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# MAPPING THE RESEARCH EVOLUTION OF ESG RISK AND SOCIAL IMPACT ASSESSMENT: A BIBLIOMETRIC ANALYSIS

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**Abstrak**
Penelitian akademis kini semakin menyoroti risiko Lingkungan, Sosial, dan Tata Kelola (ESG) serta Penilaian Dampak Sosial (SIA), terutama dalam ranah ekonomi dan keberlanjutan. Studi ini menganalisis dan memetakan publikasi ilmiah mengenai risiko ESG dan SIA dari perspektif bibliometrik untuk mengidentifikasi tren penelitian, kontributor produktif, jaringan kolaborasi, dan area fokus penelitian terkini. Studi ini menggunakan basis data Scopus untuk periode 2020–2024 dan memanfaatkan alat visualisasi *VOSviewer*. Temuan menunjukkan peningkatan substansial dalam publikasi terkait risiko ESG dan SIA dalam beberapa tahun terakhir. Kontribusi para peneliti di seluruh dunia menunjukkan minat yang melintasi batas geografis dan memberikan gambaran tentang tantangan global. Temuan ini menawarkan wawasan yang lebih baik mengenai tren penelitian dan kesenjangan terkait risiko lingkungan dan sosial serta strategi penilaian dampak social untuk mencapai tujuan pembangunan berkelanjutan.
**Kata kunci:** Risiko ESG, Penilaian dampak sosial, bibliometric, data Scopus, VOSviewer

# PEMETAAN EVOLUSI PENELITIAN RISIKO ESG DAN PENILAIAN DAMPAK SOSIAL: ANALISIS BIBLIOMETRIK

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**Abstract**
Academic research is now increasingly highlighting Environmental, Social, and Governance (ESG) and Social Impact Assessment (SIA) risks, especially in the realm of economics and sustainability. This study analyzes and maps scientific publications on ESG and SIA risks from a bibliometric perspective to identify current research trends, productive contributors, collaboration networks, and focus areas. This study utilises the Scopus database for the period 2020–2024 and employs the visualisation tool VOSviewer. The findings show a substantial increase in publications related to ESG and SIA risks in recent years. The contributions of researchers worldwide demonstrate an interest that transcends geographical boundaries and provides insight into global challenges. These findings offer better insights into research trends and gaps related to environmental and social risks as well as social impact assessment strategies to achieve sustainable development goals.
**Keywords:** ESG risk, Social Impact Assessment, bibliometric, Scopus database, VOSviewer

## 1. Introduction

In recent years, the global attention to Environmental, Social, and Governance (ESG) issues and Social Impact Assessment (SIA) has increased significantly. ESG is now not only seen as a voluntary reporting mechanism, but has shifted to become a strategic element in decision-making from government institutions, businesses, and financial institutions (Chen et al., 2023; Wuri et al., 2025). This dynamic is inseparable from the increasing urgency of climate change, the environmental crisis, and the public's demand for transparency and ethical accountability (Owen, 2020). The close linkage between environmental, social, and governance dimensions and social impact aspects underscores the importance of a holistic approach in risk management (Karwowski & Raulinajtys-Grzybek, 2021).

Environmental risks, such as greenhouse gas emissions, biodiversity loss, and the escalation of natural disasters, further pressure business sustainability and community welfare (Baratta et al., 2023; Wuri et al., 2024a). On the other hand, social risks include employment issues, social inequality, and the vulnerability of community groups, which have the potential to cause a crisis of trust. The governance risks include the effectiveness of internal oversight mechanisms, anti-corruption practices, and regulatory compliance. All of these aspects serve as a benchmark for stakeholder trust and a determinant of organisational resilience in the midst of global dynamics (Alomoto et al., 2022; Bennett et al., 2021).

The multidimensional and interconnected nature of ESG factors necessitates integrated risk management and a comprehensive social impact assessment system (Silva et al., 2022). Studies have shown that effective ESG implementation is positively correlated with long-term value creation, reputation enhancement, and systemic risk mitigation (Chytis et al., 2024; Gao et al., 2021; Wuri et al., 2025). Moreover, the social impact assessment strategy has now become the foundation in efforts to realize the Sustainable Development Goals (Chung et al.,

2023). It is in this context that the concept of double materiality—namely, the impact of organisational activities on the environment and society (inside-out), as well as the influence of external factors on organisational sustainability (*outside-in*)—has become an essential framework in modern ESG reporting and policies (Xue, 2024).

As the complexity of ESG and SIA issues increases, scientific knowledge mapping and research collaboration are an urgent need. Bibliometric analysis tools, such as VOSviewer, provide a means to visualize keyword trends, map collaborative networks, and identify relevant thematic clusters (Au et al., 2023; Vidiasratri et al., 2024; Wuri et al., 2024b). However, despite the rapid increase in the number of academic publications related to ESG and SIA, research that presents a comprehensive mapping of the structure, collaboration, and thematic focus of this field is still limited. This research was conducted to map the development of ESG and SIA research bibliometrics using the Scopus database for the period from 2020 to 2024. This analysis is expected to identify the evolution of research, key contributors, collaboration networks, and prominent keyword trends, while contributing to the strengthening of ESG concepts and practices to support the achievement of sustainable development at the global level.

## 2. Literature Review

### *2.1. Environmental, Social, and Governance Risk*

Environmental, Social, and Governance (ESG) risks reflect potential losses arising from organisational failure to manage sustainability aspects. Although often categorised as non-financial risk, its implications can have a direct impact on a company's financial condition through operational disruptions, reputational damage, non-compliance with regulations, and reduced investor confidence. This paradigm shift suggests that ESG risk no longer stands as a separate entity, but rather as a complex, interconnected system (Wuri et al., 2025; Yuan et al., 2022).

Environmental risk focuses on factors that affect the sustainability of ecosystems and the availability of natural resources. Issues that often arise include climate change, air and water pollution, greenhouse gas (GHG) emissions, deforestation, and biodiversity loss. The pressure on companies to manage these risks is increasing as stricter environmental policies and carbon pricing are imposed, and consumer preferences for sustainable products shift (Costa & Matias, 2020). Several studies have highlighted that organisations' failure to implement environmentally friendly practices increases their vulnerability to regulatory risks and supply chain disruptions, ultimately threatening business continuity (Saini et al., 2022).

Social risk encompasses a company's relationships with employees, communities, consumers, and society as a whole. These dimensions encompass fair labour practices, diversity and inclusion, workplace safety, protection of employee rights, product responsibility, and data security and privacy. Social risks can manifest in various forms, including strikes, consumer boycotts, internal conflicts, or challenges in maintaining a high-quality workforce. Failure to respond to social expectations, especially in the era of digital information disclosure and increasing public activism, can damage reputations while undermining an organization's legitimacy in the eyes of stakeholders (Pérez-Cornejo & de Quevedo-Puente, 2023).

Governance risks are related to the quality of the internal control structure, decision-making mechanisms, and the application of ethical principles in the Company's management (Dong et al., 2020). Important factors include the composition of the board of directors, shareholder rights, executive compensation mechanisms, audit transparency, measures to prevent corruption, and adherence to legal compliance. Weak governance has the potential to lead to fraudulent practices, inaccurate financial reporting, and legal violations that can harm shareholder value. Recent literature suggests that transparent ESG disclosure practices contribute to increased accountability and reduced risk of managerial irregularities.

Although the three categories of ESG risks are often studied separately, the relationship between these dimensions is very close and can have a chain effect. For example, environmental degradation can trigger social unrest, which then has implications for stricter regulatory oversight or governance crises. Some research emphasises that markets are increasingly assessing a company's resilience and adaptability based on the extent to which ESG risks are thoroughly and consistently managed (Miao, 2024).

From an investment perspective, ESG risk has become a significant factor in assessing long-term value and risk-adjusted returns. Financial institutions are now integrating ESG considerations into credit assessments, portfolio strategies, and due diligence processes. International regulations, such as the EU Taxonomy, the Sustainable Finance Disclosure Regulation (SFDR), and the Task Force on Climate-related Financial Disclosures (TCFD), increasingly emphasise the obligation of transparency and responsible behaviour on the part of companies and investors (Chiu, 2022).

Although the development of research on ESG risks is significant, several gaps remain. Social, regulatory, and cultural dynamics can influence the implementation of ESG in different ways (Diez-Cañamero et al., 2020). Some researchers have also highlighted the need to develop more consistent ESG indicators and metrics, as well as the integration of local perspectives, including indigenous peoples' wisdom, to make ESG risk analysis more inclusive and representative.

### *2.2. Social Impact Assessment*

Social Impact Assessment (SIA) is a systematic approach used to identify and evaluate the social consequences of a policy, program, project, or business activity before it is implemented (Atheefa et al., 2022). SIA plays a strategic role in ensuring sustainable development and social justice. Through a participatory and evidence-based approach, SIA encourages the development planning process to consider the aspirations, rights, and welfare of the community, especially vulnerable or marginalized groups.

In the ESG framework, SIA functions to detect both risks and social opportunities arising from company or government decisions. This analysis encompasses both qualitative and quantitative dimensions, encompassing issues such as displacement, changing livelihoods, public health, social cohesion, and access to basic services. Thus, SIA outcomes can be an essential foothold for inclusive decision-making and increase stakeholder engagement (Chen et al., 2023).

Furthermore, SIA also enriches ESG practices by capturing social dimensions that are often not reflected in financial and environmental indicators. This assessment provides an overview of the impact on social structures, local culture, and community dynamics that are directly affected by a development intervention (Șerban et al., 2022). Through participatory mechanisms, SIA enables the early identification of potential social conflicts, reputational risks, and operational barriers that may impact the project's long-term sustainability.

In practice, SIA has high relevance in strategic sectors such as energy, infrastructure, and extractive activities, where social risks are often complex and multidimensional (Wuri et al., 2025). This instrument complements the ESG risk analysis by providing a societal perspective that is usually overlooked by quantitative measurement. However, the implementation of SIA still faces various obstacles, including limited data, a lack of community participation, and methodological challenges in consistently measuring social impact.

Despite its limitations, the recognition of the importance of SIAs in the ESG framework is expanding, as public expectations and the demands of global financial institutions for social accountability increase. Today, SIA is viewed not only as a risk mitigation tool but also as a key strategy for strengthening responsible business practices and promoting long-term, sustainability-oriented approaches.

## 3. Methodology

This study employs a bibliometric approach to analyse scientific publications on specific topics, aiming to provide a comprehensive understanding of the research focus. This method is both exploratory and descriptive, providing benefits in identifying author productivity, the latest research trends, the most cited articles, and the concentration of publications in reputable journals (Chytis et al., 2024; Li et al., 2021; Vidiasratri et al., 2024).

The research process is carried out through several stages. The first step is to formulate research keywords, which are determined based on a literature review of ESG risk economics, as well as relevant previous publications. The next stage is data search and extraction. All documents recorded in the Scopus database, in accordance with the search criteria, were selected for analysis, with the aim of describing the pattern of scientific production over a specific period (Sorsa & Bona-Sánchez, 2024).

*Scopus* was chosen as the primary data source because it has an international reputation, broad multidisciplinary coverage, and a high proportion of exclusive journals. The data obtained is then processed to produce information on the number of articles published per year and the volume of citations received. Thus, bibliometric analysis plays a crucial role in evaluating scientific activities and has been widely applied in various fields of knowledge.

The literature search was conducted in July 2025 using the Scopus database and a keyword-based search strategy. The sampling technique was carried out thoroughly (total sampling), where all journal publications published in the period 2020–2024 were included. However, neither conference articles nor book chapters were included in the analysis, as the focus of this research was the literature of scientific journals with a higher academic reputation. The article selection strategy is presented in detail in Figure 1.

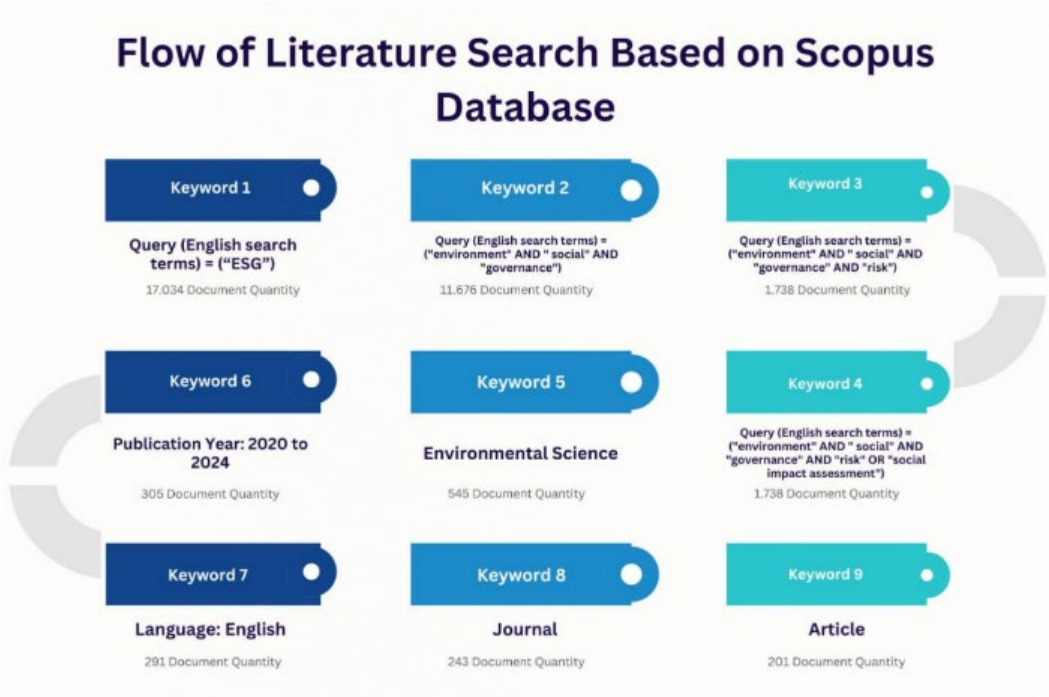


**Figure 1.** Flow of Literature Search Based on Scopus Database
Source: Scopus Database

Bibliometric data were obtained from the Scopus database by extracting several key variables, including the author's name, article title, year of publication, and number of citations. Additionally, bibliographic data, including author affiliation, publisher name, original language of the document, abstract, and keywords, are also collected for each publication. The entire

extraction results are then exported in RIS format as a basis for further analysis using the VOSviewer software (Vidiasratri et al., 2024; Wuri et al., 2025).

The VOSviewer tool is used to map the co-occurrence of keywords that often appear simultaneously in research related to ESG risks, as well as to describe collaborative networks between authors across countries. The resulting map provides a visual as well as quantitative representation of the key issues and emerging research trends in ESG risk studies. This visualization helps clarify the relationship between keywords, patterns of international collaboration, and the dynamics of research development in the field.

## 4.Results and Discussion

### *4.1. Mapping ESG Risk and Social Impact Assessment Research based on Publication Trend*

From the results of the literature search, 201 articles were identified and included in the analysis during the research period. Figure 2 presents the distribution of publications on ESG and SIA risk topics published in the reputable and indexed international journal Scopus. The peak of research productivity on this theme is expected to occur in 2024, with a total of 62 articles, accounting for approximately 30.84% of the total publications.

Furthermore, Figure 2 illustrates the trend in the number of publications related to ESG and SIA risks from 2020 to 2024. The analysis results show a significant increase in the number of published articles. As illustrated in Figure 2 and Table 1, the number of publications on ESG risks has experienced consistent growth since 2023.

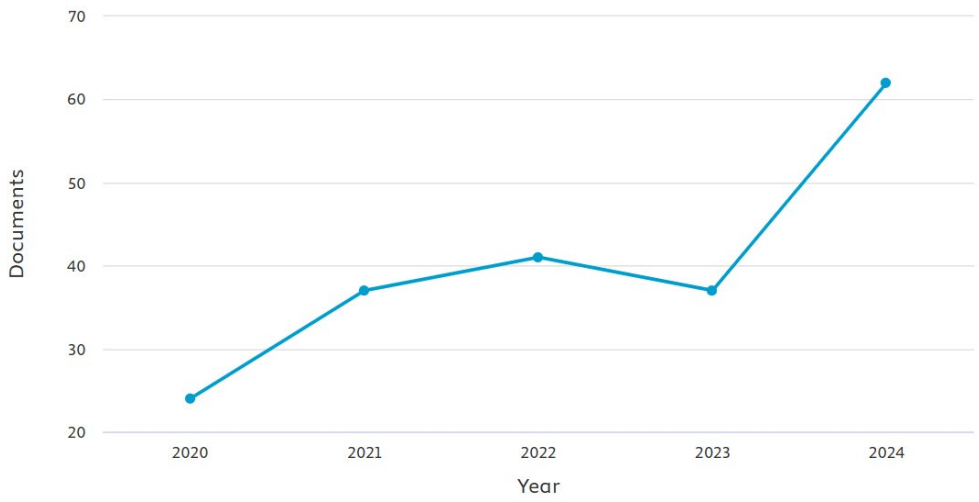


**Figure 2.**
Evolution in The Number of Publications

It is worth noting that publications on ESG risks and social impact assessments published in 2024 have garnered a high number of citations, indicating that these studies have had a significant impact. The number of articles on this topic has also increased significantly, from 24 publications in 2020 to 62 publications in 2024, resulting in a total of 1,102 citations in 2024. A sharp increase in the number of citations is evident after 2023, in line with the rise in the number of articles.

**Table 1.** Number of Literature related to ESG Risk and SIA Research

| Year | Number of Publications | Citation |
|---|---|---|
| 2020 | 24 | 0 |
| 2021 | 37 | 66 |
| 2022 | 41 | 262 |
| 2023 | 37 | 524 |
| 2024 | 62 | 1,102 |
| Total | 201 | 1.954 |

Source: Scopus Database

The total number of publications from 2020 to 2024 is 201, and the total number of citations in this period is 1,954. This reflects the growing academic attention to ESG risk issues and social impact assessments.

### *4.2. Mapping ESG Risk and Social Impact Assessment Research by Country*

In terms of the distribution of publications by country, China, the United States, and the United Kingdom occupy the top positions as the main contributors to research related to ESG risk assessment and social impact, with 58, 28, and 21 articles published, respectively. Developed countries dominated most studies, while contributions from Indonesia were still limited, with only five publications. Generally, research is conducted more frequently in countries with a high GDP per capita. At the same time, regions such as Southeast Asia, South America, Eastern Europe, and Africa are relatively underrepresented in this literature.

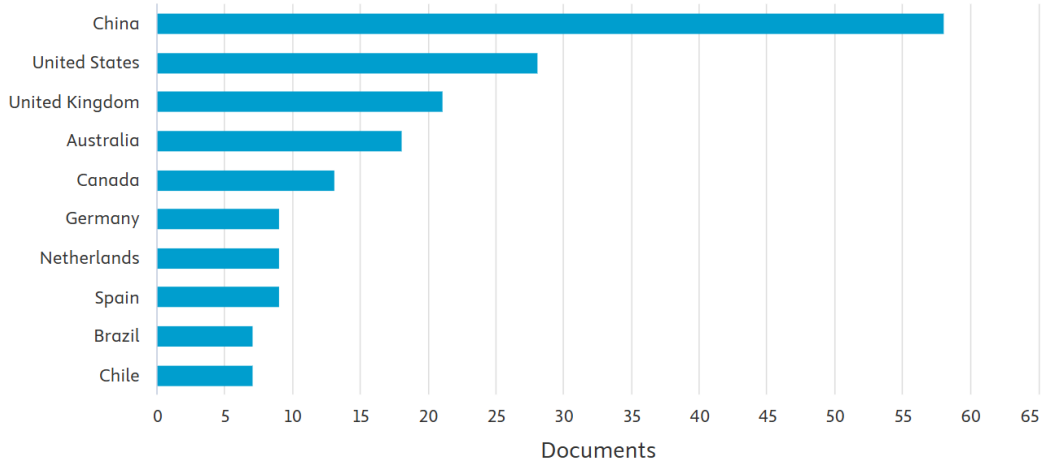


**Figure 3.** Number of Documents by Country

### *4.3. Mapping ESG Risk and Social Impact Assessment Research by Author*

Some of the authors who are most active in studies related to ESG risks and social impact assessments include Le Billon, P., Abakah, E.J.A., and Abate, G. (Figure 4). All three have a high level of collaboration with various other writers. Their productivity cannot be separated from their ability to utilise academic networks, thus placing them at the centre of the scientific writing community. These achievements are generally supported by access to significant research funding, the reputation of an internationally reputable academic institution, and intensive interaction among researchers.

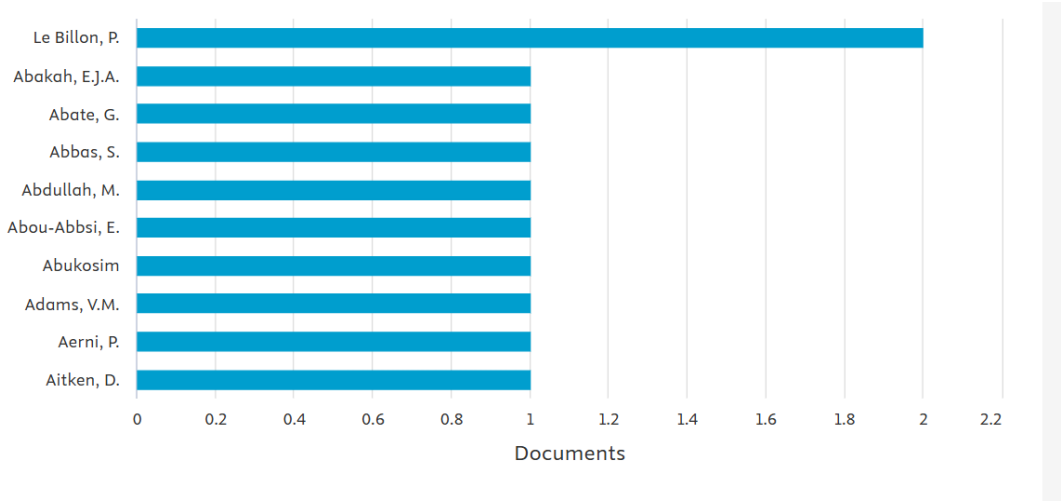


**Figure 4.** The Most Productive Authors

### *4.4. Mapping ESG Risk and Social Impact Assessment Research by Subject Area*

Studies on ESG risk mapping and social impact assessments, based on scientific fields, reveal strong interdisciplinary trends. The most significant proportion of research comes from the realm of Environmental Science, accounting for 37.5%, which confirms the dominance of ecological issues, such as climate change, pollution, and the destruction of natural resources, within the framework of ESG discussions.

Furthermore, the contribution of the Social Sciences reached 18.8%, focusing on social justice issues, community resilience, and ethics-based governance practices. Meanwhile, the Energy sector accounted for around 9.3%, illustrating the urgency of the transition to a sustainable energy system while highlighting the risks posed by dependence on fossil fuels.

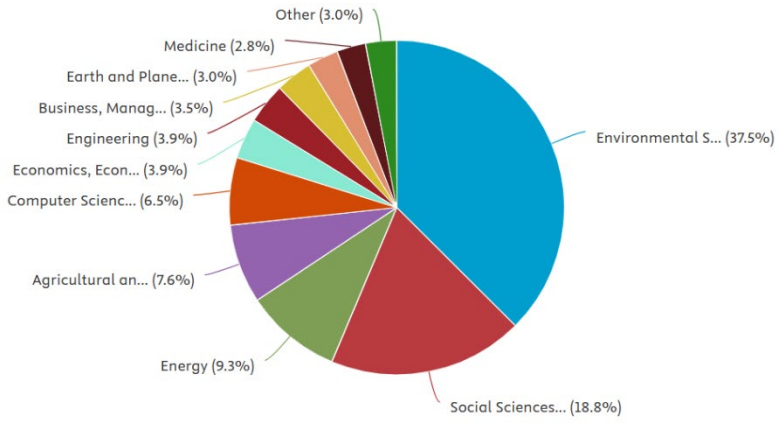


**Figure 5.** Research on ESG risks and Social Impact Assessment classified by Subject Area

Other disciplines that also play a role include Agriculture and Biology (7.6%), Computer Science (6.5%), Economics and Finance (3.9%), Engineering (3.9%), and Business and Management (3.5%). Each field presents its own perspective, ranging from food security to the use of digital technology for sustainability, as well as ESG-based investment performance and corporate strategy. Meanwhile, smaller contributions came from Engineering, Earth and Planetary Sciences (3.0%), and Medicine (2.8%), which cover essential aspects such as technological innovation, potential natural disasters, and public health. The other 3% came from the interdisciplinary realm, confirming the broader relevance of ESG in various academic

areas. This distribution pattern indicates that ESG risk-related studies are multidimensional and necessitate a cross-disciplinary approach to address the major challenges in sustainable development.

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

A list of the most frequently cited publications is presented in Table 2. Research on Environmental, Social, and Governance (ESG) risks and social impact assessments has undergone significant developments in recent years, showing important evolutions in focus, methodologies, and practical implications. Based on the most influential publications, several significant trends and patterns related to ESG risk and social impact assessment can be observed in scientific journals. These studies, which focus on the simple relationship between ESG performance and financial performance, are evolving into more complex studies that analyse the multidimensional interactions between various ESG factors and their impact on corporate risk**.**

**Table 2.** Most Cited Articles

| No | Article | Authors | Source | Year | Citations |
|---|---|---|---|---|---|
| 1 | 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 | 313 |
| 2 | 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 | 295 |
| 3 | What makes climate change adaptation effective? A systematic review of the literature | Owen, Gigi | Global Environmental Change, 62, 102071 | 2020 | 261 |
| 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 | 180 |
| 5 | Open innovation 4.0 as an enhancer of sustainable innovation ecosystems | Costa, Joana; Matias, João C.O. | Sustainability (Switzerland), 12(19), 8112 | 2020 | 170 |
| 6 | Heatwave-induced human health risk assessment in megacities based on heat stress-social vulnerability-human exposure framework | Dong, Jianquan; Peng, Jian | Landscape and Urban Planning, 203, 103907 | 2020 | 148 |
| 7 | The application of corporate social responsibility (CSR) actions for mitigation of | Karwowski Mariusz | Corporate Social Responsibility and Environmental | 2021 | 125 |

| | |
|---|---|
| environmental, social, corporate governance (ESG) and reputational risk in integrated reports | Management, 28(4), pp. 1270-1284 |

Source: Scopus Database

### *4.6. Mapping ESG Risk and Social Impact Assessment Research Based on Network Visualization*

Analysis was conducted on the simultaneous emergence of keywords and thematic trends to identify future research directions on ESG risk and social impact assessment. Keywords are seen as the most concise representation of a scientific article. Through observing the relevance of keywords in a field, researchers can gain a brief overview of the main issues and potential directions for further academic studies. In this study, a map of the concurrent occurrence of keywords was compiled using the VOSviewer software, as shown in Figure 6. In academia, this type of mapping helps form a network of topics while also illustrating the relationships between research issues.

On the map, the size of the nodes describes the intensity of the occurrence of a keyword, while the distance between nodes and the thickness of the lines connecting them indicate the frequency of the linkage. The colour associated with the node signifies a grouping of specific keywords, which typically reflects a broader research domain. Over the period from 2020 to 2024, this mapping reveals the formation of two main clusters that summarise the significant thematic focuses in the study of ESG risk assessment and social impact.

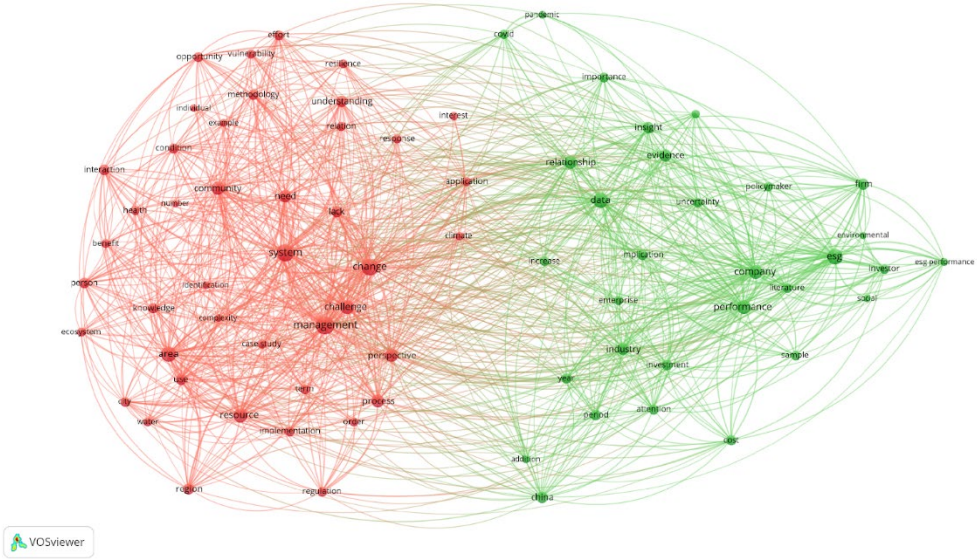


**Figure 6.** Network Visualization of ESG Risk and Social Impact Assessment Research

The co-occurrence-based bibliometric visualisation presented earlier reveals the existence of a complex and layered knowledge structure in the literature on ESG risks and social impact assessment. The mapping results through VOSviewer show the existence of two main groups—the red cluster on the left side and the green cluster on the right—which, despite their interconnectedness, still highlight different thematic focuses.

**1. Red Cluster**

The red cluster contains keywords such as *system, management, resilience, vulnerability, governance, challenge, and community*. The focus of this cluster describes the theoretical and

methodological directions in evaluating ESG risks and social impacts, especially at the system and community scales.

The concepts of resilience and vulnerability, which are prominent in this group, are often highlighted in the literature on climate change and social risk management. Yunus & Nanda (2024) emphasizing the importance of systemic frameworks for understanding people's responses to environmental stresses. In line with that, Gain et al. (2020) emphasizing the need for an interdisciplinary approach to deal with complexity and uncertainty in socio-ecological systems.

In addition, the presence of the words' governance' and 'integration' indicates that there are efforts to strengthen the application of ESG principles in public policies oriented towards social justice. Additionally, ESG emphasises the integration of sustainability aspects into regulations at various levels of government.

**2. Green Cluster**

Green clusters form a more practice-oriented and data-driven literature structure, with keywords such as *company, firm, data, evidence, performance,* and *policy maker.* The direction of this cluster indicates the focus of empirical research examining the connection between ESG risks and company performance and financial aspects.

The emergence of terms such as *uncertainty, insight,* and *relationship* indicates that this literature also highlights the limitations of knowledge and challenges in measuring ESG consistently. Saini et al. (2022) identify significant variations in ESG scores among data providers, which in turn impact investment decisions and the credibility of risk management strategies.

In addition, keywords such as *"change," "climate," "implication," "relationship," and "application" serve* as a link between clusters. The presence of these terms confirms an epistemological shift from conceptual approaches to evidence-based applied studies. The evolution of this methodology is also affirmed by Zhao et al. (2023) through a meta-analytical study on ESG disclosure and its influence on stakeholder decision-making.

### *4.7. Mapping ESG Risk and Social Impact Assessment Research Based on Overlay Visualization*

This visualization overlay image from the bibliometric analysis provides a temporal overview of the evolution of research themes in the domains of ESG risk and social impact assessment. The colours of each term (node) represent the average year of publication of a document that uses that term, with a spectrum ranging from blue (older, before 2022) to yellow (newer, closer to 2023–2024).

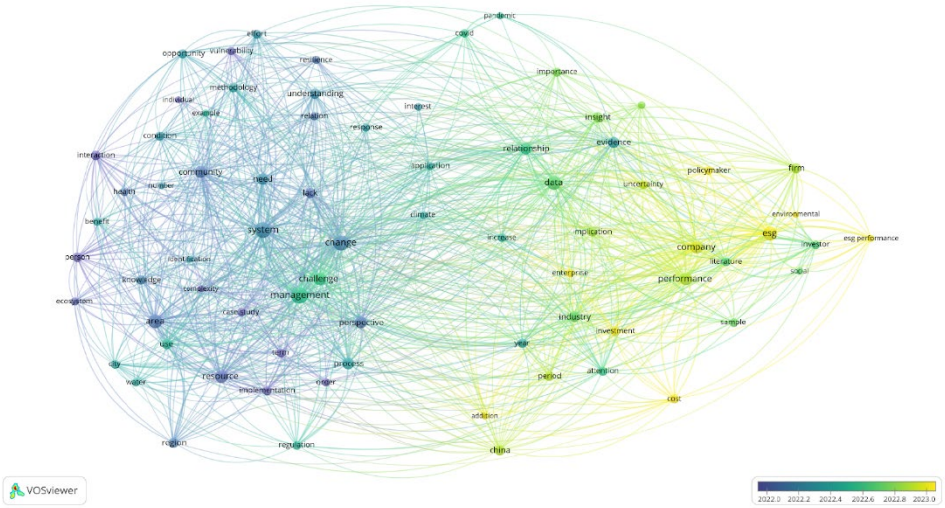


**Figure 7.** Overlay Visualization of ESG Risk and Social Impact Assessment Research

**1. The Dominance of Early Research: Systems, Resilience, and Social Complexity**

On the left side of the graph, you can see the dominance of terms such as *resilience, vulnerability, system, community,* and *governance,* which are marked by blue and turquoise. This phenomenon indicates that, in the early phases of research development (before 2022), researchers' focus is more directed towards theoretical and conceptual frameworks, particularly those related to social sustainability, adaptive systems, and climate change management.
Transition to Data Focus and Performance Evaluation

Moving to the right side of the visualisation, terms such as "data," "relationship," "evidence," "insight," and "company" are displayed in bright green and yellow. This pattern signals a shift in research towards a more quantitative and evaluation-based approach, especially from 2022 onwards.The research results found that disclosure in ESG reports has a significant impact on investors' perception of risk and the company's valuation.

In addition, the emergence of keywords such as *"firm," "ESG performance," and "environmental"* in yellow marks an increasing focus on evaluating the impact of ESG on financial performance, as well as its use as a strategic indicator in sustainable investment. A high ESG score can demonstrate better resilience to post-pandemic economic uncertainty.

**2. From Conceptual to Evaluative**

The change in colour gradation from blue to yellow represents a paradigm shift, specifically from a conceptual study with an emphasis on community and governance (before 2022) to a data-driven research, focusing on the analysis of causal relationships and corporate performance (2022–2024). This shift indicates a shift in focus from the macro-systemic level to a micro-analytical approach that can be quantitatively captured through corporate strategy. The shift in research direction promotes the integration of ESG into energy policy and investment practices. This makes ESG no longer seen as just an ethical instrument, but as a strategic tool that influences cross-level economic decision-making. The *overlay visualisation confirms that research on ESG and social impact assessment has undergone significant evolution from 2020 to* 2024. The current direction of development is moving rapidly towards a data-driven approach, with a major spotlight on ESG performance assessments within the corporate realm. These findings suggest that the future prospects for ESG research will be increasingly intertwined with data science, applied economics, and public policy that prioritise empirical evidence.

### *4.8. Mapping ESG Risk and Social Impact Assessment Research Based on Density Visualization*

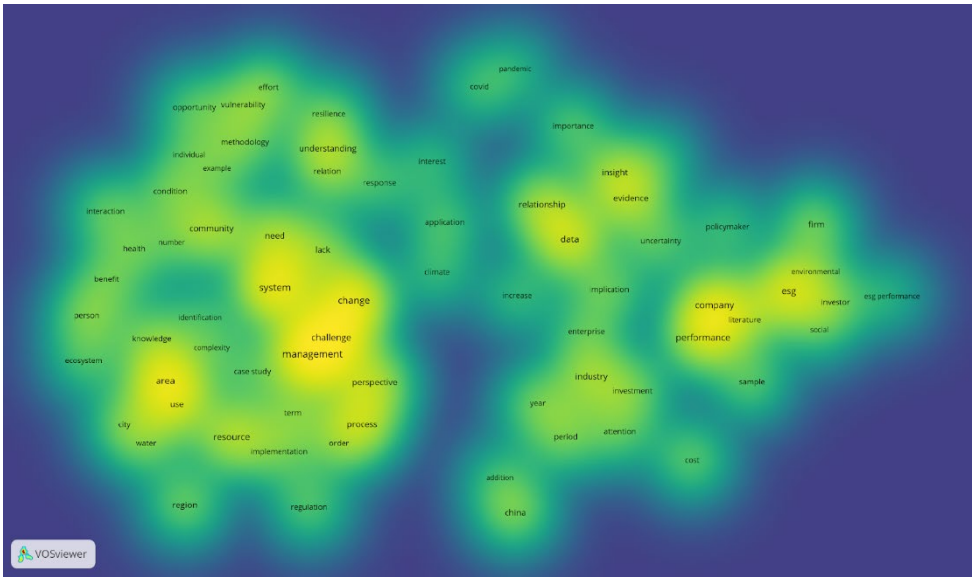


**Figure 8.** Density Visualization of ESG Risk Research and Social Impact Assessment

The density visualisation in VOSviewer displays the distribution of keyword intensity in the scientific literature on *ESG risk and social impact assessment*. Areas with yellow colour reflect points with high frequency and dense connectivity, while blue areas indicate regions with relatively lower intensity levels.

1. Highest Density Points: "Management", "System", "Company", and "Performance"

The four keywords that seem to stand out the most in *density visualization*—management *, system, company,* and *performance*—represent the core of the latest study. This confirms that the primary focus of the current research is on integrating ESG risk management systems into company operations, as well as assessing sustainability performance.

Openness in ESG disclosure can increase investors' perception of risk and company valuation, thereby making the keywords' performance' and 'company' the centre of scientific discourse. In line with this, systematically integrating ESG aspects into corporate strategic management plays a crucial role in enhancing long-term resilience.

2. Medium Density: "Data", "Relationship", "Evidence", "Challenge", and "Resource"

Medium-intensity zones (green to light yellow), represented by the words *data, relationship, evidence,* and *challenge,* show an increase in quantitative-based studies in evaluating ESG impacts. This phenomenon indicates a shift from a normative approach to an evaluative model, where researchers are increasingly using longitudinal and panel data to assess the contribution of ESG to economic and social performance.

3. Low-Density Points: "Vulnerability", "Resilience", "Community", and "Climate"

Terms that appear in blue-green areas, such as *vulnerability, resilience,* and *community*, although not dominating quantitatively, still play an important role as a conceptual foundation in ESG research. These themes are often found in the early literature that emphasises the social and ecological dimensions of sustainability.

Integrate socio-ecological aspects and local governance to build a more resilient system that can effectively address ESG risks. Furthermore, social justice and multilevel governance are strategic components in the implementation of ESG.

Although not dominating quantitatively, these themes still play an important role as a conceptual foundation in ESG research. They are often found in early literature that emphasizes the social and ecological dimensions of sustainability. In the context of developing countries

such as Indonesia, the practical implications of these concepts are particularly relevant for strengthening local governance, enhancing community and financial resilience, and integrating ESG performance into economic and policy decision-making, given that empirical contributions from emerging markets remain limited (Wahyuningtyas et al., 2024).

Overall, this visualisation shows that ESG and social impact research are increasingly moving towards a managerial orientation and corporate performance, but are still grounded in socio-ecological issues. The dominance of the terms' management' and 'performance' confirms the position of ESG as a strategic tool for the company, while words such as 'resilience' and 'community' emphasise the importance of the social dimension and justice. Thus, the future direction of research needs to combine the strength of data-driven approaches with sensitivity to local contexts, so that ESG policies are not only economically practical, but also inclusive and equitable.

## 5. Conclusion

Research on Environmental, Social, and Governance (ESG) risks and Social Impact Assessment (SIA) has developed rapidly from 2020 to 2024. The volume of publications increased significantly, reaching a peak in 2024 with 62 articles, indicating a growing academic interest in this topic. In total, 201 articles were published during the period, garnering a total of 1,954 citations, which reflects the impact and relevance of this research in academia.

The dominance of research in this field stems from developed countries, including China, the United States, and the United Kingdom, which are major contributors. On the other hand, contributions from developing countries such as Indonesia are still limited. This phenomenon shows a global interest, but with a high concentration of research in countries with larger GDP per capita. The nature of the research is also highly interdisciplinary, with Environmental Sciences being the leading field, followed by Social Sciences and the Energy sector, confirming the broad scope of ESG issues.

Keyword analysis revealed a significant shift in the study's focus, which was categorised into two main clusters: the red cluster and the green cluster. The red cluster contains keywords such as system, management, resilience, vulnerability, governance, and community. The cluster focuses on theoretical and methodological directions for evaluating ESG risks and social impacts at the system and community scales. The concepts of resilience and vulnerability that stand out here are often discussed in the literature on climate change and social risk management. The presence of the words' governance' and 'integration' also indicates efforts to strengthen the application of ESG principles in public policies oriented towards social justice.

Meanwhile, the green cluster forms a literature structure that is more practice-oriented and data-based. Keywords include company, firm, data, evidence, performance, and policymakers. The direction of this cluster indicates the focus of empirical research examining the relationship between ESG risk and company performance, as well as its financial aspects. The emergence of terms such as uncertainty, insight, and relationships also indicates that this literature highlights the limitations of knowledge and challenges in consistently measuring ESG.

Overall, the evolution of this research shows a paradigm shift. ESG is no longer viewed solely as an instrument of ethics or compliance, but rather as a strategic tool integral to corporate management and economic decision-making. Although the focus shifts toward data-driven evaluation and corporate performance, the social and equity dimensions, represented by keywords such as resilience and community, remain essential conceptual foundations. Thus, the future direction of research is expected to combine a data-driven approach with a deep understanding of the local socio-ecological context.

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