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Environmental, Social, and Governance Risk Research Trend in Scholarly Publications: A Bibliometric Perspective

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Abstract: *Environmental, Social, and Governance (ESG) risks have become a significant focus in academic research, especially in economics and sustainability. This study analyzes and maps scientific publications on ESG risks from a bibliometric perspective to identify research trends, productive contributors, collaboration networks, and current research focus areas. This study uses the Scopus database for 2020–2024 and utilizes the VOSviewer visualization tool. The findings indicate a substantial increase in publications regarding ESG risk in recent years. The contributions of researchers worldwide represent interests that cross geographical boundaries and provide an overview of global challenges. Mapping ESG risk using network visualization results in two groups of issues. The red cluster primarily focuses on regulation, risk management, and compliance. The green cluster emphasizes the practical implementation and influence of ESG on the company's performance. These findings offer enhanced insight into research trends and gaps concerning environmental and social risks and strategies to achieve sustainable ESG.*
Keywords: ESG risk; bibliometric analysis; Scopus database; environmental risk; sustainable ESG

INTRODUCTION

In recent years, Environmental, Social, and Governance (ESG) risks have become increasingly important in global policy debates, corporate governance frameworks, and investment strategies. ESG has developed from voluntary reporting systems to a fundamental component of strategic decision-making for governments, businesses, and financial institutions as stakeholders turn their attention to long-term sustainability and ethical responsibility [1]. The urgency of climate change and rising public expectations have pushed ESG issues to the forefront of public and academic discourse [2]–[4].

Environmental risks include greenhouse gas emissions, biodiversity loss, natural disasters, and resource depletion. This can upset infrastructure, change regulatory exposure, and throw off supply networks. Employment infractions, economic or gender disparity, inadequate workplace health standards, and damage to public relations include social hazards [5]. This mishandling can erode stakeholder trust and trigger a public reaction. Governance risks are linked to internal control structures—board accountability, executive compensation, corruption, legal compliance—and are closely related to investor confidence and corporate resilience [6].

ESG risks are multidimensional and dynamic. Scholars and practitioners increasingly know that ESG issues do not operate in isolation. In this way, ESG factors are interlinked, reinforcing the need for an integrated and forward-looking risk management system [6]. This has led to the emergence of ESG as a diagnostic and predictive tool in assessing organizational sustainability.

Recent literature shows a strong link between ESG performance and corporate value creation. Chen et al. [7] found that companies with strong ESG metrics tend to outperform peers in the long run, while Yuan et al. (2022) showed that ESG disclosures reduce the risk of financial misconduct. In addition, Bennett et al. [8] introduced the concept of "blue justice" to expand the ESG discourse into marine sustainability and intergenerational equality. The diversification of ESG research into thematic gaps, such as environmental justice, impact investing, digital ESG analytics, and stakeholder capitalism, shows its evolution beyond adherence to innovation.

A growing body of work also highlights the importance of assessing ESG risks through the dual lenses of materiality, i.e., impact materiality (inside-out): how organizational activities affect the environment and society (e.g., pollution, labor practices, land use). In addition, financial materiality (outside-in): how ESG factors affect an organization's economic performance and long-term viability (e.g., climate-related supply chain disruptions, social license to operate) [9].

This concept of dual materiality is at the heart of modern ESG reporting frameworks such as the EU Corporate Sustainability Reporting Directive and the Task Force on Climate-related Financial Disclosures [10]. Other research proposes that organizations adopt systematic tools, such as SIPOC (Suppliers, Input, Process, Output, Customers) models and ESG Risk Heat Maps, to track the source, magnitude, and temporal urgency of ESG risks across their operations. These tools support structured stakeholder identification and ESG impact mapping across the value chain.

Despite conceptual advances, limited empirical work still comprehensively maps how ESG risk research is structured, where knowledge gaps lie, and which disciplines contribute most actively. Traditional literature reviews offer qualitative

insights but cannot capture broader publication trends, collaborative patterns, and citation dynamics [6], [7], [11]. To address this gap, the study used a bibliometric approach to analyze ESG risk research published in the Scopus-indexed journal between 2020 and 2024. Specifically, this study aims to understand the evolution of ESG risk research, identify key contributors and subject areas, map the network and density visualizations that emerge in the ESG discourse, and provide insights for academics and practitioners who aim to strengthen the ESG framework globally.

The remainder of this study is organized as follows. Section 2 discusses the literature review. Section 3 introduces our methodology. Section 4 outlines the empirical results and undertakes the discussion. Finally, Section 5 presents our conclusion.

LITERATURE REVIEW

2.1Environmental, Social, and Governance (ESG) Risk

Environmental, social, and governance (ESG) risk is the potential negative impacts of a company's failure to manage environmental sustainability, social responsibility, and corporate governance issues. Often non-financial, these hazards can have significant financial implications if improperly managed, therefore compromising the operational continuity, regulatory compliance, investor trust, and reputation of a corporation [1], [5]. Environmental risks are associated with factors that affect ecosystems, climate systems, and natural resources [2], [3], [6]. These comprise air and water pollution, greenhouse gas (GHG) emissions, deforestation, and biodiversity loss. Stricher environmental rules, carbon pricing, and changing consumer expectations are driving increasing materiality of this risk [4]. Nardella et al. [5] state that failure to adopt environmentally sustainable practices can increase regulatory and operational risk exposure.

Social risk covers how businesses engage with workers, communities, consumers, and society. This involves employment policies, workplace diversity, employee rights, occupational safety, product responsibility, community impact, and data privacy [12]. Social risks might show themselves as strikes, boycotts, customer responses, or talent conflict. Nardella et al [5] highlight that failure to manage social expectations can lead to reputational damage and reduced stakeholder trust, especially in digital transparency and social activism.

Governance risks have dealt with ethical behavior, internal controls, and decision-making structures of the business. Among these are board composition and diversity; shareholder rights; executive compensation; audit integrity; corruption; and regulatory compliance [6]. Poor governance often results in fraud, financial reporting errors, regulatory violations, and shareholder devaluation. Yuan et al. (2022) show that effective ESG disclosure mechanisms increase transparency and reduce the likelihood of corporate financial irregularities, thereby reducing governance-related risks.

Although categorized separately, ESG concerns are strongly linked and can cause social instability and draw regulatory attention, hence generating a governance crisis [4], [6]. This interconnectedness requires a coordinated approach to handle ESG risk. According to Chen et al. [7], the market is increasingly punishing companies that fail to address ESG issues holistically and rewarding those that demonstrate resilience, adaptability, and ethical leadership.

From an investment perspective, ESG risk is progressively viewed as a key determinant of long-term valuation and risk-adjusted returns. Including ESG risk assessment into credit ratings, portfolio strategies, and due diligence procedures shows a more general move toward sustainable finance. To direct company behavior and investor transparency, regulators also implement ESG risk disclosure systems as the EU Taxonomy, the Sustainable Financial Disclosure Regulation (SFDR), and the Climate-related Financial Disclosure Task Force (TCFD) [13].

While significant progress has been made in ESG risk research, some gaps still need to be addressed. Most of the research focuses on advanced economies. At the same time, there is a need for more research in emerging countries and emerging markets to understand how ESG dynamics differ in different contexts. Bennett et al. [8] emphasize the need of including indigenous and local points of view in ESG research—which is quite underrepresented in the present body of knowledge. Furthermore required are improved ESG measures and indicators to enable comparisons between studies and raise general research quality [14].

.2. Social Impact Assessment

Social Impact Assessment (SIA) is a framework used to evaluate the consequences of planned interventions on human populations [12]. SIA helps in the ESG discussion in determining social risks and benefits for government or business operations. It evaluates relocation, job impacts, health, and community cohesiveness using both qualitative and quantitative techniques. Particularly in high-risk or underprivileged areas, SIA offers a foundation for smart decision-making and involvement of stakeholders.

Before a policy, project, or commercial activity is launched, social impact assessment (SIA) is a methodical process used to find and assess its social influence [12]. In the framework of ESG, SIA is crucial for capturing social aspects sometimes neglected in financial or environmental measurements.

SIA addresses several different areas including changes in society's structure, livelihoods, health, local culture, and access to fundamental services. By use of a participatory approach, SIA helps early identification of possible social disputes, reputation hazards, or operational constraints influencing the long-term viability of a project [5].

In ESG practice, SIA strengthens decision-making processes by providing a community-based perspective, especially in energy, infrastructure, and extractives. Social risk analysis also depends on this tool since it reveals elements not often shown by standard ESG metrics.

Despite challenges such as data limitations and minimal community engagement, SIA's integration into the ESG framework is increasingly recognized by international financial institutions and sustainability-oriented investors [1]. Growing demand for social responsibility will make SIA a strategic component of ethical corporate conduct.

2.3 Bibliometric Studies

Studies employ quantitative techniques to analyze patterns in scientific publications. When applied to ESG risk research, bibliometrics unveils the structure of scholarly communication, key contributors, dominant journals, and collaboration networks. This method enables a comprehensive overview of how ESG topics evolve and where future research could be most impactful [15], [16].

The bibliometric approach focused on ESG risk can provide valuable insights into practical methodological approaches, emerging research trends, and collaboration between researchers in a broader context. Applying bibliometric methodologies in the ESG risk can help us identify knowledge gaps and research opportunities [15], [17].

The number of ESG risk papers is currently increasing rapidly. Therefore, it is necessary to sort and summarize the relevant literature and then analyze the status of conducting ESG risk research [15]. New academics generally need help conducting ESG research to reach future development trends quickly. Therefore, this article will summarize the main trends of ESG risk literature so academics interested in this field can get started immediately.

METHODOLOGY

The research method used is a bibliometric study that analyzes publications on a particular subject to find specific information about what is being studied for exploratory and descriptive purposes. Bibliometrics offers favorable results from author production in research, trends, most cited articles, and concentration of documents in impactful journals. This research consists of several steps [16]–[18].

The first step is to choose a term through a previous economic review of ESG risks in a scientific publication. The next step is to search and extract the data. All documents in the widely recognized Scopus database, which contain terms defined in search criteria, are analyzed to visualize the behavior of scientific production over time [15].

The database is renowned for its reliability and multidisciplinary research collection, with research recommending its use due to the high proportion of exclusive journals. The data is then processed to analyze the number of articles published per year and the number of citations. Bibliometric analysis, a study of scientific activity, has been instrumental in preparing this article and has found applications in various fields [2], [15].

The search for electronic literature was carried out using the Scopus database in early March 2025. Scopus is a web-based database that provides comprehensive research information around the world. A total sampling technique was used, and several search terms were applied to the keyword search engine database. All types of journal publication documents taken from 2020 to 2024, excluding conference papers or book chapters, as this study emphasizes the literature of reputable journals. Table 1 presents the article selection strategy.

Table 1. Flow of Literature Search Based on Scopus Database

No	Search Keyword	Document Quantity
1	Query (English search terms) = (ESG)	14,965
2	Query (English search terms) = ("environment" AND " social" AND "governance")	10,904
3	Query (English search terms) = ("environment" AND " social" AND "governance" AND "risk")	1,583
4	Environmental Science	495
5	Publication Year: 2020 to 2024	291
6	Language: English	282
7	Journal	237

8	Article	196

Source: Scopus Database

Data is extracted using Scopus. The following bibliometric variables were extracted: citation information (author, title, year of publication, citation), bibliographic information (affiliation, journal publisher, original document language), abstract, and keywords. Scopus search results are exported and saved to RIS as a VOSviewer database [14], [19].

The VOSviewer software creates a co-emergence map of high-frequency keywords related to ESG risk research. This application also creates network visualizations between authors at the international level. The results of mapping the VOSviewer software are used to analyze ESG risk issues [20].

RESULT AND DISCUSSION

4.1 Mapping ESG Risk Research based on Publication Trend

After a literature search, the papers included in the analysis totaled 196 during the research period. Table 2 shows the distribution of documents written on ESG risk research, published in leading international journals indexed by Scopus. The highest productivity of this topic will occur in 2024, which is 60 papers or 30.61%. Figure 1 shows the trend of publications in the field of ESG risk during the period 2020 to 2024. The results show an increasing trend in publications in the field. As we can see from Figure 1 and Table 2, since 2020, the number of articles on ESG risks has continued to increase.

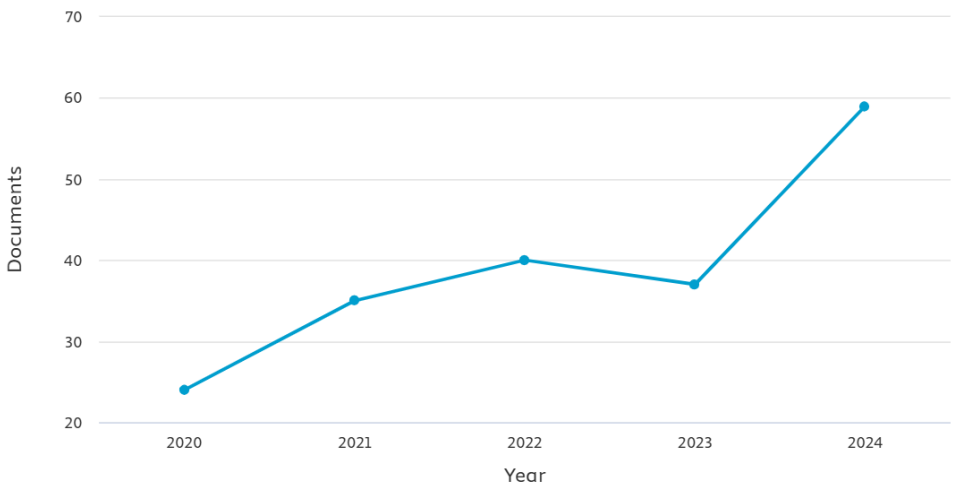

Figure 1. Evolution in The Number of Publications

It's worth noting that ESG risk articles published in 2023 and 2024 are widely cited, meaning they're highly impactful. In addition, the number of ESG risk papers jumped from 24 in 2020 to 60 in 2024. The number of paper citations has also increased drastically after 2020, with a continuous increase in papers reflecting the importance of ESG risk issues in academia.

Table 2. Number of Literature related to ESG Risk Research

Year	Number of Publications	Citation
2020	24	14
2021	35	223
2022	40	478
2023	37	790
2024	60	1,604
Total	196	3,109

Source: Scopus Database

4.2 Mapping ESG Risk Research by Country

Regarding the number of documents by country, China, the United States, and the United Kingdom are the top contributors to ESG risk research, with 58, 28, and 21 publications, respectively. The research mainly involved developed countries, while Indonesia only contributed five publications. Research is more likely to be conducted in countries with

high Gross Domestic Product per capita and less in regions such as Southeast Asia, South America, Eastern Europe, and Africa [17], [21].

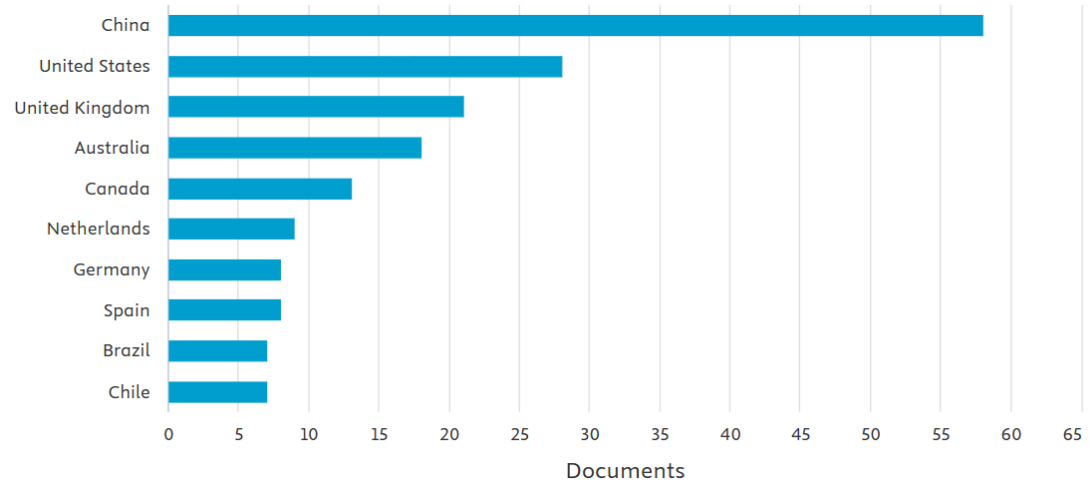

Figure 2. Number of Documents by Country

4.3 Mapping ESG Risk Research by Author

Figure 3 shows prolific authors related to ESG risk, namely Le Billon, P., Abakah, E.J.A., and Abate, G. These authors have many collaborations with other authors. Productive writers use connections and collaboration to their advantage, where they can be at the core of a collaborative network of co-authors [21]. Improved author performance is often attributed to large grants, the attraction of accredited academic institutions, and intensive communication between researchers [17], [19].

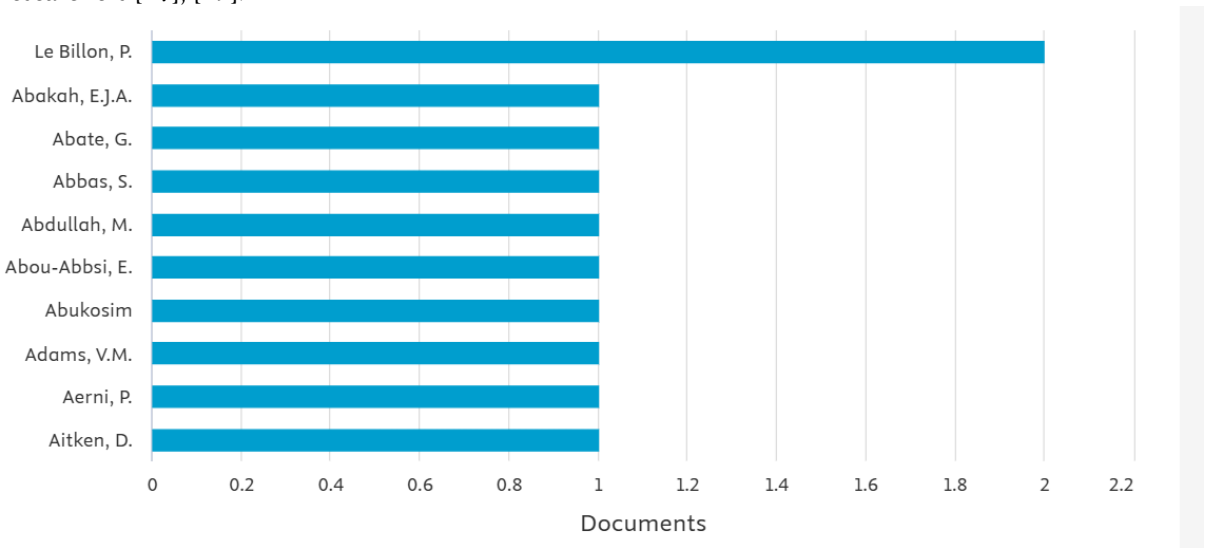

Figure 3. The Most Productive Authors

4.4 Mapping ESG Risk Research by Subject Area

Mapping ESG risk research by subject area reveals a strong interdisciplinary orientation, with the most significant proportion of studies (37.8%) coming from Environmental Science. This highlights the central role of ecological concerns, such as climate change, pollution, and resource degradation, in ESG discussions.

The Social Sciences follow with 18.7%, emphasizing themes like social equity, community resilience, and ethical governance. The Energy sector contributes 9.3%, reflecting the urgency of transitioning to sustainable energy systems and the growing risks from fossil fuel dependence.

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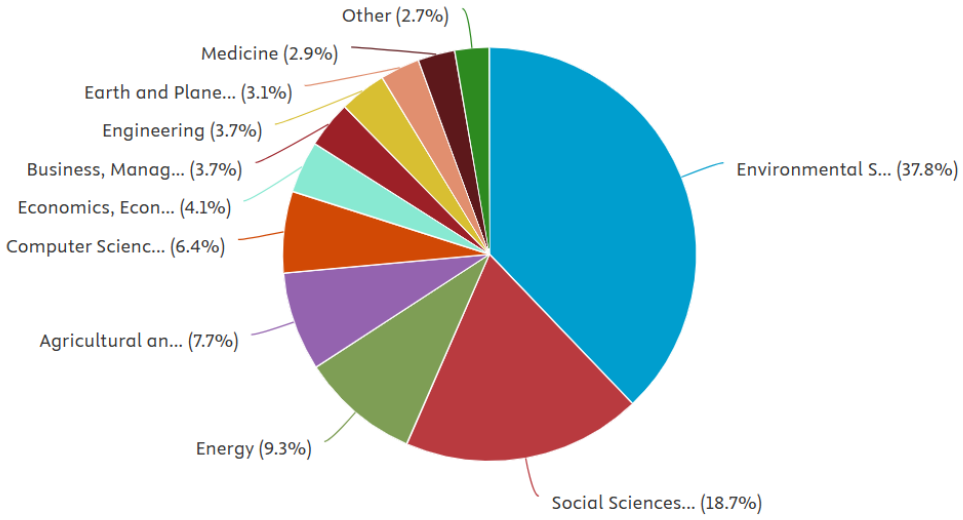

Figure 4. Research on ESG risks classified by subject area

Other key subject areas include Agricultural and Biological Sciences (7.7%), Computer Science (6.4%), Economics and Finance (4.1%), and Business and Management (3.7%), each offering unique perspectives—from food security and digital sustainability tools to ESG investment performance and corporate strategy. Smaller contributions from Engineering, Earth and Planetary Sciences, and Medicine (ranging from 3.7% to 2.9%) reflect niche but significant ESG concerns, including technological innovation, natural disaster risk, and public health. The remaining 2.7% come from other interdisciplinary fields, underscoring ESG's growing relevance across academic domains. This distribution confirms that ESG risk research is a multifaceted field, requiring cross-sectoral insight to address the complex challenges of sustainable development.

4.5 Mapping ESG Risk Research Based on Most Influential Publications Ranked by Number of Citations

A list of the most cited publications can be seen in Table 3. Research on Environmental, Social, and Governance (ESG) risks has undergone significant developments in recent years, demonstrating important evolutions in focus, methodology, and practical implications. Scientific journals reveal various important trends and patterns connected to ESG concerns based on the most important articles. Research on the fundamental connection between ESG performance and financial performance has given way to more sophisticated analysis of the multidimensional interactions among several ESG variables and their effect on business risk [7].

ESG risk research also progressively combines ideas from several fields. Reflecting the change toward a more comprehensive approach, Bennett et al [8] in their study of "Blue growth and blue justice" explain how ESG research today encompasses the elements of social and ecological justice. The study identifies ten social injustice risks that blue growth can generate, including evictions, pollution, environmental degradation, and human rights abuses, while emphasizing the importance of integrating equity principles in ESG initiatives.

The most recent studies concentrate on ESG data disclosure and transparency. Yuan et al. [22] emphasize how ESG disclosure plays a role in reducing the risk of corporate financial irregularities by helping to reduce information asymmetry. They indexed ESG disclosure rates considering non-financial disclosure. They found that ESG disclosures can reduce ambiguity, improve information transparency, and lower the risk of corporate financial irregularities.

Table 3. Most Cited Articles

No	Article	Authors	Source	Year	Citations
1	Blue growth and blue justice: Ten risks and solutions for the ocean economy	Bennett, N.J., Blythe, J., White, C.S., Campero, C	Marine Policy, 125, 104387	2021	271
2	What makes climate change adaptation effective? A systematic review of the literature	Owen, Gigi	Global Environmental Change, 62, 102071	2020	236

3	Environmental, social, and governance (ESG) performance and financial outcomes: Analyzing the impact of ESG on financial performance	Chen, Simin; Song, Yu; Gao, Peng	Journal of Environmental Management, 345, 118829	2023	223
4	ESG disclosure and corporate financial irregularities – Evidence from Chinese listed firms	Yuan, Xueying; Li, Zhongfei; Xu, Jinhua; Shang, Lixia	Journal of Cleaner Production, 332, 129992	2022	157
5	Open innovation 4.0 as an enhancer of sustainable innovation ecosystems	Costa, Joana; Matias, João C.O.	Sustainability (Switzerland), 12(19), 8112	2020	156

Source: Scopus Database

In terms of methodology, the use of bibliometric analysis to map the ESG research landscape is also increasing. In related literature, bibliometric analysis techniques can assist to find research clusters, cooperative networks, and conceptual evolutions [3] This method helps academics observe changes in ESG research areas and identify gaps in the scope of current work.Previous studies reveal how ESG practices can vary significantly across geographical, economic, and social contexts, emphasizing the importance of context-sensitive approaches in ESG risk research [8]. Theoretically, ESG risk research reveals a notable change from an exclusive concentration on shareholder value to a broader point of view. This reflects a paradigmatic change in the understanding of the role of companies in society [7].

The practical implications of ESG risk research are vast. ESG can improve corporate performance by enabling businesses to maintain sustainability, build a solid reputation, win the trust of stakeholders, and contribute to solving national sustainable development problems [7], [14]. ESG can enhance corporate performance. The results of the research underline the need of creating a legislative framework supporting strong ESG practices, particularly those that support ESG disclosure, increase internal and external monitoring, and enable the change to a more sustainable and fair economy. Strong ESG performance can also lower the company's total value risk and lower financial irregularity risk [22].

4.6 Mapping ESG Risk Research Based on Network Visualization

We analyzed the co-emergence of keywords and theme trends to identify future research directions related to ESG risk research [17], [21]. Keywords are the best introduction to academic articles. By observing the appearance of co-occurring keywords in a field, academics can quickly understand research points and future research directions in academia. This study created a graph of the co-occurrence of keywords in VOSviewer, as shown in Figure 5. In the scientific field, analyzing the appearance of keywords side by side creates a network of topics and their relationships [20].

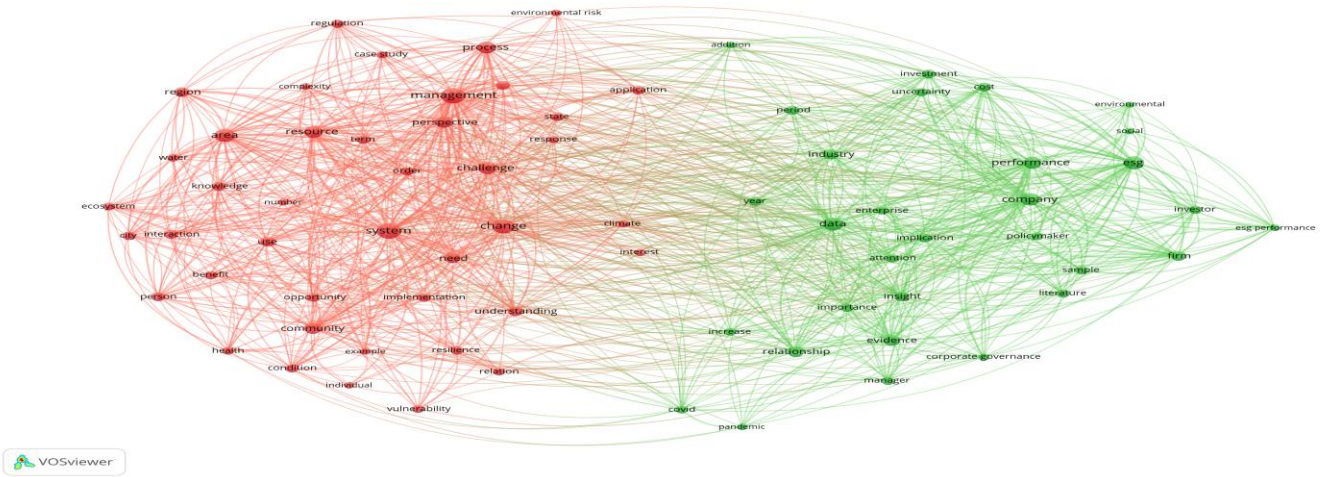

Figure 5. Network Visualization of ESG Risk Research

The size of the nodes on this map shows how often the keywords appear. The distance between the node and the connecting line's thickness measures the keyword's occurrence. The color node indicates a group of keywords, often consisting of terms that appear together and can be considered a broad field of research [15], [17]. From 2020 to 2024, two common clusters emerged to summarize interesting focus topics in ESG risk.

Cluster 1: The topics presented in the red cluster were mainly focused on the regulatory framework and risk management. This domain focuses on regulatory aspects, risk management, practical implementation, and the impact of ESG on company performance. This can be seen from the words that often appear together, such as risk, management, regulation, resource, system, challenge, and opportunity. Risk is a central concept with a high level of connectivity. Management is connected to various components such as regulation, resources, and systems. Challenges that show the complexity of implementing the ESG regulatory framework. Opportunity that indicates that risk can also be viewed as an opportunity. The results of this mapping were also found in previous studies.

Cluster 2: The topics presented in the green cluster mainly focus on performance and implementation. This can be seen from the words that often appear together, such as performance, company, ESG, investor, and innovation. This domain focuses on the practical implementation and impact of ESG on company performance and how ESG can be measured and communicated through the reporting framework.

Some words become bridging nodes, as seen in impact, climate, and finance. Impact is a vital connecting node between the two clusters, with connections to management, performance, climate, and finance. Climate bridges environmental risk aspects with financial implications [2], [3], [13]. Financially link the performance aspect with risk management. This explains how ESG impact can be measured.

Network visualization also reveals the environmental risk cluster. Subclusters that connect environmental risk, ecosystem, and regulation show how business activities impact the environment [23]. In addition, network visualization also reveals corporate governance clusters. The subcluster linking corporate governance, disclosure, relationship, and ESG performance indicates a growing research area on transparency and accountability in ESG practices. This highlights the governance aspect in ESG assessment.

4.7 Mapping ESG Risk Research Based on Density Visualization

This density visualization illustrates the interconnectedness of key themes in ESG risk research, reflecting the growing academic interest in the complex dynamics of environmental, social, and governance challenges. The dominance of terms such as regulation, environment, risk, management, climate change, regulation, environment, risk, management, and climate change confirms the importance of regulatory frameworks and environmental sustainability in contemporary discourse [3], [13], [14]. These themes are enriched by their linkages to complexity, uncertainty, and governance, demonstrating the multidimensional nature of ESG risks and the need for resilient and adaptive strategies.

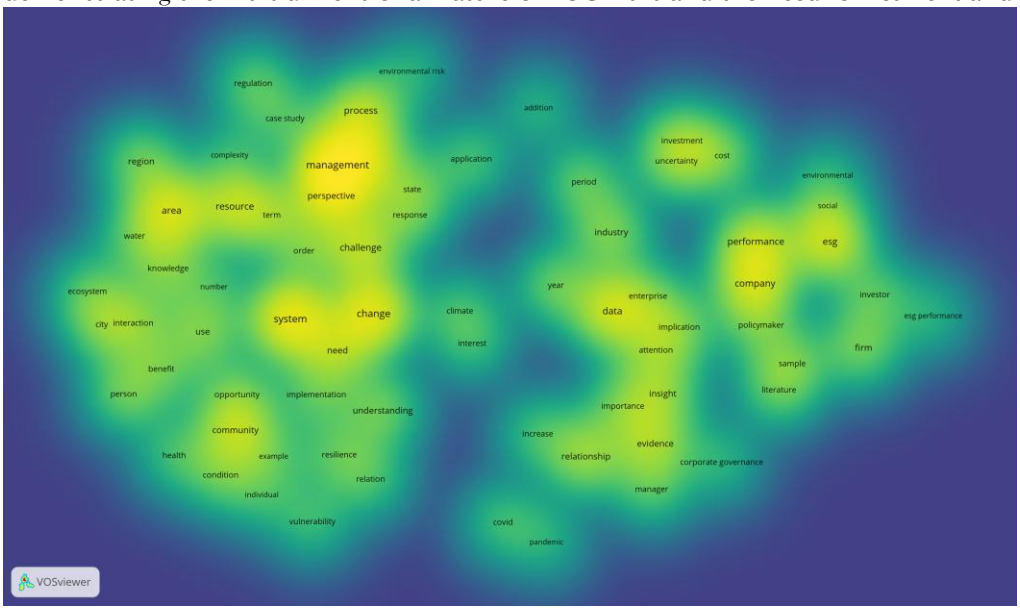

Figure 6. Density Visualization of ESG Risk Research

This visualization also reveals a strong focus on corporations' social and governance dimensions, with terms such as community, health, resilience, vulnerability, community, health, resilience, and vulnerability emphasizing the human and social impacts of ESG risks [12]. The advent of the terms COVID-19 and pandemic demonstrates a recent shift in academic interest in examining ESG risks through the lens of a global crisis, highlighting the linkages between public health, economic stability, and environmental sustainability [14].

From a methodological point of view, terms such as case study, process, solution, and evidence, case studies, processes, solutions, and evidence indicate the prevalence of empirical and applied research in this field. The repeated mention of the terms investment, performance, and corporate governance reflects the economic and financial dimensions of ESG research, especially related to risk assessment and value creation for companies and investors.

This bibliometric perspective also shows the evolution of ESG risk research over time, with the terms over time, with year, period, and trend year, period, and trend hinting at longitudinal analysis and change in priorities. The grouping of the terms knowledge, understanding, and literature affirms the role of academic research in shaping policy and practice [23]. In contrast, terms such as policymakers and organizations highlight the potential application of these research results.

This density visualization illustrates the breadth and depth of ESG risk research, which shows an interdisciplinary and dynamic field of study. Future research must continue exploring the intersection between environmental sustainability, social equity, governance innovation, environmental sustainability, social justice, and governance innovation, especially in emerging global challenges [14].

CONCLUSION

This bibliometric study provides a comprehensive overview of the global academic landscape related to Environmental, Social, and Governance (ESG) risk research from 2020 to 2024. The increasing volume and influence of publications over this era highlight the growing relevance of ESG risks academically and professionally as a multidimensional notion including corporate governance, social justice, and environmental sustainability. This analysis reveals two dominant research clusters: one focusing on regulatory frameworks and risk management, and the other on the practical implementation of ESG principles in corporate performance and disclosure.

These findings suggest that ESG risk research is primarily concentrated in developed countries, with significant contributions from China, the United States, and the United Kingdom. A network of collaborations and influential authors is essential in shaping knowledge structure and driving interdisciplinary research forward. Using VOSviewer, relevant mapping finds important nodes and links spanning regulatory, climate, financial performance, governance, and stakeholder impacts, therefore highlighting the complexity and interdependence of ESG-related issues.

Despite strong growth in this area, gaps remain, especially in addressing ESG issues in developing countries and integrating indigenous or local perspectives. Future research should be expanded to cover diverse geographies and create more nuanced metrics and indicators for ESG assessments. The study maps existing knowledge and offers strategic insights for scholars, policymakers, and practitioners who aim to strengthen ESG frameworks in pursuit of more equitable and sustainable development outcomes.

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Data Availability:

The data presented in this study are available on request from the corresponding authors.

Conflict of interest: The authors declare that there is no conflict of interest**.**

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