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GREENWASHING AND ESG: A BIBLIOMETRIC ANALYSIS OF GLOBAL RESEARCH TRENDS, INTELLECTUAL STRUCTURE, AND EMERGING THEMES

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Abstract: *In recent years, the intersection of greenwashing and Environmental, Social, and Governance (ESG) practices has attracted substantial academic and policy interest due to the rising emphasis on corporate sustainability and accountability. Despite the expanding body of research, the intellectual structure and global evolution of this domain remain underexplored. This study conducts a comprehensive bibliometric analysis to map the scientific landscape of greenwashing and ESG literature, using data extracted from the Scopus database spanning 2012–2025. Employing tools such as biblioMagika®, OpenRefine and VOSviewer, the study identifies publication trends, influential authors, institutions, journals, and thematic clusters that define the research trajectory. The findings reveal a rapid growth in publications post-2015, driven by increasing regulatory scrutiny and investor demand for transparent sustainability reporting. Key thematic areas include corporate social responsibility, sustainability communication, ESG disclosure quality, and stakeholder legitimacy. The analysis also uncovers gaps in empirical validation and calls for future research integrating ESG performance metrics with behavioral and policy perspectives. This paper contributes to the consolidation of knowledge on greenwashing and ESG, providing a foundation for scholars, policymakers, and practitioners seeking to promote authentic and accountable sustainability practices.*

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Keywords: *Greenwashing, ESG, bibliometric analysis, sustainability reporting, Scopus; VOSviewer*

Introduction

Environmental, social, and governance, ESG, has become increasingly important in corporate strategy, investment decisions, and regulatory debate. Firms are now expected to demonstrate not only financial performance but also responsible environmental, social, and governance practices. As ESG reporting has expanded, concerns have also grown over the credibility of sustainability claims and the extent to which such disclosures reflect actual performance rather than symbolic positioning (Berg et al., 2022; Gillan et al., 2021).

In this context, greenwashing has emerged as a major issue in both research and practice. Greenwashing refers to misleading or exaggerated claims that create a false impression of a firm's environmental or sustainability performance (Delmas & Burbano, 2011). In the ESG era, this concern extends beyond advertising to include sustainability reporting, non-financial disclosure, ESG ratings, and stakeholder communication. Prior studies show that unreliable ESG disclosures can undermine decision-making and create barriers to the effective use of ESG information by investors and other stakeholders (Yu et al., 2020).

Research on greenwashing and ESG has grown rapidly across disciplines such as management, accounting, finance, and environmental studies. Existing studies examine issues including disclosure quality, stakeholder legitimacy, reporting incentives, and the financial implications of sustainability claims (Lee & Raschke, 2022; Uyar et al., 2020). However, the field remains fragmented, and existing reviews do not fully capture its broader publication trends, intellectual structure, and thematic development. A bibliometric analysis is therefore useful because it allows a systematic mapping of influential publications, key contributors, and emerging research themes (Gillan et al., 2021; Lee & Raschke, 2022).

Against this background, this study conducts a bibliometric analysis of global research on greenwashing and ESG. It aims to map the evolution of the literature, identify influential contributors, uncover the intellectual structure of the field, and highlight emerging themes. In doing so, the study provides a structured overview of publication trends, citation patterns, and thematic development, while also identifying underexplored areas for future research.

Problem Statement

The rapid growth of environmental, social, and governance reporting has increased the demand for credible sustainability information. Firms are now expected to disclose their environmental and social performance to investors, regulators, consumers, and other stakeholders. However, this pressure may encourage firms to present favourable ESG narratives that do not fully reflect their actual practices. This creates a credibility problem because stakeholders may rely on ESG disclosures that are selective, vague, exaggerated, or unsupported by evidence.

Greenwashing has therefore become a major concern in ESG reporting. It refers to misleading sustainability communication that creates an overly positive image of corporate environmental performance (Delmas & Burbano, 2011; Lyon & Montgomery, 2015). In the ESG context, greenwashing may also involve symbolic reporting, weak disclosure quality, inconsistent ESG ratings, and gaps between ESG claims and actual corporate behaviour. This issue is closely

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related to ESG decoupling, where firms disclose sustainability commitments without corresponding substantive action (Laeeq et al., 2026).

Although research on greenwashing and ESG has grown rapidly, the literature remains fragmented. Existing bibliometric studies have examined general greenwashing, CSR greenwashing, ESG disclosure prevention, ESG business research, ESG decoupling, and regional comparisons (Chytis et al., 2024; Hu et al., 2026; Pop et al., 2026; Sneideriene & Legenzova, 2025). However, limited attention has been given to integrating these studies into a clear map of global research trends, intellectual structure, and emerging themes linking greenwashing and ESG.

Therefore, this study conducts a bibliometric analysis of greenwashing and ESG research. By mapping publication trends, influential contributors, research clusters, and emerging themes, this study aims to clarify how greenwashing has evolved into a central issue in ESG disclosure credibility, corporate accountability, and sustainability reporting.

Accordingly, this study addresses four key research questions:

a) Who are the most influential authors, institutions, and journals in greenwashing - ESG research?
b) What publication and citation trends illustrate the field's evolution over time?
c) What dominant themes and emerging topics characterize literature?
d) How have collaboration patterns among countries and institutions developed in this domain?

By answering these questions, this bibliometric study provides a comprehensive overview of global greenwashing and ESG research, identifying both its foundational works and its most promising directions for future inquiry.

Literature Review

ESG reporting, sustainability disclosure, and corporate accountability

Environmental, social, and governance reporting has become a major mechanism through which firms communicate their sustainability commitments, governance practices, risk exposure, and long-term value creation strategies. ESG reporting differs from traditional financial reporting because it extends corporate accountability beyond financial performance to include environmental impact, social responsibility, ethical conduct, board oversight, and stakeholder engagement. As investors, regulators, consumers, and civil society increasingly demand credible sustainability information, ESG disclosure has become central to corporate legitimacy and market confidence.

From an accounting perspective, ESG reporting raises important questions about disclosure quality, materiality, assurance, comparability, and reliability. ESG information is useful only when it reflects actual corporate practices rather than symbolic communication. When firms disclose sustainability information without measurable, verifiable, or comparable evidence, ESG reporting may fail to reduce information asymmetry. Instead, it may create opportunities for impression management. This problem is especially important because ESG information is now used in investment screening, risk assessment, credit evaluation, corporate reputation management, and regulatory monitoring. Therefore, ESG reporting is not merely a communication exercise. It is an accountability mechanism.

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Recent ESG research shows that the field has grown rapidly across business, finance, accounting, and management disciplines. Chytis et al. (2024), for example, found upward publication and citation trends in ESG business research and showed that ESG scholarship increasingly involves performance analysis, conceptual structure mapping, and collaboration networks. Similarly, Rani et al. (2025) mapped ESG and CSR literature and found that sustainability, ESG, and CSR have become key research domains for firms attempting to balance financial objectives with social and environmental responsibility. These studies suggest that ESG research has moved from a peripheral sustainability topic to a mainstream business and governance issue.

Conceptualising greenwashing

Greenwashing refers to misleading environmental or sustainability-related communication that creates an overly favourable impression of a firm's environmental conduct. Delmas and Burbano (2011) define greenwashing as misleading consumers about a firm's environmental performance or the environmental benefits of a product or service. Their work identifies several drivers of greenwashing, including external pressures, market incentives, organisational weaknesses, and uncertain regulation. This definition remains influential because it frames greenwashing as a problem of mismatch between corporate claims and actual environmental performance.

Lyon and Montgomery (2015) extend the concept by describing greenwashing as communication that misleads stakeholders into forming overly positive beliefs about an organisation's environmental practices or products. This broader definition is useful because greenwashing does not always involve direct falsehood. It can also occur through selective disclosure, vague language, exaggeration, symbolic commitments, omission of negative information, or excessive emphasis on minor environmental initiatives. Thus, greenwashing can be understood as a spectrum of misleading sustainability communication rather than a single form of misconduct.

In the context of accounting and corporate reporting, greenwashing is best understood as a disclosure credibility problem. A firm may issue sustainability reports, ESG statements, carbon neutrality pledges, or climate-related disclosures while failing to provide sufficient evidence that these claims reflect substantive action. This creates a gap between what firms say and what firms do. The issue is not only environmental. It affects auditability, assurance, stakeholder trust, reporting quality, and the reliability of non-financial information. For this reason, greenwashing has become increasingly relevant to sustainability accounting, corporate governance, and ESG assurance research.

Greenwashing in the ESG context

The link between greenwashing and ESG has become stronger as ESG information has gained importance in financial markets and corporate decision-making. ESG disclosures are used by investors, analysts, regulators, rating agencies, lenders, consumers, and other stakeholders to evaluate corporate responsibility, risk, and long-term resilience. However, when ESG claims are vague, selective, exaggerated, or unsupported by verifiable evidence, they may distort stakeholder judgement. In this sense, greenwashing undermines the usefulness of ESG information.

Greenwashing in ESG disclosure is particularly serious because ESG information can influence capital allocation. Investors may direct funds toward firms that appear sustainable, even when

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the underlying practices do not support the claims made in public disclosures. This creates a risk of mispricing, weakens market discipline, and reduces trust in sustainable finance. Bhullar et al. (2025) argue that research on greenwashing and ESG is closely connected to information asymmetry, market efficiency, ESG disclosure quality, and accountability. Their bibliometric and systematic review shows that greenwashing can affect ESG practices within the business community and shape future research on transparency, mispricing, and disclosure credibility.

Greenwashing is also connected to the concept of ESG decoupling. ESG decoupling occurs when a gap exists between a firm's ESG disclosures and its actual practices. Laeeq et al. (2026) define ESG decoupling as the gap between ESG disclosure and actual corporate behaviour, and they position greenwashing as part of a wider problem involving corporate governance, brownwashing, corporate irresponsibility, SDGs, and ESG auditing. This concept strengthens the theoretical basis of greenwashing research because it moves the discussion beyond misleading claims toward the deeper problem of disclosure-performance misalignment.

Theoretical foundations of greenwashing and ESG research

Several theories explain why firms engage in ESG reporting and why greenwashing may occur. Stakeholder theory suggests that firms disclose ESG information to respond to the expectations of investors, regulators, customers, employees, and society (Freeman, 1984). However, when stakeholder pressure is strong but actual sustainability performance is weak, firms may exaggerate ESG achievements or disclose information selectively.

Legitimacy theory argues that firms use disclosure to gain or maintain social acceptance (Suchman, 1995). In environmentally sensitive industries, ESG reporting may be used to manage legitimacy threats arising from pollution, climate risk, regulatory scrutiny, or public criticism. Greenwashing occurs when such reporting is symbolic rather than supported by substantive corporate action.

Signalling theory explains ESG disclosure as a way for firms to signal strong governance, environmental responsibility, and long-term sustainability (Spence, 1973). However, ESG signals become unreliable when they are not supported by measurable indicators, credible evidence, or independent assurance. Under these conditions, ESG disclosure may increase information asymmetry rather than reduce it.

Impression management theory further explains how firms may use sustainability narratives to shape stakeholder perceptions. Firms may highlight positive ESG actions while downplaying negative environmental or social impacts (Merkl-Davies & Brennan, 2007). Therefore, greenwashing can be viewed as a form of impression management in which ESG communication creates an image of responsibility that may not reflect actual performance.

Together, these theories suggest that greenwashing arises from the tension between accountability and image management. ESG reporting can improve transparency, but it can also enable symbolic disclosure when firms prioritise legitimacy and reputation over substantive sustainability performance.

Previous bibliometric research on greenwashing, ESG, and CSR

Recent bibliometric studies show growing scholarly interest in greenwashing, ESG disclosure, CSR, and sustainability accountability. These studies are important because they map publication trends, influential contributors, research clusters, and emerging themes in a field

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that has expanded rapidly across accounting, finance, management, marketing, and environmental studies.

Several studies examine greenwashing as a broad sustainability and CSR issue. Wodnicka and Tartaraj (2025) analysed greenwashing in corporate social responsibility and found that the literature increasingly connects greenwashing with ESG, corporate governance, and sustainability communication. Mehta et al. (2025) examined greenwashing as part of the "dark side" of sustainability and identified key themes such as CSR, ESG performance, consumer trust, climate change, and sustainability scepticism. Similarly, Astuti et al. (2025) mapped the evolution of greenwashing research and showed that the field has expanded from environmental marketing into regulation, governance, sustainable finance, digital technology, and artificial intelligence.

A more recent stream focuses specifically on greenwashing in ESG disclosure. Sneideriene and Legenzova (2025) examined greenwashing prevention in ESG disclosures and argued that greenwashing threatens disclosure accuracy, financial market confidence, stakeholder trust, and decision-making quality. Hu et al. (2026) compared ESG greenwashing research in China and the global context, showing that the field has developed through stages of emergence, growth, and expansion. Mugisana et al. (2025) also studied greenwashing in ESG disclosure through theoretical and bibliometric analysis, highlighting regulation, transparency, governance, and reporting quality as dominant themes.

Other related studies examine broader ESG, CSR, and decoupling literature. Chytis et al. (2024) mapped ESG in business research, while Rani et al. (2025) analysed ESG and CSR literature to identify global research trends and emerging themes. Laeeq et al. (2026) examined ESG decoupling, which refers to the gap between ESG disclosure and actual corporate behaviour. This concept is closely related to greenwashing because it captures the mismatch between symbolic sustainability claims and substantive corporate practices.

The closest prior studies to the present research are Bhullar et al. (2025) and Pop et al. (2026). Bhullar et al. (2025) examined greenwashing and ESG using bibliometric analysis and identified themes related to information asymmetry, market efficiency, ESG disclosure, accountability, and mispricing. Pop et al. (2026) provided a broad bibliometric overview of greenwashing research and highlighted the changing nature of greenwashing in relation to sustainability reporting and ESG credibility.

Overall, previous bibliometric studies have made important contributions, but the literature remains fragmented. Some studies focus on general greenwashing, others on CSR, ESG disclosure, ESG business research, ESG decoupling, or regional comparisons. This study responds to that gap by focusing specifically on greenwashing and ESG as a disclosure credibility and accountability problem. It maps global research trends, intellectual structure, and emerging themes to clarify how greenwashing has evolved into a central issue in ESG reporting and sustainability accountability.

Research gap and positioning of the present study

Existing bibliometric studies have made important contributions, but the literature remains fragmented. Some studies focus on general greenwashing research, while others focus on CSR greenwashing, ESG business research, ESG-CSR literature, ESG disclosure prevention, China-

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global comparison, or ESG decoupling. Although these studies overlap, they do not fully integrate greenwashing and ESG as a single disclosure credibility and accountability problem.

This study addresses that gap by mapping global research trends, intellectual structure, and emerging themes at the intersection of greenwashing and ESG. Unlike broader ESG bibliometric studies, this paper focuses specifically on greenwashing as a threat to ESG disclosure quality. Unlike general greenwashing bibliometric studies, this paper places ESG reporting, assurance, accountability, and disclosure-performance alignment at the centre of the analysis. The study therefore contributes by clarifying how greenwashing has evolved from an environmental communication issue into a central concern in ESG reporting, corporate governance, sustainable finance, and accounting research.

The paper also contributes methodologically by using bibliometric analysis to identify publication trends, influential contributors, intellectual foundations, collaboration structures, and emerging research clusters. This enables a systematic understanding of how the field has developed and where future research is likely to move. In particular, the study highlights future research opportunities related to ESG assurance, greenwashing detection, ESG ratings, sustainability reporting quality, regulatory enforcement, artificial intelligence, and the measurement of disclosure-performance gaps.

Emerging Frontiers in ESG and Greenwashing Research

Recent research trends in ESG demonstrates that methodologies and data sources are evolving. Liu et al. (2023) used social media data to assess public ESG perceptions, revealing that societal sentiment influences corporate reputations. Pop et al. (2025) conducted a bibliometric analysis of the shifting greenwashing literature landscape, highlighting themes such as misinformation, ESG fraud, and verification mechanisms. Forliano, Battisti, de Bernardi & Kliestik (2025) provided a systematic meta-analysis that identifies four thematic clusters in greenwashing literature, which are social responsibility, institutional complexity, performance outcomes, and marketing/trust, which offers theoretical typologies for future study. Collectively, these studies point to a growing need for more objective, data-rich methodologies to evaluate ESG credibility, detect greenwashing, and integrate macro and micro level perspectives.

The remainder of this paper is organised as follows. Section 3 outlines the methodology, detailing data collection from the Scopus database, search strategies, and bibliometric techniques deployed for both performance and science mapping. Section 4 presents and discusses empirical findings, including publication and citation trajectories, influential authors, journals and institutions, dominant thematic clusters, and international collaboration patterns in the greenwashing–ESG literature. Finally, Section 5 concludes by summarising key insights, identifying emerging research frontiers, and discussing theoretical, methodological and practical implications for advancing scholarship and practice in the domains of greenwashing and ESG.

Research Methodology

This study employs a bibliometric approach to systematically map the intellectual, conceptual, and social structures of greenwashing and Environmental, Social, and Governance (ESG) research. Bibliometric methods are particularly effective for capturing the evolution of emerging knowledge domains, identifying influential authors and publications, and uncovering thematic trends across large bodies of literature. By integrating performance analysis with

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science mapping, this study provides a comprehensive, replicable, and objective overview of the global greenwashing - ESG research landscape.

Research Design

A bibliometric design was adopted to evaluate scholarly research, citation performance, and collaboration patterns within the greenwashing - ESG literature. The research design enables both quantitative analyses; to assess publication output, citation impact, and authorship networks and qualitative insights; to explore conceptual linkages, intellectual foundations, and thematic evolution.

Performance analysis was used to identify the most influential authors, journals, countries, and institutions, while science mapping techniques (co-authorship, co-citation, and co-word analyses) were applied to visualize intellectual and conceptual structures within the field.

Data Source and Collection

The Scopus database was selected as the primary data source due to its comprehensive coverage of peer-reviewed journals, high indexing standards, and rich bibliographic metadata suitable for bibliometric analysis. The search strategy combined relevant keywords related to "greenwashing" and "Environmental, Social, and Governance (ESG)" within titles, abstracts, and author keywords. Boolean operators and wildcard symbols were used to broaden the search scope while maintaining relevance.

The search was conducted on 15 February 2026, covering publications from the year 2012 to 2025. The search was limited to journal articles, conference papers, and book chapters, while editorials, notes, and non-scholarly items were excluded to ensure academic rigor. The following search string was used in Scopus to retrieve the dataset:

TITLE-ABS-KEY (("greenwashing") AND ("ESG" OR "environmental" OR "social" OR "governance") AND ("sustainability" OR "sustainable" OR "responsibility" OR "ethical") AND ("stakeholder" OR "shareholder" OR "investor" OR "community") AND ("transparency" OR "accountability" OR "disclosure" OR "reporting")

The initial search yielded nearly 600 documents related to greenwashing and Environmental, Social, and Governance (ESG) practices. To ensure analytical precision and data reliability, a rigorous data cleaning and harmonization process was undertaken. Duplicate records were systematically identified and removed to eliminate redundancy and potential citation bias. Subsequently, document titles, abstracts, and keywords were manually reviewed to exclude irrelevant studies, non-peer-reviewed publications, and papers that did not explicitly address the intersection of greenwashing and ESG reporting.

To enhance data quality and interoperability, OpenRefine and biblioMagika® (Ahmi, 2024) were employed for metadata standardization and normalization of author names, institutional affiliations, country codes, and keyword variations. These tools ensured consistency by detecting and correcting typographical errors, duplicates, and formatting inconsistencies across bibliographic fields. For advanced bibliometric visualization, VOSviewer (van Eck & Waltman, 2014) was utilized to construct co-authorship, co-citation, and keyword co-occurrence networks, enabling the identification of intellectual structures, collaboration patterns, and thematic clusters within the greenwashing–ESG research domain.

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Following this comprehensive refinement, the final dataset comprised 476 publications (articles, reviews, and conference papers) spanning from year 2012 to 2025, providing a robust foundation for mapping global research trends, impact, and thematic evolution in the field.

Data Cleaning, Standardization, and Harmonization

The bibliographic dataset retrieved from Scopus was subjected to a rigorous two-stage cleaning and harmonization process to ensure accuracy, coherence, and analytical reliability. Two complementary software tools, biblioMagika® (Ahmi, 2024) and OpenRefine, were used to standardize records, harmonize metadata, and enhance overall data quality before bibliometric analysis.

Stage 1: Pre-processing with biblioMagika®

In the first stage, biblioMagika®, an Excel-based bibliometric toolkit, was employed to conduct data normalization and quality alignment. The process involved:
Unifying author name variations (e.g., "Smith, J." and "Smith, John") into standardized records. Consolidating institutional name discrepancies (e.g., "Harvard University" and "Harvard Univ."). Ensuring consistent formatting of country names and regional identifiers.

This standardization reduced redundancy and improved metadata consistency, allowing for accurate computation of key bibliometric indicators such as total citations, h-index, and publication counts. The refined dataset was then prepared for visualization in VOSviewer (van Eck & Waltman, 2014), facilitating the mapping of collaboration and citation networks.

Stage 2: Refinement with OpenRefine

The second stage focused on improving precision and completeness through data verification and correction. OpenRefine was applied to (i) clarify author identities with similar names by verifying affiliations and publication records; (ii) correct incomplete or inconsistent institutional and country entries and (iii) align geographic identifiers with ISO-standard nomenclature to support accurate spatial and collaboration analyses.

This systematic two-stage approach ensured a high-quality, coherent dataset, minimizing potential errors that could distort bibliometric results or visual interpretations.

Bibliometric Tools and Analytical Techniques

To ensure transparency and reproducibility, a PRISMA-style approach was followed to document the screening and selection process. An initial 604 records were retrieved from Scopus, of which 8 were excluded due to duplication, irrelevance, or incomplete metadata. The resulting 596 publications, comprising journal articles, reviews, and conference papers spanning 2012–2025, formed the final dataset used for bibliometric analysis of greenwashing–ESG research.

To preserve the integrity of citation metrics, self-citations were identified and excluded using VOSviewer's normalization filter, supplemented by validation in OpenRefine. This ensured that the analysis accurately reflected genuine scholarly influence among distinct authors and institutions.

The curated dataset was analyzed through performance analysis and science mapping using VOSviewer. The performance analysis evaluated research productivity, citation impact, and the

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most influential authors, institutions, and journals. Science mapping techniques were applied to explore the structural and conceptual dimensions of the field, including:

- Co-citation analysis: identifying foundational studies and shared intellectual linkages.
- Keyword co-occurrence analysis: revealing conceptual relationships and emerging research trends.
- Bibliographic coupling: uncovering active thematic clusters and current research fronts.

Together, these techniques provide a comprehensive overview of the intellectual evolution, collaborative dynamics, and thematic structure of greenwashing - ESG scholarship, establishing the foundation for the subsequent results and discussion.

Visualization and Interpretation

VOSviewer was employed to generate visual network maps depicting the structural and thematic landscape of greenwashing and Environmental, Social, and Governance (ESG) research. In these maps, nodes represent research entities, such as authors, institutions, or keywords, while link strength indicates the closeness of their relationships. The visualizations, including trend graphs, bibliographic coupling, and thematic evolution maps, illustrate research growth, clustering patterns, and collaboration intensity across regions and disciplines. Together, these outputs provide a comprehensive and integrated view of how greenwashing–ESG research has evolved, identifying key thematic clusters, emerging areas of inquiry, and the expanding global collaboration underpinning this field.

Results and Discussion

This section presents and interprets the results of a comprehensive bibliometric analysis conducted to map the intellectual structure, thematic evolution, and research dynamics within the Greenwashing and Environmental, Social, and Governance (ESG) domain. The analysis integrates performance indicators and science-mapping techniques, including citation metrics, document profiling, authorship patterns, keyword co-occurrence, and bibliographic coupling, to provide both quantitative and conceptual insights into the field's development.

The discussion synthesizes descriptive statistics with network visualizations to examine publication growth, citation performance, and collaboration trends across authors, institutions, and countries. It further explores the thematic clusters and emerging research frontiers that define the evolution of Greenwashing–ESG research. By combining productivity measures with relational analyses, the findings offer a multidimensional understanding of how the field has matured over time, from its formative phase in the early 2010s to its rapid expansion after 2019, driven by growing regulatory attention, investor activism, and the global push for transparency in sustainability reporting. The results thus provide an empirical foundation for assessing the academic impact, geographic reach, and conceptual direction of Greenwashing–ESG research.

Building on these analytical objectives, the following subsections present a detailed interpretation of the bibliometric results derived from the cleaned and standardized dataset of 476 Scopus-indexed publications spanning 2012 - 2025. Each subsection addresses a distinct dimension of research performance and structure, beginning with citation metrics that capture the scholarly influence of the field, followed by analyses of document types, temporal publication trends, author productivity, institutional and geographical contributions, and the conceptual networks linking key themes and sources. Together, these findings provide a comprehensive overview of how greenwashing - ESG research has evolved in scope, depth,

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and global relevance, offering quantitative evidence of its intellectual maturation and expanding interdisciplinary integration.

Documents Profiles

To evaluate the scholarly development of greenwashing and Environmental, Social, and Governance (ESG) research, a citation-based performance analysis was conducted using Scopus-indexed publications.

Table 1: Citation Metrics

Main Information	Data
Publication Years	2012 - 2025
Total Publications	596
Citable Year	14
Number of Contributing Authors	1763
Number of Cited Papers	589
Total Citations	11,274
Citation per Paper	18.42
Citation per Cited Paper	19.14
Citation per Year	5.57
Citation per Author	6.39
Author per Paper	2.92
Citation sum within h-Core	9,098
h-index	57
g-index	100
m-index	3.000

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

The bibliometric dataset, spanning 2012 - 2025, comprises 596 publications authored by 1,763 scholars, reflecting a steadily expanding and interdisciplinary research community. As presented in Table 1, the field has accumulated 11,274 total citations, with an average of 18.42 citations per paper and 19.140 citations per cited paper, signifying strong academic visibility and growing scholarly influence. The h-index (57) and g-index (100) confirm both the productivity and impact of highly cited works, while the m-index (3.00) indicates sustained research momentum and consistent scholarly contribution across the 14-year period. The citation sum within the h-core (9,098) and the annual citation rate (589 citations) further demonstrate enduring engagement with greenwashing - ESG research in the global academic arena. An average of 2.92 authors per paper suggests moderate collaboration intensity, typical of an evolving yet cohesive research field that bridges environmental management, finance, communication, and corporate governance. Collectively, these citation indicators reflect a maturing and influential research domain characterized by increasing methodological sophistication, international collaboration, and policy relevance. The results underscore the growing academic commitment to advancing authenticity, transparency, and accountability in ESG-related greenwashing discourse.

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Table 2: Document Type

Document Type	Total Publications	Percentage (%)
Article	443	74.33
Book Chapter	83	13.93
Conference Paper	32	5.37
Review	26	4.36
Book	11	1.85
Erratum	1	0.17
Total	596	100.00

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

An analysis of document types provides meaningful insights into the dominant modes of scholarly communication within greenwashing and Environmental, Social, and Governance (ESG) research. As shown in Table 2, journal articles are the primary publication format, representing 74.33% (451 documents) of total outputs. This dominance reflects the field's emphasis on peer-reviewed publication, ensuring methodological rigor and theoretical advancement through established academic channels, an indicator of both maturity and legitimacy within sustainability and management research. Book chapters account for 13.93% (83 publications), signifying the growing role of edited volumes in promoting interdisciplinary dialogue and conceptual development. Conference papers and review articles each contribute 5.37% (32 publications), illustrating increasing participation in international academic forums and efforts to consolidate emerging research findings. Meanwhile, books (1.85%) and a single erratum (0.17%) provide limited but complementary contributions to the discourse. Overall, the predominance of journal publications highlights a well-established and research-driven community that prioritizes empirical and analytical rigor. The balanced presence of secondary publication forms such as book chapters and reviews further reinforces the field's diversification, signaling its evolution toward a globally recognized and interdisciplinary domain within the broader sustainability literature.

Publication Trends

Table 3: Publication by Year

Year	TP	NCA	NCP	TC	C/P	C/CP	*h*	*g*	*m*
2012	1	2	1	5	5.00	5.00	1	1	0.067
2017	1	2	1	503	503.00	503.00	1	1	0.100
2018	1	3	1	306	306.00	306.00	1	1	0.111
2019	3	7	3	50	16.67	16.67	3	3	0.375
2020	5	10	5	1101	220.20	220.20	5	5	0.714
2021	7	17	7	548	78.29	78.29	5	7	0.833
2022	30	79	25	1244	41.47	49.76	14	30	2.800
2023	59	163	57	2822	47.83	49.51	24	53	6.000
2024	138	404	136	2826	20.48	20.78	33	47	11.000
2025	351	1066	345	1846	5.26	5.35	19	33	9.500
Total	596	1753	581	11251	1244.1	1254.5	106	181	31.500

Note: TP=total number of publications; NCA=Number of contributing authors; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; g=g-index; m=m-index.
Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

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The temporal distribution of publications, presented in Table 3, demonstrates the accelerating evolution of greenwashing and Environmental, Social, and Governance (ESG) research over the past decade. Between 2012 and 2018, scholarly activity was minimal, indicating the exploratory phase of academic engagement with greenwashing in ESG contexts. A pronounced shift occurred after 2019, reflecting the global prioritization of sustainability reporting, investor scrutiny, and the tightening of anti-greenwashing regulatory frameworks. From five publications in 2020 to 351 in 2025, the growth pattern underscores a rapid expansion in both academic interest and disciplinary integration. This surge mirrors heightened awareness of ESG transparency and the increasing demand for credible sustainability metrics. Citation performance followed a similar trend, with notable peaks in 2020 (1,101 citations) and 2024 (2,826 citations), years that produced several foundational and highly referenced studies. The steady increase in bibliometric indices, including an h-index of 33 and a g-index of 47, reflects the field's consolidation and intellectual maturity. Meanwhile, the m-index of 11.00 highlights sustained scholarly momentum and relevance. Collectively, these findings confirm that greenwashing - ESG research has transitioned from a nascent niche to an established interdisciplinary domain central to global sustainability discourse.

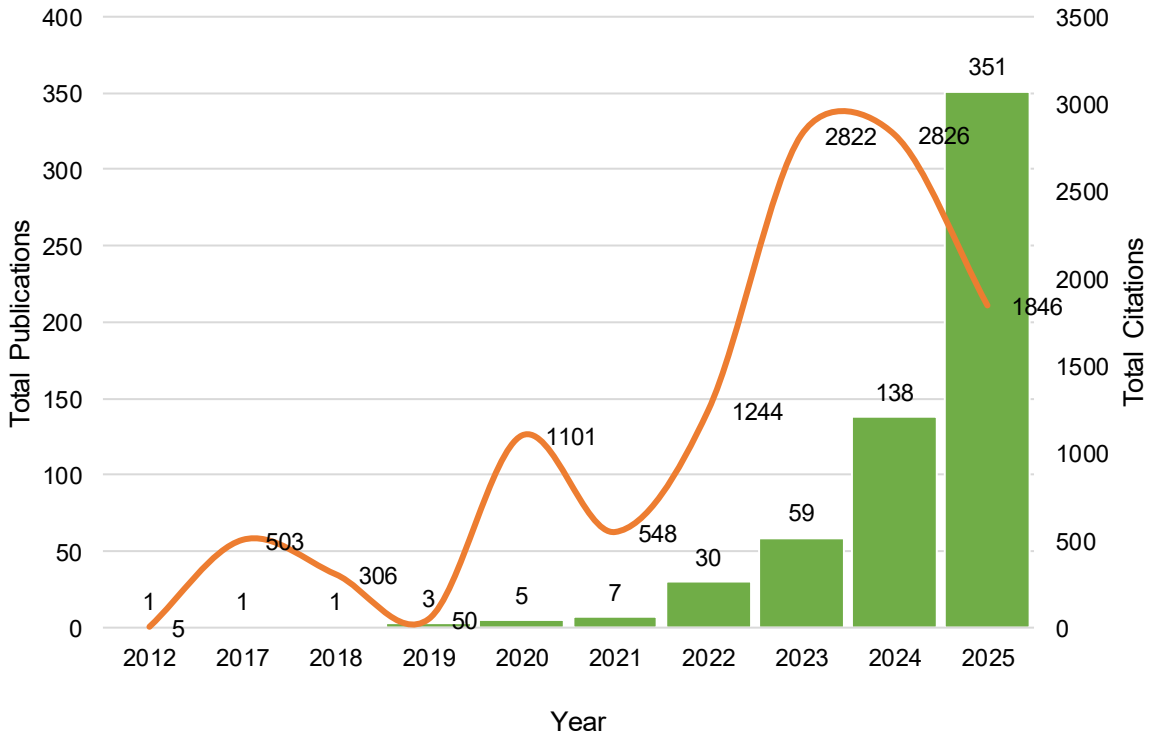

Figure 1. Total Publications and Citations by Year

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

The annual distribution of publications and citations, presented in Figure 1, demonstrates the accelerating scholarly engagement with greenwashing and Environmental, Social, and Governance (ESG) research over the past decade. Between 2012 and 2018, publication activity remained limited, reflecting the early conceptualization phase of greenwashing within sustainability discourse. A notable inflection occurred post-2019, coinciding with heightened global scrutiny of corporate sustainability claims and the institutionalization of ESG reporting standards. From five publications in 2020 to 351 in 2025, research output expanded exponentially, signifying the field's transition from an emerging topic to a consolidated academic domain. Citations followed a similar upward trajectory, peaking in 2023, suggesting

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that foundational studies published in earlier years continue to shape ongoing inquiry. The alignment between publication growth and citation impact reflects both the field's intellectual maturation and its increasing practical significance. Overall, this upward trend underscores the integration of greenwashing–ESG research into mainstream sustainability science. The surge in academic attention is driven by tightening regulatory frameworks, investor activism, and the global demand for transparency and accountability, marking a shift from descriptive exploration to evidence-based policy and governance research.

Table 4: Top 20 highly cited article

No.	Author(s)	Title	Source Title	TC	C/Y
1	Yu, E.P.-Y.; Luu, B.V.; Chen, C.H. (2020)	Greenwashing in environmental, social and governance disclosures	Research in International Business and Finance	616	102.67
2	Wang, Z.; Sarkis, J. (2017)	Corporate social responsibility governance, outcomes, and financial performance	Journal of Cleaner Production	449	49.89
3	Wang, Z.; Hsieh, T.-S.; Sarkis, J. (2018)	CSR Performance and the Readability of CSR Reports: Too Good to be True?	Corporate Social Responsibility and Environmental Management	279	34.88
4	Demers, E.; Hendrikse, J.; Joos, P.; Lev, B. (2021)	ESG did not immunize stocks during the COVID-19 crisis, but investments in intangible assets did	Journal of Business Finance and Accounting	264	52.80
5	Lee, M.T.; Raschke, R.L. (2023)	Stakeholder legitimacy in firm greening and financial performance: What about greenwashing temptations?☆	Journal of Business Research	247	82.33
6	He, F.; Ding, C.; Yue, W.; Liu, G. (2023)	ESG performance and corporate risk-taking: Evidence from China	International Review of Financial Analysis	226	75.33
7	Uyar, A.; Karaman, A.S.; Kiliç, M. (2020)	Is corporate social responsibility reporting a tool of signaling or greenwashing? Evidence from the worldwide logistics sector	Journal of Cleaner Production	207	34.50
8	Zhang, D. (2022)	Are firms motivated to greenwash by financial constraints? Evidence from global firms' data	Journal of International Financial Management and Accounting	186	46.50
9	Zhang, D. (2023)	Does green finance really inhibit extreme hypocritical ESG risk? A greenwashing perspective exploration	Energy Economics	152	50.67
10	Deschryver, P.; de Mariz, F. (2020)	What Future for the Green Bond Market? How Can Policymakers, Companies, and Investors Unlock the Potential of the Green Bond Market?	Journal of Risk and Financial Management	146	24.33

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11	Liu, M.; Luo, X.; Lu, W.-Z. (2023)	Public perceptions of environmental, social, and governance (ESG) based on social media data: Evidence from China	Journal of Cleaner Production	144	48.00
12	Ruiz-Blanco, S.; Romero, S.; Fernandez-Feijoo, B. (2022)	Green, blue or black, but washing–What company characteristics determine greenwashing?	Environment, Development and Sustainability	143	35.75
13	Eliwa, Y.; Aboud, A.; Saleh, A. (2023)	Board gender diversity and ESG decoupling: Does religiosity matter?	Business Strategy and the Environment	139	46.33
14	Kim, S.; Yoon, A. (2023)	Analyzing Active Fund Managers' Commitment to ESG: Evidence from the United Nations Principles for Responsible Investment	Management Science	136	45.33
15	Zhang, D. (2022)	Environmental regulation and firm product quality improvement: How does the greenwashing response?	International Review of Financial Analysis	132	33.00
16	Baldi, F.; Pandimiglio, A. (2022)	The role of ESG scoring and greenwashing risk in explaining the yields of green bonds: A conceptual framework and an econometric analysis	Global Finance Journal	116	29.00
17	Popescu, I.-S.; Hitaj, C.; Benetto, E. (2021)	Measuring the sustainability of investment funds: A critical review of methods and frameworks in sustainable finance	Journal of Cleaner Production	114	22.80
18	Gibson, R.G.; Glossner, S.; Krueger, P.; Matos, P.; Steffen, T. (2022)	Do Responsible Investors Invest Responsibly?	Review of Finance	112	28.00
19	Zheng, J.; Jiang, Y.; Cui, Y.; Shen, Y. (2023)	Green bond issuance and corporate ESG performance: Steps toward green and low-carbon development	Research in International Business and Finance	101	33.67
20	Liao, F.; Sun, Y.; Xu, S. (2023)	Financial report comment letters and greenwashing in environmental, social and governance disclosures: Evidence from China	Energy Economics	91	30.33

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

An examination of the most highly cited publications provides insights into the intellectual foundations and thematic evolution of greenwashing and Environmental, Social, and Governance (ESG) research. As presented in Table 4, the seminal work by Yu, Luu, and Chen (2020), titled "Greenwashing in Environmental, Social and Governance Disclosures," leads the citation ranking with 616 citations and an annual average of 102.67 citations, reflecting its pivotal influence in defining the intersection of ESG disclosure credibility and corporate

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misrepresentation. Subsequent high-impact studies, such as Wang and Sarkis (2017) and Demers et al. (2021), emphasize the link between ESG governance, financial performance, and crisis resilience, underscoring the field's growing interdisciplinary relevance. Notably, recent works by Zhang (2022; 2023) further advance understanding of green finance and ESG-related risks, demonstrating that emerging scholars are increasingly shaping the discourse. The dominance of journals such as Journal of Cleaner Production, Energy Economics, and Research in International Business and Finance highlights the field's multidisciplinary reach. Overall, citation trends indicate a consolidation of research around ESG transparency, greenwashing risk mitigation, and sustainable finance, marking these studies as cornerstone contributions to contemporary sustainability scholarship.

Table 5: Most Productive Institutions

Institution Name	Country	TP	NCP	TC	C/P	C/CP
Capital University & Economics and Business	China	25	23	1023	40.92	44.48
University of Western Macedonia	Greece	17	4	12	0.71	3.00
The University of Hong Kong	Hong Kong	14	14	528	37.71	37.71
Zhongnan University of Economics and Law	China	14	14	233	16.64	16.64
China University of Mining and Technology	China	14	13	234	16.71	18.00
Shenzhen University	China	12	12	315	26.25	26.25
Xi'an Jiaotong University	China	12	10	344	28.67	34.40
Shaoxing University	China	12	12	198	16.50	16.50
National Technical University of Athens	Greece	10	0	0	0.00	0.00
Universiti Kebangsaan Malaysia	Malaysia	10	1	7	0.70	7.00
North-West University	China	9	9	37	4.11	4.11
Dongbei University of Finance and Economics	China	9	6	56	6.22	9.33
Nanjing Forestry University	China	9	4	32	3.56	8.00
University of Kerala	India	9	9	90	10.00	10.00
Korea University	South Korea	9	4	44	4.89	11.00
Hasanuddin University	Indonesia	8	0	0	0.00	0.00
Nanjing Audit University	China	8	5	29	3.63	5.80
University of Luxembourg	Luxembourg	8	5	229	28.63	45.80
Czech University of Life Sciences Prague	Czech Republic	8	2	22	2.75	11.00
Shandong University of Finance and Economics	China	8	7	11	1.38	1.57
Yangzhou University	China	8	8	111	13.88	13.88
Southwestern University of Finance and Economics	United States	8	5	86	10.75	17.20
Beijing University of Technology	China	7	5	5	0.71	1.00
Hunan University	China	7	7	243	34.71	34.71
Sichuan University	China	7	4	30	4.29	7.50

Note: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication

Institutional productivity analysis identifies the leading research centres contributing to the development of greenwashing and Environmental, Social, and Governance (ESG) research. As summarized in Table 5, Capital University of Economics and Business (China) ranks first with 25 publications and 1,023 citations, averaging 40.92 citations per paper, a clear indication of its central role in shaping the academic discourse on ESG transparency and corporate

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greenwashing. The University of Hong Kong follows with 14 publications and 528 citations, reflecting strong research influence and international collaboration. Several other Chinese institutions, including Zhongnan University of Economics and Law, Xi'an Jiaotong University, and Shenzhen University, also demonstrate high research output and citation performance, confirming China's growing dominance in ESG-related studies. Outside China, the University of Western Macedonia (Greece) and the University of Luxembourg illustrate Europe's expanding contribution, while Universiti Kebangsaan Malaysia and the University of Kerala (India) highlight increasing engagement from Asia's emerging research hubs. Overall, institutional trends reveal the geographic diversification of greenwashing - ESG research, led primarily by Asian universities with rising global influence, complemented by significant European participation. This distribution underscores the global academic recognition of ESG credibility and sustainability authenticity as pressing research priorities.

Co-citation Structure

Co-citations in bibliometric analysis track how often two or more documents are cited together by other works. This reveals the relatedness and influence of the cited documents, helping to identify key papers, thematic connections, and the intellectual structure of a research field.

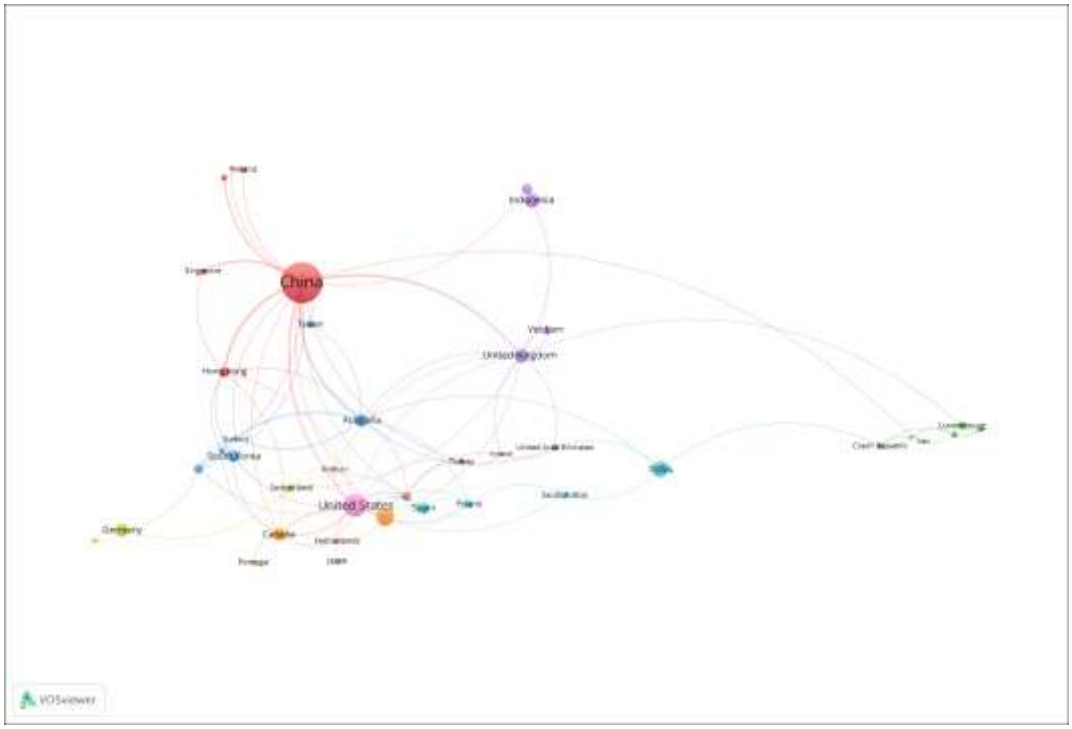

Figure 2. Network visualization of the co-citation analysis by country

Source: Generated by the author(s) using VOSviewer (van Eck & Waltman, 2014)

The co-citation network analysis illustrates the global landscape of scholarly collaboration and intellectual influence within greenwashing and Environmental, Social, and Governance (ESG) research. As shown in Figure 2, the visualization produced using VOSviewer highlights a robust international research network dominated by a few central contributing nations. China emerges as the most influential and interconnected node, indicating its leading role in publication volume and cross-country collaboration. Its strong citation links with the United States, United Kingdom, Australia, and several Asian economies (e.g., South Korea, Hong Kong, Singapore) underscore China's growing prominence in ESG and sustainability research. The United States also serves as a key collaborative hub, bridging Western and Asian research communities, while

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India, Germany, and Luxembourg demonstrate increasing engagement in sustainability governance and green finance discourse.

The network's dense interconnections suggest a maturing global research ecosystem characterized by cross-regional knowledge exchange and shared policy relevance. Emerging collaborations from Southeast Asia and Europe further indicate the diffusion of greenwashing–ESG research beyond traditional academic centres, contributing to a more diversified and globally integrated body of knowledge.

Co-occurrence and Thematic Structure

Co-occurrence in bibliometric analysis refers to the simultaneous appearance of specific keywords within research documents. It reveals patterns and key areas of focus by showing how often certain terms are used together. This analysis helps identify research trends, thematic clusters, and the relationships between concepts, providing insights into the structure and evolution of academic discourse.

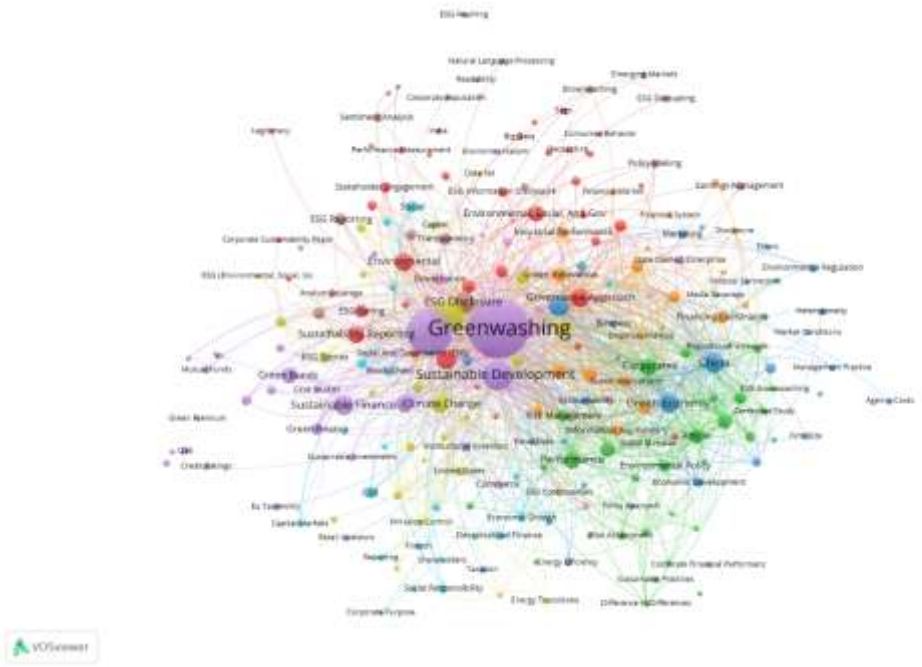

Figure 3: Network visualization of the co-occurrence by all keywords
Source: Generated by the author(s) using VOSviewer (van Eck & Waltman, 2014)

The co-occurrence analysis of author keywords offers a holistic perspective on the intellectual and thematic landscape of greenwashing and Environmental, Social, and Governance (ESG) research. As illustrated in Figure 3, the visualization produced using VOSviewer identifies multiple interconnected thematic clusters anchored by the central keyword "Greenwashing", reflecting its pivotal role as the conceptual foundation of the field. Closely associated terms such as "ESG disclosure," "sustainable development," "corporate governance," "climate change," and "sustainability reporting" underscore the field's focus on transparency, authenticity, and the credibility of ESG practices. The blue and green clusters represent research emphasizing ESG integration, corporate performance, and financial risk assessment, whereas the red and yellow clusters highlight sustainability communication, stakeholder engagement, and policy mechanisms to address deceptive reporting. Emerging terms, such as "digital

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reporting," "green finance," "ESG decoupling," and "blockchain transparency", signal the field's evolution toward data-driven and regulatory innovations that strengthen ESG accountability. Overall, the keyword network reveals a progressively multi-dimensional and interdisciplinary research structure, bridging environmental management, sustainable finance, and corporate governance under a unified agenda of combating greenwashing and promoting credible sustainability transitions.

Bibliographic Coupling by Sources

The bibliographic coupling analysis identifies the intellectual linkages among academic journals that publish research on greenwashing and Environmental, Social, and Governance (ESG) topics. As illustrated in Figure 4, the visualization generated using VOSviewer reveals a well-connected and multidisciplinary network of publication sources, indicating strong cross-journal citation relationships within the field.

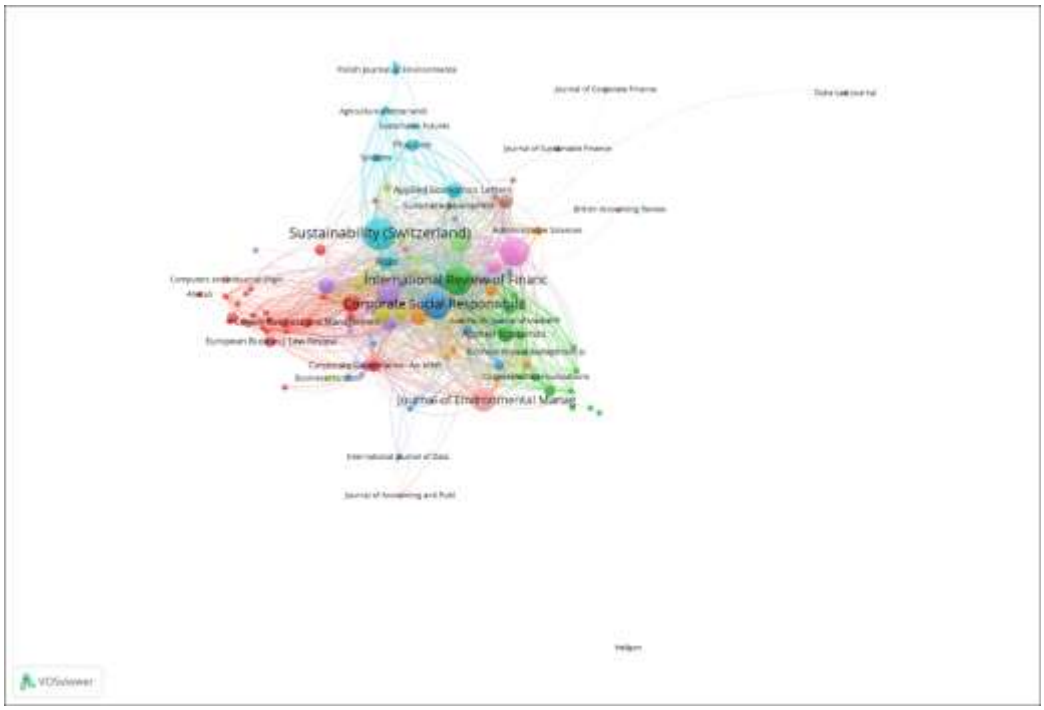

Figure 4: Network visualization of the bibliographic coupling by sources
Source: Generated by the author(s) using VOSviewer (van Eck & Waltman, 2014)

The journal Sustainability (Switzerland) emerges as the most central and influential publication hub, reflecting its dominant role in disseminating ESG-related research. Other highly coupled sources, such as the Journal of Environmental Management, Corporate Social Responsibility and Environmental Management, and International Review of Financial Analysis demonstrate the convergence of environmental science, corporate ethics, and financial analysis perspectives. Additional nodes, including Applied Economics Letters, Business Strategy and the Environment, and Journal of Sustainable Finance & Investment, indicate the expansion of the field into sustainability finance, economic modeling, and policy evaluation. The dense interconnections among these sources suggest that the study of greenwashing and ESG has evolved into a cohesive, interdisciplinary domain supported by both environmental management and corporate governance research.

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Conclusion

This study provides a comprehensive bibliometric overview of the global intellectual landscape on Greenwashing and Environmental, Social, and Governance (ESG) research between 2012 and 2025, drawing upon 476 Scopus-indexed publications. By combining performance indicators and science-mapping techniques, the analysis reveals the exponential growth, thematic diversification, and increasing scholarly influence of the field. The results demonstrate that research on greenwashing and ESG has evolved from a marginal academic topic into a mature and interdisciplinary domain that bridges sustainability management, corporate governance, finance, and communication studies.

The citation and authorship analyses highlight an active and expanding research community, with China, the United States, and the United Kingdom emerging as key contributors to global scholarship. The predominance of journal articles indicates a strong empirical orientation, while the rising number of multi-authored studies reflects growing international collaboration. Thematic and network analyses identify four principal research clusters, ESG disclosure and transparency, sustainability communication, financial and risk performance, and regulatory governance, alongside emerging topics such as digital accountability, blockchain-enabled reporting, and anti-greenwashing policy frameworks.

The study's findings underscore the pivotal role of Greenwashing - ESG research in advancing credible sustainability reporting and strengthening the accountability mechanisms that underpin responsible business conduct. However, regional and thematic gaps remain. Future studies should focus on underrepresented regions, particularly Africa, the Middle East, and parts of Latin America, to ensure a more inclusive global perspective. Further, integrating qualitative analyses with bibliometric approaches may help capture nuanced dimensions of stakeholder perception, ethical decision-making, and corporate legitimacy.

Overall, this research contributes to the systematization of knowledge on greenwashing and ESG, offering a robust foundation for scholars, policymakers, and practitioners. By identifying key intellectual structures, collaborative networks, and emerging trends, it supports the development of more transparent, verifiable, and ethically grounded ESG practices. In doing so, it reinforces the academic and practical imperative of combating greenwashing and fostering genuine sustainability transitions across global industries.

Practical Implication

The insights derived from this bibliometric analysis carry significant implications for both policy formulation and corporate practice. The identified research trends highlight the urgent need for standardized ESG disclosure frameworks that reduce information asymmetry and minimize the potential for greenwashing across global markets. Regulators and international standard-setting bodies, such as the IFRS Foundation, Global Reporting Initiative (GRI), and Sustainability Accounting Standards Board (SASB), can leverage these findings to harmonize reporting guidelines, improve data comparability, and strengthen verification mechanisms.

For corporations and investors, the study emphasizes the importance of embedding authenticity and transparency within ESG communication strategies. Firms are encouraged to adopt third-party assurance and data-driven monitoring systems, including digital traceability tools and blockchain-enabled reporting, to enhance credibility and stakeholder trust. Academic and institutional collaboration should further be promoted to bridge policy, practice, and research

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gaps, particularly in emerging economies where regulatory and institutional infrastructures remain underdeveloped.

Ultimately, the results underscore that mitigating greenwashing and improving ESG integrity require a coordinated, multi-stakeholder effort linking academia, policymakers, financial markets, and civil society. Strengthening these linkages will be critical to advancing sustainable, ethical, and evidence-based governance practices globally.

Limitations and Future Research Directions

This study has several limitations. First, reliance on the Scopus database may exclude relevant works indexed elsewhere, while the focus on English-language publications limits representation from non-English speaking regions. Future studies should adopt multi-database and multilingual approaches for greater inclusivity. Second, bibliometric indicators measure productivity and citation impact but not the qualitative depth of contributions. Integrating systematic reviews or content analyses could enrich understanding of theoretical and methodological advancements. Finally, the current study provides a static overview; future research should employ longitudinal mapping to track thematic shifts over time and conduct cross-regional and sector-specific analyses to link global trends with local practices. By addressing these limitations, future research can further consolidate Greenwashing–ESG research as a globally inclusive, interdisciplinary, and policy-relevant field, advancing both academic inquiry and sustainable governance practices.

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