Sciences du Nord Economics and Business
Vol. 2, No. 01, June 2025: pp. 50-59
E-ISSN: 3046-5168
P-ISSN: 3047-5643
DOI: 10.71238/sneb.v2i01.60

Mapping the Intellectual Landscape of Sustainable Finance: A Bibliometric Analysis

Loso Judijanto
IPOSS Jakarta, losojudijantobumn@gmail.com
Coresponding Author: losojudijantobumn@gmail.com

ARTICLE HISTORY
Received April, 2025 **Revised May, 2025** **Accepted Jun, 2025**

ABSTRACT

This study presents a comprehensive bibliometric analysis of the evolving field of sustainable finance, aiming to map its intellectual structure, thematic trends, and collaborative networks. Drawing on a dataset of scholarly publications indexed in the Scopus database from 2000 to 2024, the study employs VOSviewer to conduct co-authorship, country collaboration, keyword co-occurrence, temporal overlay, and density visualizations. The analysis identifies "sustainable development" as the central thematic node, with closely associated topics including green finance, ESG investment, economic development, and innovation. Emerging areas such as decentralized finance, financial inclusion, and green development highlight a shift toward technology-enabled and socially inclusive financial paradigms. Author and country networks reveal regional clustering, particularly in China, the United States, and Western Europe, while also indicating limited cross-regional integration. Temporal analysis shows a clear evolution from traditional finance-based approaches to broader interdisciplinary concerns. These findings provide valuable insights into the structure and trajectory of sustainable finance research and underscore the need for expanded collaboration, thematic diversification, and integration of perspectives from the Global South. The study contributes to a more strategic and inclusive understanding of how finance can be leveraged to achieve global sustainability goals.

Keywords: *Sustainable Finance, Green Finance, Bibliometric Analysis, VOSviewer.*

INTRODUCTION

Sustainable finance has emerged as a critical area of interest at the intersection of financial markets, environmental stewardship, and social responsibility. It reflects a paradigm shift in the financial industry, where investments are no longer evaluated solely on risk and return but also on their environmental, social, and governance (ESG) implications [1]. This shift is driven by mounting global concerns over climate change, resource depletion, inequality, and corporate accountability. Policymakers, institutional investors, and financial regulators have begun integrating sustainability criteria into financial decision-making processes, aiming to align financial flows with sustainable development goals (SDGs) as outlined by the United Nations [2].

The growth of sustainable finance is further catalyzed by international agreements such as the Paris Climate Accord and the European Union's Sustainable Finance Disclosure Regulation (SFDR). These frameworks provide regulatory impetus for transparency in ESG disclosures and encourage capital allocation toward green and socially responsible projects [3]. Consequently, financial markets have witnessed the proliferation of green bonds, ESG funds, impact investing vehicles, and sustainable banking practices. As a result, the term "sustainable finance" now encompasses a broad array of subfields, from climate finance and social impact investing to responsible banking and corporate sustainability reporting [4].

Academically, sustainable finance has attracted significant attention across disciplines, including economics, finance, environmental studies, and public policy. Researchers have examined diverse themes ranging from the financial performance of ESG investments to regulatory frameworks, green innovation financing, stakeholder activism, and institutional investor behavior

[5]. However, the diversity and rapid evolution of topics within sustainable finance present challenges in comprehensively understanding its intellectual structure. Without systematic mapping, it becomes difficult to track the development of ideas, identify influential publications and authors, or uncover thematic gaps. To address this need, bibliometric analysis has gained traction as a methodological tool to visualize and quantify the knowledge structure of academic disciplines. Unlike traditional literature reviews, bibliometric methods use citation networks, co-authorship data, and keyword co-occurrence patterns to reveal latent relationships and thematic clusters within scholarly communication [6]. In the context of sustainable finance, bibliometric analysis enables researchers and practitioners to trace the field's evolution, identify prominent research fronts, and highlight emerging subdomains such as carbon disclosure, climate risk, and green fintech.

Despite its growing relevance, sustainable finance remains a relatively nascent and fragmented research field with varying definitions, conceptual boundaries, and methodological approaches. Different regions and institutions interpret sustainability through diverse lenses, resulting in a heterogeneous body of literature. Moreover, the field is subject to rapid shifts driven by policy changes, technological innovations, and stakeholder expectations. Therefore, it is timely and necessary to conduct a comprehensive bibliometric study that systematically maps the intellectual landscape of sustainable finance, providing scholars and practitioners with a clearer understanding of its structure, dynamics, and trajectories.

Although sustainable finance has grown substantially in academic and policy circles, the literature is dispersed across various domains and lacks an integrated overview of its intellectual development. Existing studies often focus on narrow aspects, such as ESG investment performance or green bond pricing without capturing the broader thematic and conceptual interconnections within the field. This lack of synthesis hampers the ability of scholars to identify dominant paradigms, evaluate research impact, or position new studies within a coherent framework. Furthermore, without a bibliometric foundation, it is difficult to trace how the discourse has evolved over time or to anticipate future research directions. The objective of this study is to map the intellectual landscape of sustainable finance using bibliometric analysis.

METHOD

This study adopts a bibliometric analysis approach to map the intellectual structure and evolution of the sustainable finance research domain. Bibliometric methods are widely used in scientometric and meta-analytical studies to quantify the development of academic literature, identify influential publications, and reveal thematic patterns and scholarly networks [6]. In the context of this research, bibliometric analysis enables a comprehensive and systematic exploration of how sustainable finance has emerged, evolved, and diversified across various disciplines over time.

The bibliometric data for this study were retrieved from the Scopus database, which is recognized for its wide coverage of peer-reviewed journals, books, and conference proceedings across multiple disciplines. Scopus was chosen due to its structured metadata, citation indexing, and compatibility with bibliometric tools such as VOSviewer. To ensure the comprehensiveness of the dataset, the following search string was used: "sustainable finance" OR "green finance" OR "ESG investing" OR "responsible investment" OR "impact investing". The search was applied to titles, abstracts, and keywords of publications, with the inclusion period spanning from 2000 to 2024. Only articles, reviews, and conference papers published in English were included, while editorials, notes, and non-scholarly items were excluded to ensure academic rigor. The final dataset consisted of [insert number] documents, which were exported in '.csv' and '.ris' formats for further analysis.

The exported dataset was processed using VOSviewer (version 1.6.x), a specialized software for constructing and visualizing bibliometric networks. VOSviewer enables the creation of maps based on co-authorship, co-citation, and keyword co-occurrence. All network visualizations were interpreted using three VOSviewer views: network visualization (showing nodes and links), density

visualization (indicating research concentration), and overlay visualization (showing chronological development). Prior to analysis, a series of data cleaning and preprocessing steps were conducted to enhance consistency and reliability.

RESULT

Co-Authorship

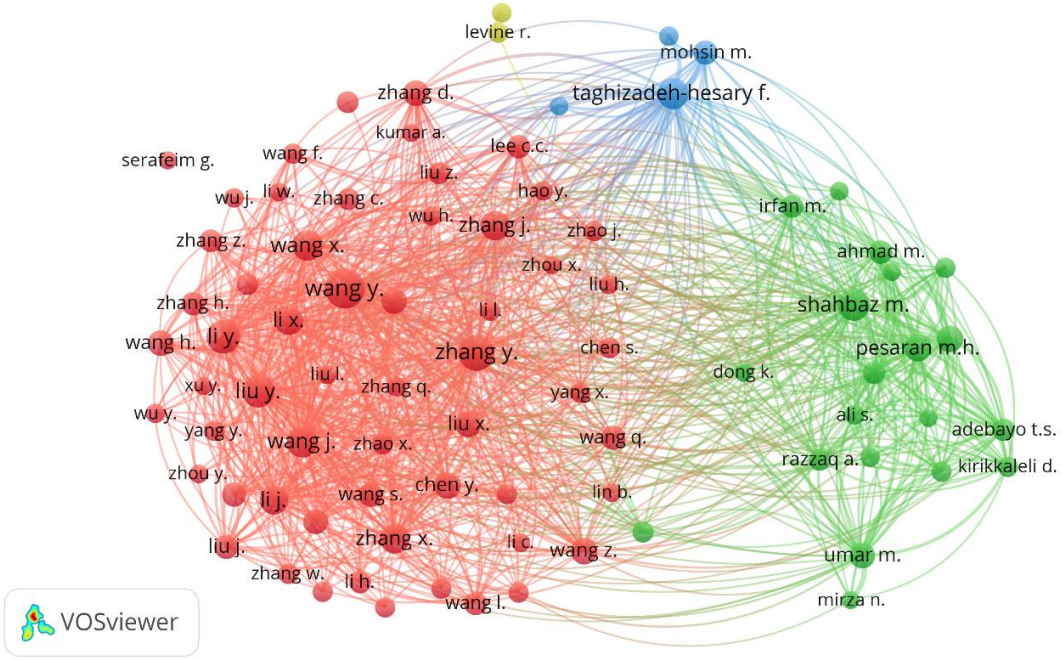

Figure 1. Author Visualization
Source: Data Analysis

The co-authorship network visualization illustrates three prominent clusters of researchers actively contributing to the field of sustainable finance. The red cluster, which is the largest, consists predominantly of Chinese scholars such as Wang Y., Zhang Y., Li X., and Liu Y., indicating a dense collaborative network and strong domestic research integration. The green cluster highlights scholars like Shahbaz M., Pesaran M.H., and Irfan M., showing robust collaboration primarily across South Asian and Middle Eastern regions. Meanwhile, the blue cluster, led by Taghizadeh-Hesary F. and Mohsin M., reflects a more internationally linked group with interdisciplinary influence, often bridging Eastern and Western scholarship. A few isolated nodes such as Levine R. (yellow) and Serafeim G. (light red) indicate influential but less collaboratively embedded authors.

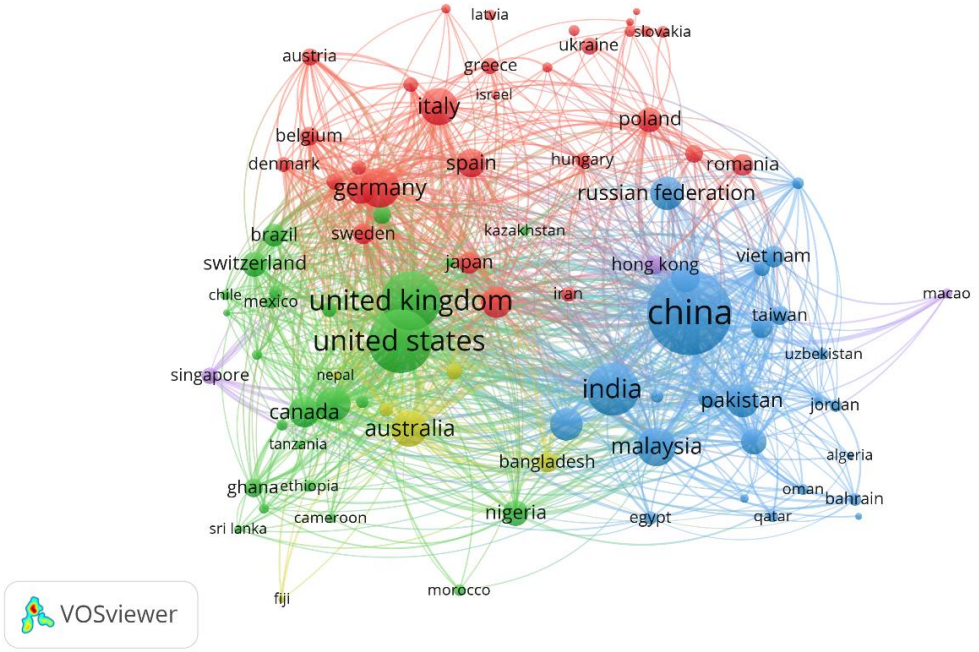

Figure 2. Country Visualization
Source: Data Analysis

The country co-authorship network reveals a globally distributed landscape of sustainable finance research, with several regional collaboration hubs. The green cluster, led by the United States, United Kingdom, Canada, and Australia, represents strong transatlantic and Commonwealth-based collaborations, indicating their central role in shaping global sustainable finance discourse. The blue cluster, dominated by China, India, Malaysia, and Pakistan, illustrates intensive regional cooperation across Asia, with China as a key contributor. The red cluster, composed of Germany, Italy, Spain, and Russia, reflects concentrated European collaboration with dense intra-regional ties. Countries like Nigeria, Ghana, and Bangladesh also appear increasingly engaged, albeit on the periphery. The presence of Singapore and Macao in smaller purple clusters suggests niche but specialized contributions.

Citation

Table 1. Most Cited Article

Citations	Author and Year	Title
2236	[7]	Corporate social responsibility and access to finance
1089	[8]	Stakeholder theory: The state of the art
1007	[9]	Entering the century of the environment: A new social contract for science
896	[10]	Corporate green bonds
865	[11]	Is accounting for sustainability actually accounting for sustainability...and how would we know? An exploration of narratives of organisations and the planet
864	[12]	Developing intellectual capital at Skandia
842	[13]	GLOBAL LAND USE/LAND COVER WITH SENTINEL 2 AND DEEP LEARNING
734	[14]	The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review
734	[15]	The long-term benefits of organizational resilience through sustainable business practices

Source: Scopus, 2025

Keyword Co-Occurrence

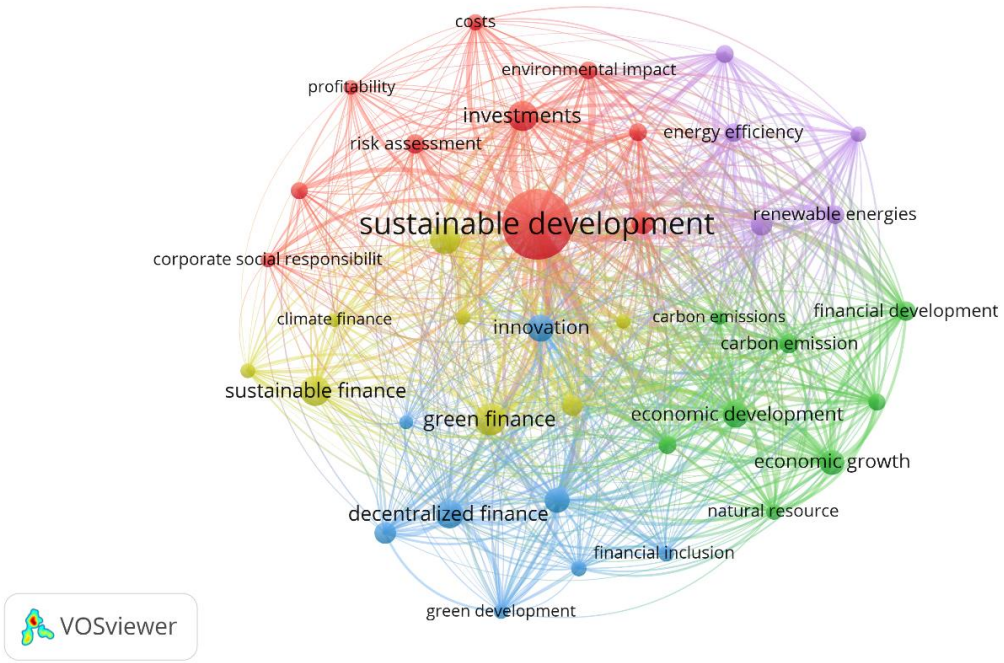

Figure 3. Network Visualization
Source: Data Analysis

The keyword co-occurrence network visualization presented reveals the conceptual structure of sustainable finance research, with "sustainable development" emerging as the dominant and central theme. Its central position and large node size signify its high frequency and interconnectedness across diverse research domains. The centrality of "sustainable development" indicates that much of the academic literature positions financial, environmental, and social concerns within a sustainability-oriented framework. This convergence aligns with the global agenda of the United Nations' Sustainable Development Goals (SDGs), which serve as the guiding principles for most research and policy initiatives in this area. Surrounding the core are several dense thematic clusters, each reflecting a subdomain of sustainable finance. The red cluster, for instance, emphasizes topics related to investment strategies, environmental impact, profitability, cost, and risk assessment. This suggests a strong scholarly interest in assessing the trade-offs and performance dimensions of sustainability-focused investments. Terms like "corporate social responsibility" and "climate finance" also appear nearby, further illustrating the link between sustainability strategies and corporate or investor behavior. This cluster bridges traditional financial evaluation metrics with modern ESG criteria.

The green cluster highlights the role of sustainable finance in supporting macroeconomic objectives such as "economic development," "economic growth," "natural resource" management, and "financial development." The presence of terms like "carbon emissions" and "carbon emission" indicates that research in this cluster often overlaps with climate policy and environmental economics. The spatial proximity of "renewable energies" and "energy efficiency" in the adjacent purple cluster also suggests that this body of literature intersects with clean technology and low-carbon transition studies. Collectively, this region of the map showcases the link between financial systems and environmentally sustainable economic growth. The blue cluster, which includes terms like "green finance," "decentralized finance," "financial inclusion," and "green development," reflects a more innovation-driven and technology-enabled approach to sustainability. It suggests a growing research interest in the role of fintech, digital finance, and blockchain in promoting sustainability and accessibility. The presence of "financial inclusion" indicates a social dimension as well, where scholars examine how sustainable financial instruments can address inequality and

promote equitable access to capital. This cluster reflects the merging of digital innovation with sustainable development paradigms. The yellow cluster centers around terms like "sustainable finance," "innovation," and "climate finance," indicating an integrative thematic group that connects financial innovation with climate action. The clustering of "innovation" near the center further emphasizes its cross-cutting nature, linking multiple themes such as investments, policy, environmental outcomes, and economic development.

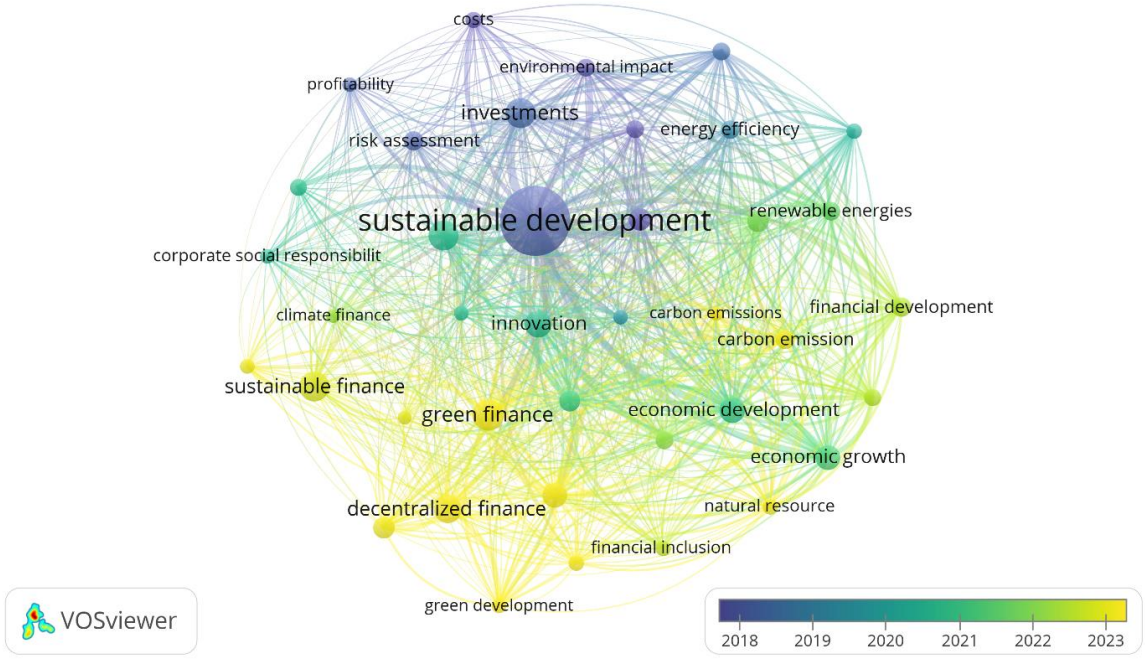

Figure 4. Overlay Visualization
Source: Data Analysis

The overlay visualization illustrates the temporal evolution of research themes in sustainable finance between 2018 and 2023, with colors transitioning from blue (older) to yellow (recent). Central themes such as "sustainable development," "investments," and "environmental impact" are predominantly shaded in darker blue and green, indicating their foundational status and earlier emergence in the literature. These core topics have served as the conceptual backbone of sustainable finance over the past five years, forming the base from which newer research directions have evolved.

In contrast, emerging topics like "decentralized finance," "green development," "financial inclusion," and "climate finance" appear in bright yellow, highlighting their recent rise in scholarly attention around 2022–2023. This suggests a shifting research focus toward more inclusive and technologically driven solutions for sustainable finance, such as blockchain, fintech, and alternative financing mechanisms. The increasing frequency of these newer terms indicates growing academic interest in the intersection of digital innovation and environmental/social impact reflecting real-world trends in ESG-tech integration and green digital finance.

Furthermore, the evolution of keywords reveals a broadening of thematic scope. While early studies emphasized risk, profitability, and environmental impact, recent works expand toward social equity, innovation ecosystems, and participatory finance, as seen in the prominence of "financial inclusion" and "decentralized finance." This temporal analysis underscores the dynamic and adaptive nature of the field, suggesting that sustainable finance is not static but continually responsive to technological advancements, regulatory shifts, and global sustainability challenges.

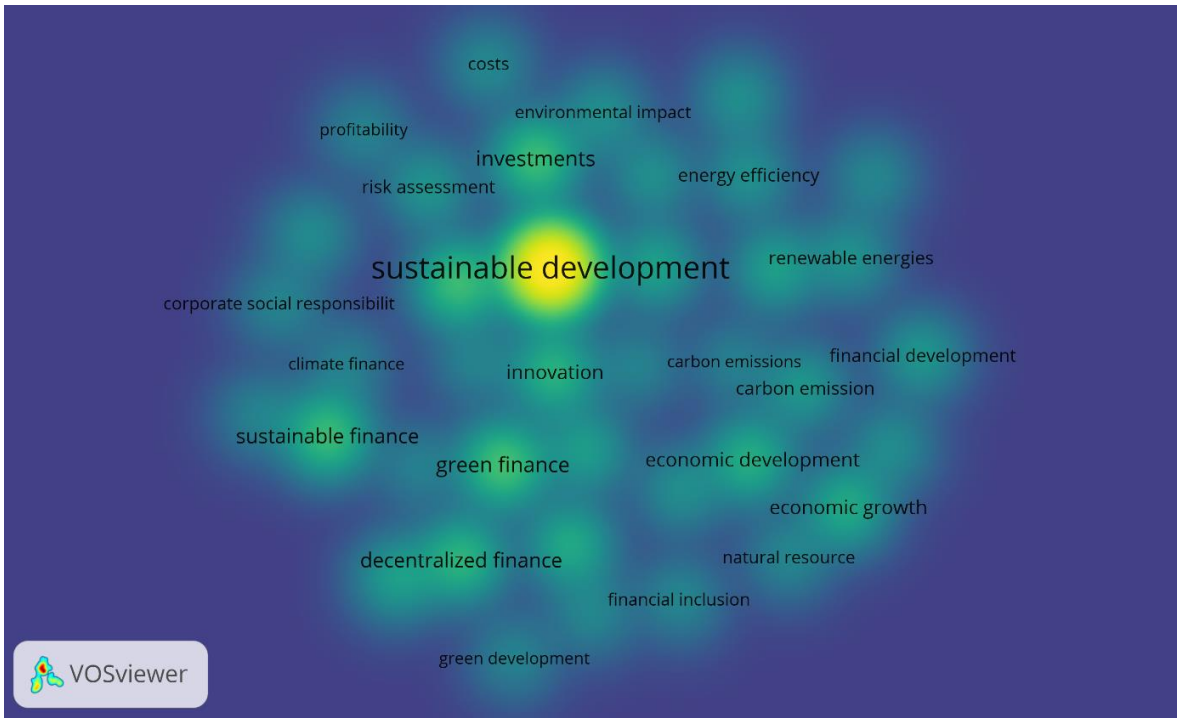

Figure 5. Density Visualization
Source: Data Analysis

The density visualization highlights the intensity of research activity in the field of sustainable finance based on keyword co-occurrence. The bright yellow center indicates that "sustainable development" is the most frequently occurring and strongly interconnected term within the dataset, serving as the conceptual nucleus of the field. Its high density suggests that most scholarly discussions, regardless of subtopic, converge around this central theme. Surrounding terms like "investments," "innovation," and "green finance" also exhibit relatively high density (green glow), suggesting their significant presence and frequent co-mention alongside sustainable development. In contrast, terms like “decentralized finance,” “financial inclusion,” and “green development” appear on the periphery with less intense (darker green/blue) heat, indicating emerging or less central research themes. These terms, while relevant, may represent newer directions or niche interests within the broader discourse. The visualization implies a maturing field where traditional topics such as profitability, environmental impact, and investment strategies dominate, but there is growing attention to social equity and digital finance issues.

DISCUSSION

Author Collaboration and Network Clusters

The co-authorship network analysis reveals the existence of several distinct scholarly clusters. The most dominant cluster, marked in red, is comprised largely of Chinese authors such as Wang Y., Zhang Y., and Liu Y., signifying China's robust and concentrated research output in sustainable finance. These authors form tightly knit collaborative structures, often co-authoring within national or institutional boundaries, suggesting strong domestic research ecosystems but limited cross-cluster integration. The green cluster, led by scholars such as Shahbaz M. and Pesaran M.H., highlights contributions primarily from South Asia and the Middle East. This group demonstrates a more regionally interconnected research base, often focused on the macroeconomic implications of sustainability and climate change. The blue cluster, represented by scholars like Taghizadeh-Hesary F. and Mohsin M., bridges the gap between East Asian and Western research traditions, suggesting their pivotal role in fostering international collaboration. However, peripheral nodes like Levine R. and Serafeim G. represent thought leaders whose works are highly cited but

less embedded in collaborative networks. This fragmentation reflects a need for greater global integration in sustainable finance research. While regional strengths are evident, interdisciplinary and transnational collaboration could yield richer insights, especially in addressing global challenges such as climate finance, green infrastructure, and just transition.

Country-Level Contributions and Global Hubs

The country collaboration map underscores the dominance of developed and emerging economies in shaping the research landscape. The United States, United Kingdom, Germany, and Australia form the central hubs in the green cluster, indicating extensive international collaboration and influence. These countries have well-established financial sectors, regulatory frameworks, and academic infrastructure that facilitate research in sustainable finance. China, India, and Malaysia, forming the blue cluster, reflect the surge in academic output from Asia, particularly in the context of green finance and ESG practices. Interestingly, the map shows growing involvement from countries in Africa (e.g., Nigeria, Ghana) and Southeast Asia (e.g., Vietnam, Bangladesh), although their nodes are smaller and located on the periphery. This suggests an emerging but underrepresented presence that warrants capacity-building support. The overall visualization reveals that while sustainable finance is global in scope, knowledge production remains regionally concentrated, with many countries still disconnected from the mainstream scholarly dialogue. Bridging this gap is vital for two reasons. First, sustainable finance solutions must be context-sensitive, and diverse regional perspectives are crucial. Second, global initiatives such as the Sustainable Development Goals (SDGs) require collective action across all economies. Enhancing inclusion in research networks could contribute to more equitable and globally relevant policy outcomes.

Thematic Structure and Core Research Areas

The keyword co-occurrence network reveals "sustainable development" as the central thematic anchor, with strong links to concepts like green finance, sustainable finance, investments, innovation, and carbon emissions. The map identifies multiple clusters, each representing a subdomain of sustainable finance. The red cluster emphasizes financial performance dimensions, including profitability, risk assessment, and investment strategies. This reflects traditional finance concerns adapted to sustainable contexts, such as evaluating ESG investments. The green cluster focuses on macroeconomic outcomes, such as economic development, financial development, and carbon reduction, suggesting a policy-oriented research strand. The blue and yellow clusters, featuring terms like decentralized finance, financial inclusion, and green development, represent emerging intersections between technology and sustainability. The prominence of these terms suggests a growing academic interest in how fintech, blockchain, and digital finance can enhance ESG transparency, promote inclusive financing, and enable decentralized climate solutions. Collectively, the thematic map shows that sustainable finance is no longer limited to environmental or ethical investing but now spans a broad range of domains, including innovation ecosystems, macro-financial stability, digital transformation, and social equity.

Temporal Trends and Emerging Themes

The overlay visualization illustrates how the field has evolved over time, with earlier research (2018–2020) focusing on foundational concepts like "sustainable development," "investments," and "environmental impact," shown in darker shades of blue and green. These early themes reflect efforts to frame sustainable finance within existing financial theory and evaluate ESG-linked performance outcomes. However, the transition to bright yellow (2022–2023) indicates the emergence of new and forward-looking topics such as "decentralized finance," "financial inclusion," "climate finance," and "green development." These topics reflect current academic and industry trends emphasizing innovation, accessibility, and systemic transformation. This evolution underscores the field's responsiveness to real-world developments, including the rise of green fintech, the need for inclusive climate adaptation financing, and heightened attention to the social dimensions of sustainability. The field is increasingly dynamic, shifting from theory-building to solution-oriented frameworks that blend finance, policy, and technology.

Research Density and Field Maturity

The density visualization provides insights into research intensity across different thematic areas. The central yellow glow around "sustainable development" signifies its role as the most studied and integrated concept in the literature. High-density nodes around green finance, innovation, and investments confirm that these areas have attracted sustained scholarly interest. In contrast, peripheral areas such as financial inclusion, decentralized finance, and green development show lower density, indicating that while these are emerging topics, they have not yet reached maturity in terms of volume and integration. These findings point to opportunities for further exploration, especially as these concepts gain traction in policy circles and among practitioners. Importantly, the uneven density highlights the need for diversification in research focus. Much of the literature remains anchored in financial performance and environmental outcomes, while topics related to governance, gender equity, biodiversity, and just transitions remain relatively underexplored in bibliometric terms.

CONCLUSION

This study provides a comprehensive bibliometric analysis of the intellectual landscape of sustainable finance, revealing its rapid expansion, thematic diversity, and evolving research dynamics. The field is anchored by foundational concepts such as sustainable development, green finance, and ESG investments, while emerging topics like decentralized finance, financial inclusion, and green development signal a growing orientation toward innovation and inclusivity. Author and country collaboration networks highlight both regional strengths and fragmentation, suggesting the need for broader international and interdisciplinary partnerships. The temporal and density visualizations further underscore the transition from traditional financial concerns to more forward-looking, impact-driven research. The findings not only map the structural contours of the field but also offer strategic insights for future research directions, policy formulation, and collaborative engagement in building a more sustainable global financial system.

REFERENCES

[1] G. Ferri dan B. A. Acosta, "Sustainable finance for sustainable development," *Cent. Relatsh. Bank. Econ. Work. Pap. Ser.*, vol. 30, 2019.

[2] M. T. Musakwa dan N. M. Odhiambo, "Remittance inflows and poverty nexus in Botswana: A multivariate approach," *J. Sustain. Financ. Invest.*, vol. 12, no. 2, hal. 475–489, 2022.

[3] L. Nugroho, A. Badawi, dan N. Hidayah, "Discourses of sustainable finance implementation in Islamic bank (Cases studies in Bank Mandiri Syariah 2018)," *Int. J. Financ. Res.*, vol. 10, no. 6, hal. 108–117, 2019.

[4] M. Piratti dan V. Cattelan, "Islamic green finance: A new path to environmental protection and sustainable development," in *Islamic social finance*, Routledge, 2018, hal. 144–172.

[5] I. Akomea-Frimpong, D. Adeabah, D. Ofosu, dan E. J. Tenakwah, "A review of studies on green finance of banks, research gaps and future directions," *J. Sustain. Financ. Invest.*, vol. 12, no. 4, hal. 1241–1264, 2022.

[6] N. Donthu, S. Kumar, D. Mukherjee, N. Pandey, dan W. M. Lim, "How to conduct a bibliometric analysis: An overview and guidelines," *J. Bus. Res.*, vol. 133, hal. 285–296, 2021.

[7] B. Cheng, I. Ioannou, dan G. Serafeim, "Corporate social responsibility and access to finance," *Strateg. Manag. J.*, vol. 35, no. 1, hal. 1–23, 2014.

[8] B. L. Parmar, R. E. Freeman, J. S. Harrison, A. C. Wicks, L. Purnell, dan S. De Colle, "Stakeholder theory: The state of the art," *Acad. Manag. Ann.*, vol. 4, no. 1, hal. 403–445, 2010.

[9] J. Lubchenco, "Entering the century of the environment: a new social contract for science," *Science (80-.).*, vol. 279, no. 5350, hal. 491–497, 1998.

[10] C. Flammer, "Corporate green bonds," *J. financ. econ.*, vol. 142, no. 2, hal. 499–516, 2021.

[11] R. Gray, "Is accounting for sustainability actually accounting for sustainability… and how would we know? An exploration of narratives of organisations and the planet," *Accounting, Organ. Soc.*, vol. 35, no. 1, hal. 47–62, 2010.

[12] L. Edvinsson, "Developing intellectual capital at Skandia," *Long Range Plann.*, 1997.

[13] K. Karra, C. Kontgis, Z. Statman-Weil, J. C. Mazzariello, M. Mathis, dan S. P. Brumby, "Global land use/land cover with Sentinel 2 and deep learning," in *2021 IEEE international geoscience and remote sensing symposium IGARSS*, IEEE, 2021, hal. 4704–4707.

[14] S. Drempetic, C. Klein, dan B. Zwergel, "The influence of firm size on the ESG score: Corporate sustainability ratings under review," *J. Bus. ethics*, vol. 167, no. 2, hal. 333–360, 2020.

[15] N. Ortiz-de-Mandojana dan P. Bansal, "The long-term benefits of organizational resilience through sustainable business practices," *Strateg. Manag. J.*, vol. 37, no. 8, hal. 1615–1631, 2016.