration despite relatively lower publication volumes. Overall, this pattern highlights the dominance of the Asian region, particularly China, as noted by Zheng et. al. (2024), in terms of ESG research output, while

European and developed economies are characterized by extensive cross-border cooperation, reflecting diverse global research processes and collaborative dynamics within the field.

Most Cited Countries

The most cited countries refer to nations whose publications receive the highest number of citations, reflecting the visibility, impact, and influence of their research within a given field (Basnet et. al., 2024; Joshi, 2016). Figure 6 presents the most cited countries in ESG research, with China leading at 15,062 citations, indicating its strong research impact and scholarly visibility, followed by the United States (10,034), Italy (4,923), and the United Kingdom (4,230). Other countries with notable citation counts include Australia (3,286), South Korea (2,281), Germany (2,144), Malaysia (2,021), and India (1,845). Additional contributions are observed from France, Spain, Canada, Israel, Turkey, Portugal, Poland, Thailand, Norway, Sweden, and Japan, demonstrating a broad global distribution of citation impact. Overall, these findings suggest that while China and the United States dominate in total citations, several European and Asia-Pacific countries also exert significant scholarly influence, underscoring the global and multi-regional nature of impactful ESG research.

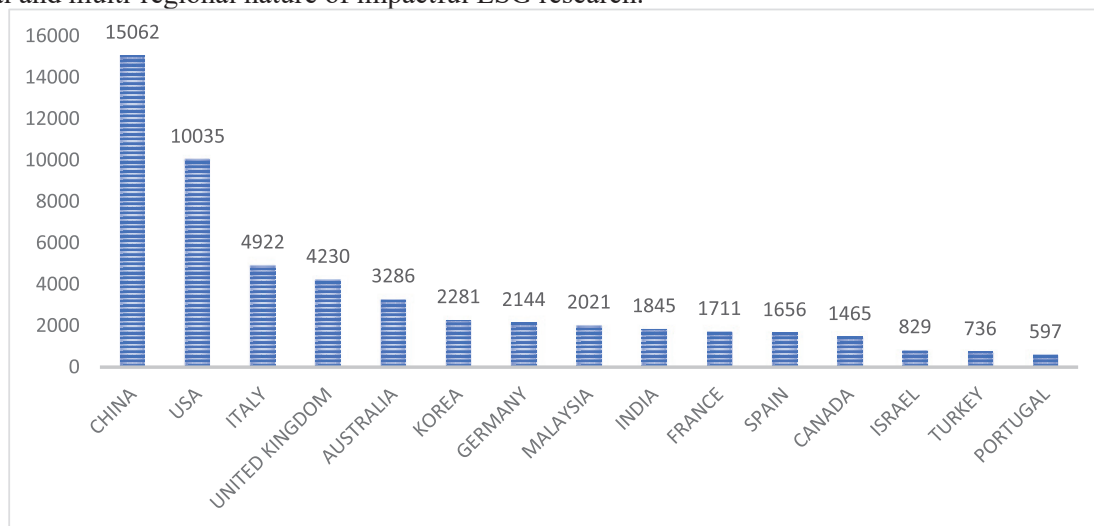


Figure 6: Most Cited Countries

Source: Generated by Author using Biblioshiny(R)

Countries Scientific Production

Table 4: Annual Scientific Production of Countries

Region	Freq
China	1629
Usa	605
Italy	436
Uk	423
India	411
South Korea	317
Malaysia	221
Australia	199
Spain	188
France	175
Germany	172
Indonesia	142
Brazil	124
Poland	120

Source: Generated by Author Using Biblioshiny(R)

The annual scientific production by country is depicted in Table 4, highlighting the global contributors to ESG research. The findings indicate that China leads with 1,629 publications, establishing itself as the top global contributor in the field. It is followed by the United States (605), Italy (436), the United Kingdom (423), and India (411), representing the major contributors after China. Other notable contributors include South Korea, Malaysia, Australia, and several European countries such as Spain, France, and Germany. Overall, the results demonstrate China's dominance in ESG research, the strong contributions of the United States, and active participation from other countries worldwide, reflecting the global and collaborative nature of ESG scholarship.

Most Cited Articles

Table 5 presents the top 10 most cited papers in ESG and corporate finance research, highlighting their influence and impact within the field. The most cited paper is *Firms and Social Responsibility: A Review of ESG and CSR Research in Corporate Finance*, with a total of 1,608 citations, 321.60 citations per year (TC/year), and a normalized citation count of 15.73, reflecting its substantial scholarly influence. It is followed by *The Real Effects of Financial Constraints: Evidence from a Natural Experiment* (980 citations, 196.00 TC/year, normalized TC 9.58) and *Corporate Governance and Firm Performance: Evidence from International Data* (923 citations, 184.60 TC/year, normalized TC 9.03). Other notable articles include *Financial Globalization and Systemic Risk: Evidence from Cross-Country Data* (915 citations, 114.38 TC/year, normalized TC 5.42), *ESG and Corporate Performance: International Evidence* (703 citations, 175.75 TC/year, normalized TC 15.24), and *Institutional Investors and Corporate Governance: Evidence from Cross-Country Ratings* (662 citations, 165.50 TC/year, normalized TC 14.35). These results indicate that post-2020 research on ESG and corporate finance has gained significant popularity, with high annual citation rates and normalized impact metrics demonstrating the growing influence of these studies on the field over time.

Table 5: Most cited Document

Paper Title	DOI	Total Citations	TC per Year	Normalized TC
Firms and social responsibility: A review of ESG and CSR research in corporate finance	10.1016/j.jcorpfin.2021.101889	1608	321.60	15.73
The real effects of financial constraints: Evidence from a natural experiment	10.1016/j.jfineco.2020.11.001	980	196.00	9.58
Corporate governance and firm performance: Evidence from international data	10.1016/j.jfineco.2020.12.011	923	184.60	9.03
Financial globalization and systemic risk: Evidence from cross-country data	10.1016/j.gfj.2017.03.001	915	114.38	5.42
ESG and corporate performance: International evidence	10.1016/j.jfineco.2021.09.009	703	175.75	15.24
Institutional investors and corporate governance: Evidence from ESG investing	10.1016/j.irfa.2022.102291	662	165.50	14.35
Corporate social responsibility and firm value: A meta-analysis	10.1002/csr.1452	616	77.00	3.65
Environmental management practices and firm performance: Evidence from global firms	10.1016/j.jenvman.2023.118829	460	153.33	13.53
Sustainability reporting and corporate performance: A bibliometric review	10.1002/bse.1927	457	50.78	5.64

Paper Title	DOI	Total Citations	TC per Year	Normalized TC
Financial crises and market reactions: Evidence from global markets	10.1016/j.frl.2020.101593	448	89.60	4.38

Source: Generated by Author Using Biblioshiny

Science Mapping

Science mapping identifies connections between research participants (Baker et. al., 2021; Donthu et al., 2021). The analysis focuses on the intellectual interactions and structural connections between research constituencies. Science mapping techniques include citation, co-citation, bibliographic, word, and co-authorship analysis. Combining these techniques with network analysis can provide insights into the bibliometric and intellectual structure of a research field (Baker et al., 2020; Tunger & Eulerich, 2018).

Word cloud

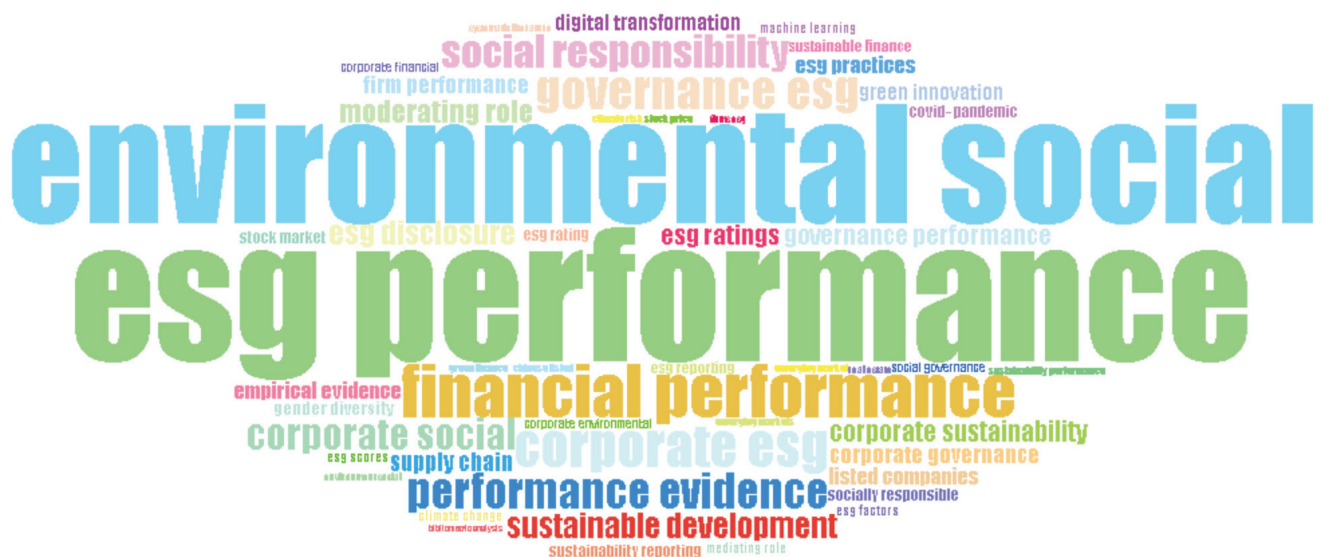


Figure 7: Word Cloud Analysis

Source: Generated By Author Using Biblioshiny(R)

A word cloud is a visual analytical tool commonly used in bibliometric studies to display the most frequently used keywords in ESG literature, with word size reflecting relative frequency and prominence of concepts within the research domain (Baker et. al., 2021; Donthu et al., 2021). In this study, the word cloud visually represents the most frequently occurring keywords in ESG research, where larger words indicate higher frequency, thereby highlighting dominant themes and research focus areas. In Figure 9, keywords such as “ESG,” “investment,” and “investor” appear in larger fonts, indicating their high frequency and central role in the literature. Smaller keywords, such as “sustainable,” “performance,” “corporate,” “decision,” and “governance,” represent supporting themes and emerging areas of interest. This visualization indicates that the ESG research field is primarily focused on investment-related decision-making, corporate governance, and sustainability performance, while other emerging topics suggest growing diversification in research themes and the potential for further exploration in less-studied areas.

Tree Map

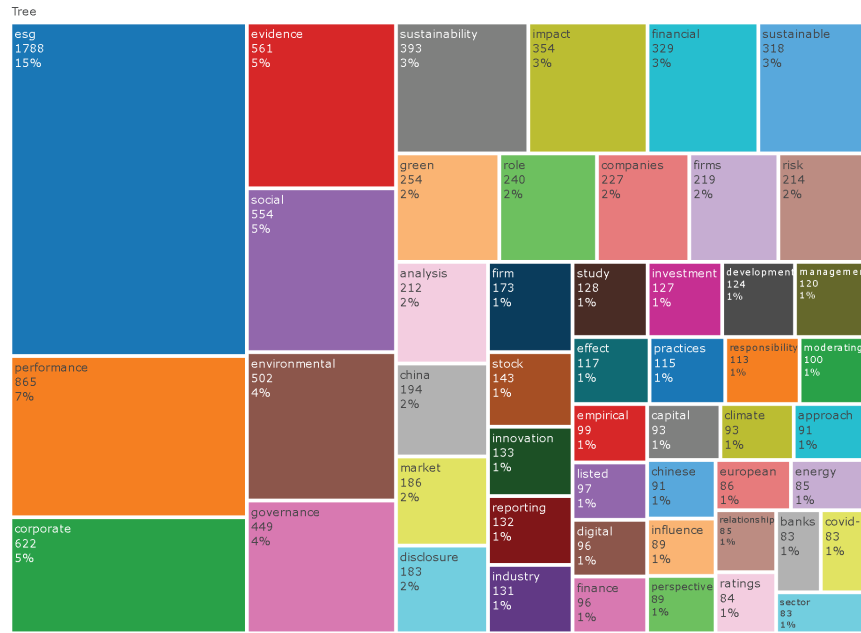


Figure 8: Tree Map Analysis

A tree map is a hierarchical visualization technique that displays data as proportionally sized blocks, allowing for the identification of the frequency or significance of elements within a dataset (Basnet et. al., 2024; Donthu et. al., 2021). In this study, the tree map depicts the most frequent keywords in ESG literature, with each term represented as a block proportional to its occurrence. The keyword “ESG” occupies the largest block with 1,788 occurrences (15%), indicating its dominance as the central theme of the literature. This is followed by “Performance” (865; 7%) and “Corporate” (625; 5%), reflecting a strong research focus on financial decision-making within the ESG domain. Medium-sized blocks, including “Social” (554; 5%), “Governance” (449; 4%), “Environmental” (502; 4%), and “Performance,” represent the core components of ESG studies. Smaller blocks, such as “Sustainability,” “Green,” “Stock Market,” “Investing,” “Climate,” and “Corporate Investors,” highlight supporting and emerging themes that contribute to the broader conceptual structure of ESG research, illustrating the diverse and evolving nature of the field.

Trend Topic

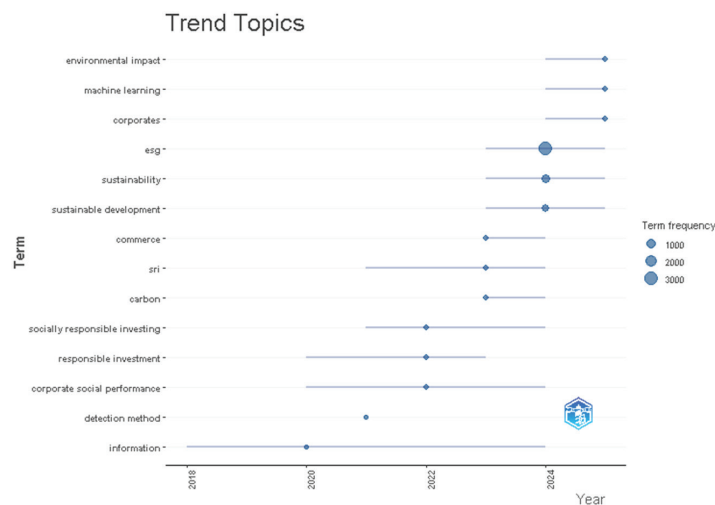


Figure 9: Trend Topic

Source: Generated by Author Using Biblioshiny (R)

Trend topic is another important that identifies the evolution of research themes over time, highlighting how the focus of scholarly attention shifts within a field (Donthu et. al., 2021). The trend of ESG-related topics, where the size and length of bubbles represent the prominence and temporal duration of key research themes (Figure 9). This visualization not only reflects topics that have been studied in the past and the years when research activity was highest but also helps identify emerging areas and potential directions for future investigation (Singh et al., 2023). Over time, ESG research initially concentrated on themes such as ESG itself, sustainability, sustainable development, socially responsible investment, social issues, funds, and development. From 2024 onwards, the focus has shifted toward ESG performance, sustainable development, environmental impact, green investment, and applications of machine learning, indicating the evolving priorities and emerging trends within the ESG research domain.

Co- occurrence Network Analysis

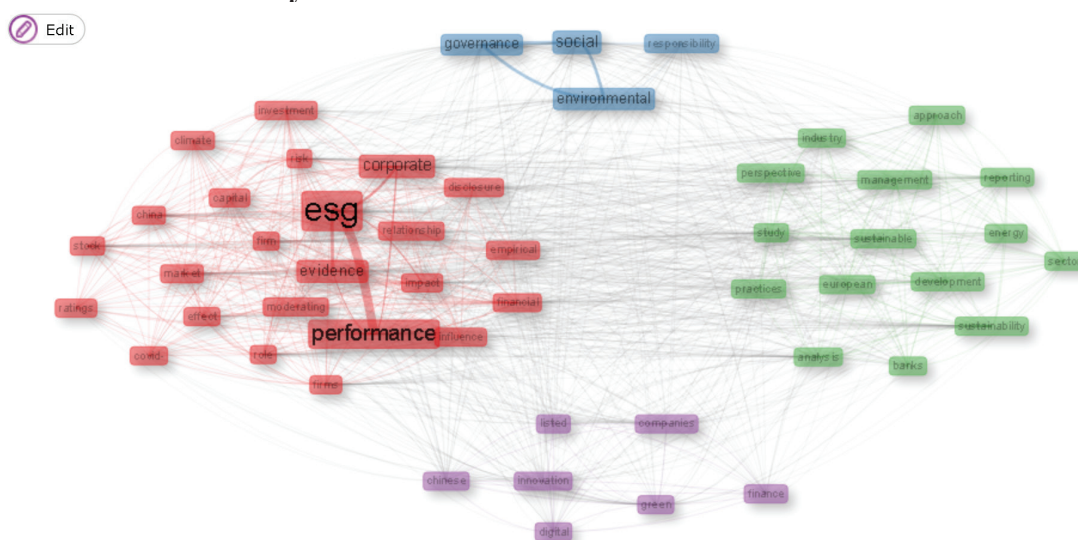


Figure 10: Co- occurrence Network Analysis
 Source: Generated by Author Using Biblioshiny (R)

A co-occurrence network is a bibliometric visualization that shows how frequently specific keywords appear together within a set of publications, revealing the relationships and thematic structure of a research field. The co-occurrence network of ESG-related keywords, illustrating distinct thematic clusters (Figure 10). The red cluster, dominated by “ESG” and “Performance,” represents the primary focus of the literature, with strong connections to terms such as “Corporate,” “Impact,” “Risk,” and “Decisions,” highlighting the link between ESG and investment behavior and decision-making. The blue cluster centers on the three ESG pillars “Environmental,” “Social,” and “Governance” emphasizing research addressing these core components. The green cluster groups keywords like “Performance,” “Financial,” and “Market,” indicating a focus on financial outcomes and firm-level analysis. Finally, the purple cluster includes terms such as “Responsible,” “Sustainable,” and “Funds,” reflecting studies related to socially responsible and sustainable investing. Together, the network provides a clear overview of the key themes and conceptual relationships within ESG research.

Thematic Map

Thematic mapping analysis was conducted on ESG literature using the Biblioshiny interface from the Bibliometrix R package, which categorizes research themes into four quadrants based on centrality (x-axis, indicating relevance within the field) and density (y-axis, indicating the degree of development) (Singh et al., 2023) . The four quadrants—motor, basic, emerging, and niche themes provide insights into the development, relevance, and influence of different research areas. Motor themes, characterized by high centrality and high density, represent

well-developed and highly influential topics that drive ESG research forward (Mishra et al., 2025a). In this study, motor themes include ESG disclosure, corporate investment, sustainable investment, and investment decision-making, indicating that these areas have received the greatest scholarly attention and are central to understanding ESG-driven financial and corporate behavior (Figure 11). Basic themes, with high centrality but low density, are important to the field but remain underdeveloped; examples include investment decision, financial performance, ESG rating, and corporate ESG, suggesting that these areas are foundational but require further theoretical and empirical exploration.

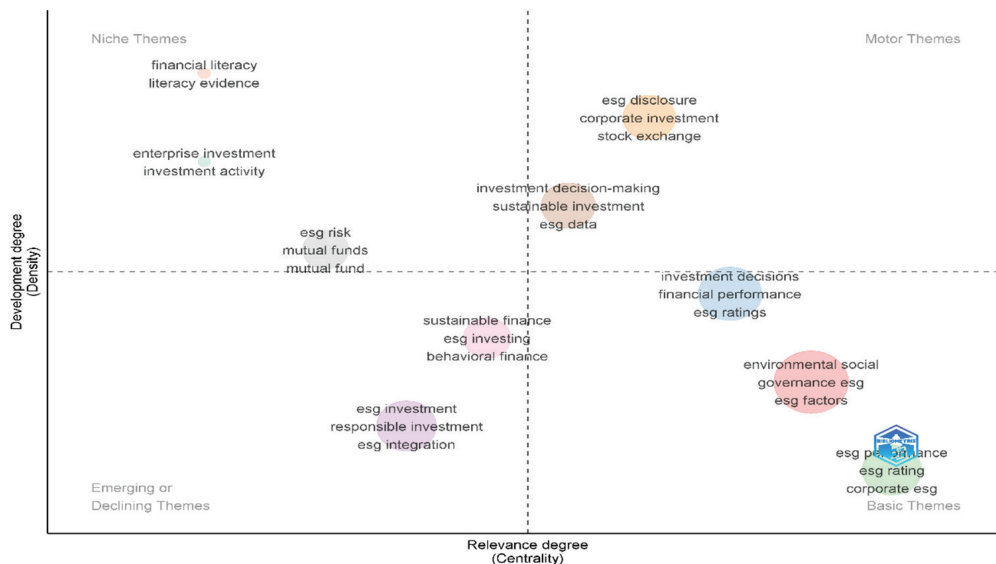


Figure 11: Thematic Map

Source: Generated by Author Using Biblioshiny(R)

Emerging themes, positioned in the quadrant with low centrality and low density, are weakly developed but represent significant opportunities for future research. In the ESG literature, emerging themes include ESG investment, responsible investment, ESG integration, sustainable finance, and behavioral finance, highlighting areas where novel investigations could provide valuable contributions. Niche themes, with high density but low centrality, are highly developed yet specialized topics with limited influence on other areas. Examples include financial literacy, enterprise investment, mutual funds, and ESG risk, reflecting specialized research with meaningful implications for corporate governance and ESG-related financial decision-making. Overall, thematic mapping clarifies which aspects of ESG research are well-established, which require further development, and which offer potential for future investigation, thereby identifying research gaps and guiding scholars toward emerging and impactful directions in ESG investment and decision-making (Mishra et al., 2025a).

Thematic Evolution

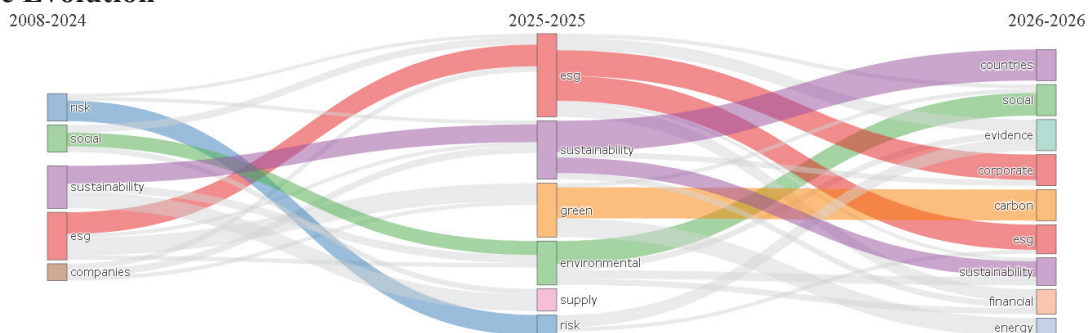


Figure 12: Thematic Evolution

Source: Generated by Author Using Biblioshiny (R)

The thematic evolution of ESG research from 2008 to 2026 highlights a gradual shift from broad, foundational concepts toward more specialized and data-driven areas of inquiry (Figure 12). Between 2008 and 2024, the literature primarily focused on general themes such as social responsibility, ESG, companies, and risk management, reflecting an emphasis on establishing the conceptual foundations of the field. By 2025, the focus began to narrow toward more specific topics, including environmental impact and evidence-based practices, signaling a transition from theoretical discussions to measurement, accountability, and empirical validation. By 2026, the thematic focus has become highly granular, concentrating on technical areas such as carbon and energy management, financial metrics, and country- or firm-specific functions. Overall, the diagram demonstrates a clear trajectory in ESG research, moving from general conceptual awareness toward a complex, multi-dimensional, and outcomes-oriented model of sustainable governance that integrates technical, financial, and operational perspectives.

Country Bibliographic Coupling

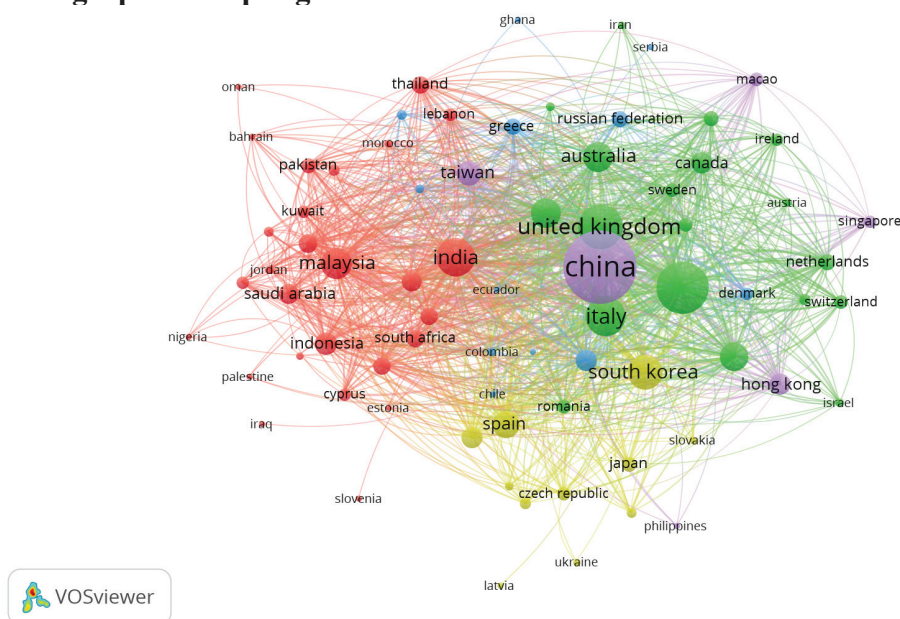


Figure 13: Bibliographic Coupling based on Country
 Source: Generated by Author Using VOSviewer

Bibliographic coupling is a bibliometric method that compares research documents based on the references they share, identifying relationships between studies through their cited sources (Basnet et al., 2024; Donthu et al., 2021). It occurs when two papers cite the same third document, indicating a conceptual or thematic connection between them (Y. Gao et al., 2025). For instance, when publications from different countries reference similar studies, it suggests that researchers in those countries are drawing on the same literature and may be exploring related topics. At a broader level, bibliographic coupling at the country level can reveal connections between nations based on shared references in their research outputs (Mishra et al., 2025a). The figure illustrates these relationships, highlighting collaborative networks among countries. The United States, Japan, Singapore, Germany, and Spain are grouped within the red cluster, indicating strong mutual connections, while China and Yemen also demonstrate extensive collaboration with multiple countries, reflecting the global interconnectedness of ESG research.

Bibliographic Coupling with Institutions

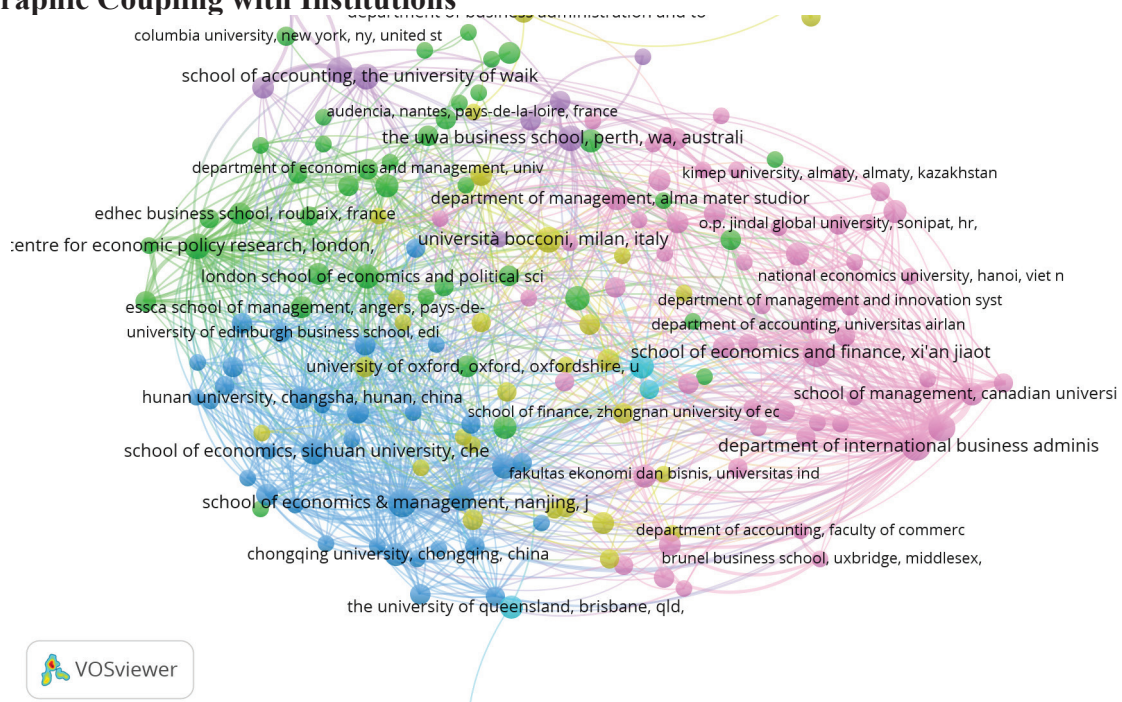


Figure 13: *Bibliographic Coupling based on Institutions*

Source: Generated by Author Using VOSviewer

Bibliographic coupling of institutions illustrates a dense global network of research collaboration centered on business, economics, and management (Figure 14). The visualization reveals several distinct clusters, most notably a prominent pink cluster representing a concentration of institutions with shared research interests in international business and management. Central to the network are the green and blue clusters, which highlight the significant role of major research hubs that maintain extensive shared literature with both Eastern and Western counterparts. A yellow cluster focused on departments of accounting and finance acts as a thematic bridge across different regional groups, while more peripheral nodes indicate specialized interdisciplinary links to fields like environmental sciences. Overall, the map demonstrates that while geographic and thematic concentrations exist, the academic landscape is highly integrated through a shared foundation of cited research.

ESG and Nature Based Solutions (NSB)

Environmental, Social, and Governance (ESG) frameworks are increasingly incorporating Nature-Based Solutions (NBS) as companies and policymakers recognize that leveraging natural systems provides cost-effective and sustainable responses to environmental challenges (Devkota et al., 2022; Thompson, 2023). NBS refer to interventions that protect, sustainably manage, and restore ecosystems to address societal challenges while simultaneously supporting biodiversity and human well-being (Seddon, 2020). Common examples include reforestation, wetland restoration, and ecological water-treatment systems, which directly align with the environmental pillar of ESG frameworks by reducing ecological impacts and enhancing corporate sustainability performance. Integrating NBS into ESG reflects a broader shift toward sustainable development, aiming to address climate change, biodiversity loss, and resource scarcity concurrently (Feigin et al., 2023; Chapagain et al., 2025). This convergence underscores the potential of NBS to strengthen ESG initiatives by embedding nature-centric strategies into corporate decision-making and long-term sustainability planning.

Empirical studies indicate that embedding NBS into ESG strategies enhances environmental performance and promotes resilience in corporate operations. For instance, nature-based water treatment systems, such as Natural Biological Systems, demonstrate how ecosystem services can reduce carbon emissions and improve wastewater management, offering practical solutions that yield environmental co-benefits while supporting sustainability

objectives (Cohen & Cohen, 2023). Beyond water management, other frameworks emphasize linking environmental practices with broader economic and social outcomes, positioning NBS as a critical component of ESG strategies capable of driving innovation and mitigating ecological risk (Devkota & Paija, 2020). Additionally, incorporating biodiversity considerations, such as coastal wetland protection and restoration, exemplifies how NBS can support corporate strategies that both reduce environmental risks and enhance ecosystem services, further demonstrating the multidimensional value of nature-based approaches within ESG-focused business models.

Despite the evident benefits, challenges in implementing NBS within ESG frameworks remain, particularly regarding measurement, reporting, and standardized valuation. Comprehensive frameworks for assessing and reporting nature-based outcomes are still underdeveloped, limiting widespread adoption and investor confidence (Thompson, 2021). Furthermore, the scalability of NBS initiatives depends on strong regulatory frameworks, cross-sector partnerships, and institutional expertise to ensure effectiveness across diverse ecological and economic contexts (Chee et al., 2021; Taneja et al., 2023). Nevertheless, linking NBS to ESG reporting standards can enhance risk management, stakeholder engagement, and long-term investment strategies by providing tangible evidence of environmental impact, especially when corporate sustainability reports include metrics that quantify nature-based contributions (Khan & Shehzad, 2025).

From a governance perspective, NBS adoption supports transparency, accountability, and stakeholder trust. Companies that implement extensive sustainability initiatives, including NBS, can strengthen their public image and foster long-term financial sustainability through enhanced stakeholder confidence (Toxopeus & Polzin, 2021). NBS not only reinforce the environmental dimension of ESG but also advance social and governance objectives by promoting community involvement, participatory decision-making, and alignment with global sustainability agendas. Consequently, NBS has emerged as a fundamental element of ESG practices, offering multifunctional benefits in climate mitigation, biodiversity conservation, and sustainable resource management (Gillan et al., 2021; Lamb et al., 2025; Taneja et al., 2023). While the integration of NBS into ESG holds substantial potential for achieving sustainability targets, realizing this potential will require improved measurement, reporting, and evaluation frameworks to maximize the effectiveness and impact of nature-based interventions in corporate practice (Cohen & Cohen, 2023; Pascal et al., 2021).

Conclusion

This study investigated the global research trends on Environmental, Social, and Governance (ESG) using bibliometric analysis. The findings reveal that global interest in ESG research is growing rapidly, with an annual growth rate of 20.09% and an average of 21.56 citations per document, and publication output has increased markedly since 2020, as shown through annual scientific production. Performance analysis identified *Sustainability* (Switzerland) as the most relevant source, leading the field with 290 articles, while Li Y emerged as the most prolific author with 33 publications. At the country level, China produces the most impactful work, with 15,062 citations, followed by the USA (10,035), highlighting the dominance of these nations in ESG scholarship. Furthermore, science mapping, conducted through keyword-based analyses including word clouds, tree maps, trend topics, and co-occurrence networks, indicates that ESG research is largely centered on investment-related decision-making, corporate governance, and sustainability performance, with “ESG” appearing most frequently (1,788 occurrences), followed by “Performance” (865) and “Corporate” (625). Thematic analysis revealed that emerging areas such as responsible investment, ESG integration, sustainable finance, and behavioral finance offer promising avenues for future research, whereas niche topics like ESG risk, mutual funds, and enterprise investment are highly specialized but limited in scope. Thematic evolution further shows a transition from earlier focuses on performance, investment decision-making, capital markets, and sustainable finance toward integrated, system-centric approaches post-2025. In this regard, the findings underscore the rapid expansion and increasing sophistication of ESG research, highlighting its growing influence on corporate practices and sustainable investment strategies globally.

Despite the rapid growth and increasing maturity of ESG research, the bibliometric evidence highlights several research areas that need to be addressed. Firstly, the country-level analysis reveals a geographical

imbalance, with dominant contributions from China, the USA, and selected European economies. Therefore, future studies should expand empirical investigations to underrepresented regions, including South Asia, Africa, and least developed economies, to capture institutional, regulatory, and cultural heterogeneity in ESG adoption and implementation. Secondly, thematic mapping identifies ESG integration, responsible investment, sustainable finance, and behavioral finance as emerging but weakly developed themes. In this regard, future research should explore how behavioral factors such as investor sentiment, financial literacy, risk perception, and cognitive biases shape ESG investment decisions. Thirdly, future ESG research can benefit from integrating artificial intelligence, text mining, and alternative data sources—such as ESG disclosures, news sentiment, and environmental datasets to address persistent challenges related to ESG measurement inconsistency, rating divergence, and greenwashing.

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