

Sustainable and Green Finance Research in Emerging Economies: A Bibliometric Mapping and Science-Mapping Analysis

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Abstract

In recent years, there has been growing awareness among investors about sustainable investment approaches that embed environmental, social, and governance considerations into financial decision-making. This has in turn led to a surge in research and publications in this domain. In the context of emerging economies, such an increase can be attributed to the growing role of sustainable and green finance in mobilising capital, promoting responsible investment approaches, and ensuring inclusive development. Against this backdrop, the current study performs bibliometric mapping and science mapping techniques to understand the trend of sustainable and green finance literature in emerging economies. Using the Scopus database, 247 articles published in English-language journals and in the final stage of publication were identified up to 17 January 2026. Publication trends, productive and influential authors, highly cited studies, and prominent sources were identified. The results revealed that publication has grown significantly since 2021, with Tan Y. and Zhu Z. being the most influential authors of the domain. Further, keyword co-occurrence and bibliographic coupling were also conducted to identify the major research themes and intellectual structure of the field. Keyword co-occurrence analysis found diverse interconnected thematic clusters with green finance and sustainable finance as its core theme, demonstrating the multi-faceted nature of the research area. However, bibliographic coupling analysis in the study concluded that existing research on sustainable and green finance in emerging economies is still at a formative stage, with a substantial scope for future studies to contribute to theoretical consolidation.

Keywords: Green finance; Sustainable finance; Emerging economies; Bibliometric analysis; ESG Investing.

1. Background of the Research

The global financial landscape is experiencing a major change from conventional practices to a more integrated approach that incorporates sustainability factors such as environmental, social, and governance (ESG) into financial decision-making. The principal concept of sustainable finance is to formulate a long-term strategy that not only addresses the economic aspects but also considers a holistic approach that takes into consideration the economic, social, and governance factors (Friede et al., 2015). Green finance, although often interchangeably used with sustainable finance, conceptually it is much narrower in scope. Green finance comprises activities that establish a two-way relationship between the environment and finance but excludes social and governance aspects (International Organisation for

Standardisation [ISO], 2022). Even though both promote sustainable development and are synonymous, the distinction between green and sustainable finance is important for policymakers and investors for proper allocation of resources and policy formulation to achieve specific Sustainable Development Goals. In recent years, there has been a surge in research and publications on sustainable finance (Jaiswal et al., 2025). This expansion of the existing literature over the past decade can be attributed to international initiatives, task forces, and global agreements such as the Paris Agreement in 2015 (Kashi, 2023). However, the existing literature is largely skewed towards developed economies (Shen et al., 2016; Tilt, 2016), with limited insights from the developing countries. Emerging economies face a unique set of challenges and opportunities that drive the need for sustainable finance. Research has shown that investors' interest and need for ESG integration are the main reasons for growth in the sustainable finance market in such economies (Goel et al., 2022). Despite its promising momentum, market maturity in emerging economies remains constrained owing to challenges such as inconsistent ESG standards, data disclosure gaps, greenwashing risks, and low domestic investor participation. (International Finance Corporation [IFC], 2023).

Against this backdrop, the current study is a literature review systematically based on bibliometric analysis of green and sustainable finance research conducted in emerging economies, based on 247 peer-reviewed articles indexed in Scopus. Bibliometric analysis is a scientific method that facilitates examination of existing literature to understand and identify publication patterns, research trends, intellectual structure, and scholarly impact within the field (Donthu et al., 2021). More specifically, the study aims to address the following research questions (RQs):

- (i)RQ1: What are the recent publication trends in sustainable and green finance research related to emerging economies?
- (ii)RQ2: Who are the most influential authors and important institutions in the selected area of study?
- (iii)RQ3: Which are the most significant articles and sources in the existing literature for the selected area of study?
- (iv)RQ4: What are the major research themes and thematic clusters in sustainable and green finance literature focusing on emerging economies?
- (v)RQ5: What is the intellectual structure of sustainable and green finance research in emerging economies?

The remainder of this paper is divided into the following sections: Section 2 discusses the literature review; Section 3 states the research methodology; Section 4 provides the results and analysis; and Section 5 presents the conclusion of the study.

2. Literature Review

2.1 Evolution of Sustainable and Green Finance

The origin of sustainable finance can be traced back to the late 1980s, when the term “sustainable development” gained widespread recognition through the Brundtland Report, "Our Common Future". This report has established the initial connection between economic growth and environmental sustainability. It highlighted that long-term prosperity relies on ecological health and social balance (Brundtland and Khalid, 1987). However, the real momentum came after the 2008 global financial crisis when the United Nations Environment Programme (UNEP) encouraged the concept of “green economy” as a strategy for economic recovery, job creation, and long-term environmental sustainability (Gehring, 2016). The adoption of the United Nations Sustainable Development Goals in 2015 marked another turning point in the global economy, accelerating the shift from narrowly environmentally focused financial practices to a broader sustainable framework for financing and investment decisions (Schoenmaker, 2017). Notably, studies have also shown that sustainable finance gained importance for investors during the COVID -19 pandemic as they perceived ESG integration acted as a mechanism for downside risk protection (Hoang & Yang, 2021).

2.2 Insights from emerging economies on sustainable and green finance

A study on emerging economies has revealed that sustainable finance is heavily influenced by the governance quality, consistency of regulations, and reliability of ESG information (Narayan et al., 2025). Research also found that in emerging economies, the push for ESG integration primarily comes from regulatory pressure and stakeholder involvement (Khamisu et al., 2024), rather than as a voluntary pledge. However, Naeem et al. (2022), in a study across twenty-seven emerging economies, found that firms with better ESG practices have higher market valuations and better profitability. This indicates that ESG is no longer confined to a mere compliance mechanism in developing countries. Tansan et al. (2023) support these findings, documenting a strong positive relationship between ESG performance and firm growth in terms of valuation and shareholder returns in emerging markets.

2.3 Research scenario in sustainable and green finance

The domain of green and sustainable finance has attracted significant attention from researchers in recent years, as demonstrated by the rapid growth of publications within the existing literature (Abdul Gafoor et al., 2024; Jaiswal et al., 2025). This growth, combined with the interdisciplinary nature of the field, has resulted in the diversifying research streams, varied methodologies, and a broadened geographic focus (Ante, 2024; Roy and Vasa, 2025). In this context, the present bibliometric analysis study maps the extant literature on sustainable and green finance in emerging economies.

3. Research Methodology

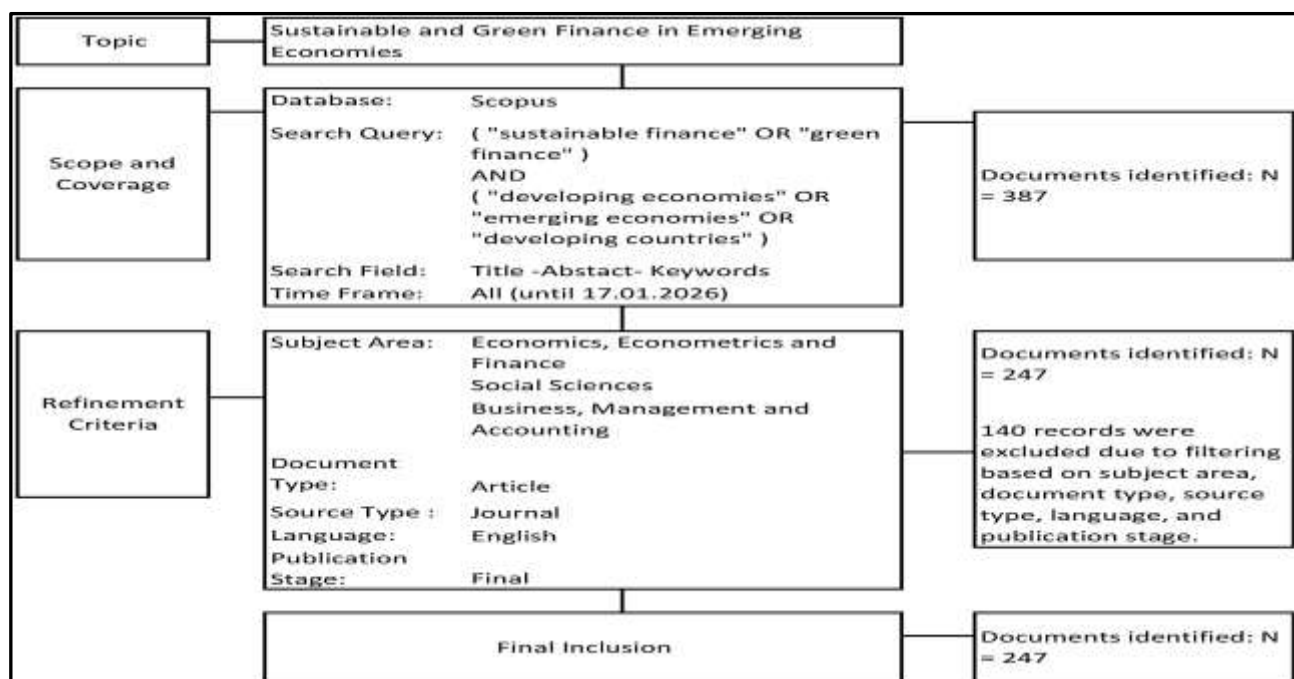
The study aims to conduct a bibliometric analysis to examine publication trends, collaborative patterns, and thematic evolution of existing literature on sustainable finance in emerging economies.

3.1 Data Collection

The bibliographic data for the study were retrieved from the Scopus database. Scopus is well-known for its comprehensive coverage of peer-reviewed journals and its suitability for bibliometric research (Donthu et al., 2021). The search strategy included the keywords "sustainable finance" or "green finance" together with "developing economies" or "emerging economies" or "developing countries". The search scope was restricted to title, abstract, and keywords. The study encompasses all articles published on the given topic up to 17th January 2026. The search was refined to three subject areas, namely, economics, econometrics and finance, social sciences and business, management and accounting. Only journal articles published in the English language and indexed in their final publication stage were considered for analysis. After applying these filters, a sample of 247 articles was derived. The search query process is also illustrated in Figure-1.

The Scopus search string: (TITLE-ABS-KEY(("sustainable finance" OR "green finance") AND ("developing economies" OR "emerging economies" OR "developing countries")) AND (LIMIT-TO (SUBJAREA,"ECON") OR LIMIT-TO (SUBJAREA,"SOCI") OR LIMIT-TO (SUBJAREA,"BUSI")) AND (LIMIT-TO (SRCTYPE,"j")) AND (LIMIT-TO (DOCTYPE,"ar")) AND (LIMIT-TO (LANGUAGE,"English")) AND (LIMIT-TO (PUBSTAGE,"final"))).

Figure 1: Search Query Process in the Scopus Database



3.2 Data Analysis Tools

The data recovered from the Scopus database was extracted in CSV format and then imported into VOSviewer. The required analysis was then performed in VOSviewer in order to address the research questions. In addition, Excel was also used for analysis to gain a better understanding of the results.

3.3 Techniques for Analysis

A bibliometric analysis was performed to address the objectives and understand the changing trends and concepts in sustainable finance in emerging economies. It is considered as an extensive and impactful methodology for systematically evaluating the research trends, scholarly influence, and intellectual structure within a given domain (Zupic & Čater, 2014; Donthu et al., 2021). It includes two aspects, namely, performance analysis and science mapping. Performance analysis helps to measure the productivity and scholarly impact in a research domain, while science mapping visualises the intellectual structure and identifies the knowledge clusters (Lim and Kumar, 2024). RQ1, RQ2, and RQ3 are addressed through performance analysis, while RQ4 and RQ5 are analysed using science mapping techniques, namely, keyword co-occurrence analysis and bibliographic coupling.

4. Results and Discussions

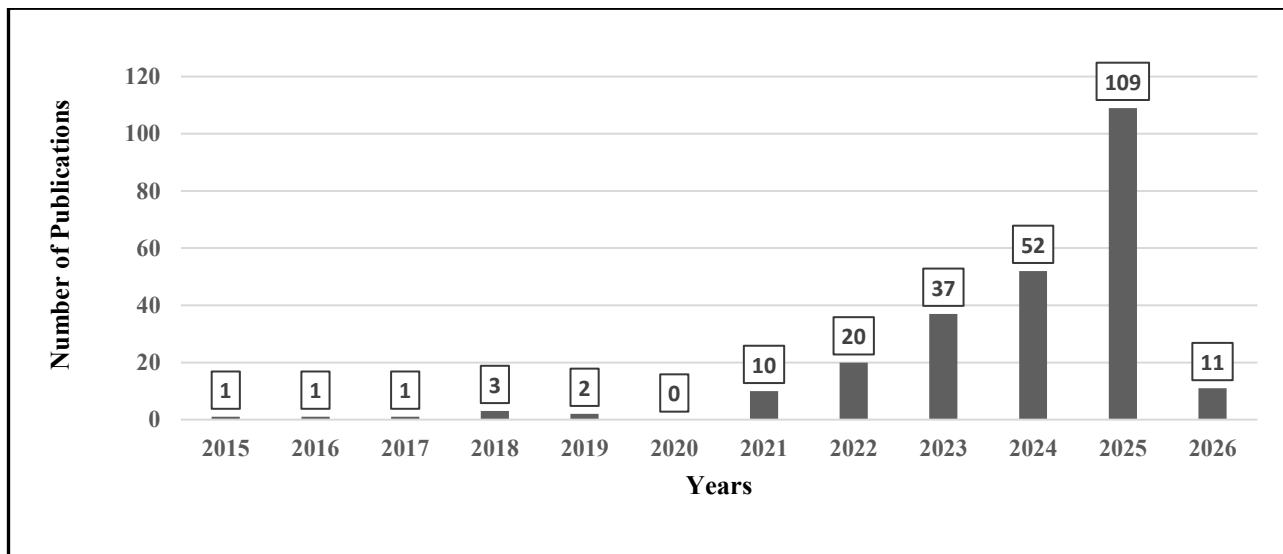
4.1 Performance Analysis

Performance Analysis focuses on the identification of trends within the reviewed literature by evaluating the growth of publications, citation metrics, and authorship trends (Lim and Kumar, 2024).

4.1.1 Publication Trends over time

To examine RQ1, Figure 2 shows a graphical representation of the annual publications of the 247 retrieved articles. The earliest contribution is from 2015, and among the most active years with the highest number of publications, 2025 is in the first place, followed by the year 2024. The volume of publications remained extremely low during the pre-COVID period, i.e., from 2015 to 2019, with fewer than five articles published annually, implying that the research on sustainable or green finance in emerging economies was still at a nascent stage. In 2020, which marked the outbreak of COVID-19, no articles were published, signifying the initial disruption caused by the global health crisis on research activities.

Figure 2: Publication trend over time for 247 documents



Note : Publication count for 2026 includes only relevant documents published up to 17th January 2026

Source: Compiled by Authors

However, in the post-COVID period, a substantial rise in the number of publications could be observed. This trend displays that COVID-19 acted as a catalyst, increasing academic attention towards sustainable or green finance as policymakers, institutions, and investors of emerging economies started to emphasise resilience, risk management, and long-term sustainability in financial decision-making.

4.1.2 Significant Authors

To answer RQ2, an analysis of the most productive and cited authors is performed, which helps identify the prominent researchers who have played a key role in the development of the research domain. Table 1 provides insights into the top-cited authors in the research field. Table 2 presents the most productive researchers who have made significant

contributions through multiple publications. Tan Y. and Zhu Z. are the most influential authors, with the highest citation impact through a single co-authored publication. Their joint study titled “The effect of ESG rating events on corporate green innovation in China: The mediating role of financial constraints and managers' environmental awareness” has attracted remarkable scholarly attention. Wang Q., Chang C., and Wang H. also validate their strong influence through several publications and high citation counts. Taghizadeh-Hesary, F. emerges as the most important contributor with five publications, demonstrating his sustained and active engagement in the research domain. Notably, Chang C. is the only author who has appeared in both tables with three publications and 114 average citations, displaying his intensive and meaningful contributions.

An analysis of the number of authors for each paper was also performed. Among the 247 articles selected for study, 6.48% were authored by a single author, 20.24% by two authors, and 73.28% by three or more authors. This authorship pattern suggests a strong preference among researchers in the domain to collaborate.

Table 1: Top Authors based on citations

Authors	Affiliation	TC	TP	TC/TP
Tan, Yafei	School of Accounting, Zhejiang Gongshang University, Hangzhou, Zhejiang, China	509	1	509
Zhu, Zhaohui	School of Accounting, Zhejiang Gongshang University, Hangzhou, Zhejiang, China	509	1	509
Wang, Quanjing	Zhengzhou University, Zhengzhou, Henan, China	402	2	201
Chang, Chunping	Shih Chien University, Taipei, Taiwan	342	3	114
Wang, Haijie	Zhengzhou University, Zhengzhou, Henan, China	326	2	163
Behera, Biswanath	Department of Humanities and Social Sciences, National Institute of Technology Rourkela, Rourkela, India	262	2	131
Sethi, Narayan	Department of Humanities and Social Sciences, National Institute of Technology Rourkela, Rourkela, India	262	2	131
Siddik, Abu bakkar	School of Management, University of Science and Technology of China, Hefei, Anhui, China	185	2	92.5
Fatema, Nazneen	Department of Economics & Banking, International Islamic University Chittagong, Dhaka, Bangladesh	151	1	151
Masukujjaman, Mohammad	Department of Business Administration, Northern University Bangladesh, Dhaka, Dhaka, Bangladesh	151	1	151
Zheng, Guangwen	School of Economics and Management, Shaanxi University of Science and Technology, Xinyang, Shaanxi, China	151	1	151
<i>Note(s): TC = Total Citations; TP = Total Papers; TC/TP= Total citations per paper</i>				
Source: Compiled by Authors				

Table 2: Top Authors based on number of articles published

Authors	Affiliation	TP
Taghizadeh-hesary, Farhad	Tokai University, Tokyo, Japan	5
Chang, Chunping	Shih Chien University, Taipei, Taiwan	3
Rasoulnezhad, Ehsan	Faculty of World Studies, University of Tehran, Tehran, Iran	3
Bhatnagar, Sumedha	Department of Humanities and Social Sciences, Malaviya National Institute of Technology Jaipur, Jaipur, Rajasthan, India	3
Sharma, Dipti	Department of Humanities and Social Sciences, Malaviya National Institute of Technology Jaipur, Jaipur, Rajasthan, India	3
Source: Compiled by Authors		

4.1.3 Significant Studies

In order to address RQ3, Table 3 illustrates the top-cited documents from the sample of articles under study. Panel A of Table 3 states the top ten articles based on total citation counts. However, since total citation counts inevitably have a bias in favour of old studies, additionally, the top ten articles based on average citation counts per year are listed in Panel B to overcome the bias. Tan and Zhu (2022) and Wang, Wang, and Chang (2022) are the top two cited papers in both Panel A and Panel B, demonstrating their strong relevance in the field of sustainable finance pertaining to emerging economies. Further, both panels show a high degree of repetition. Out of the ten articles present in Panel A, six repeat themselves in Panel B, showing that the impact of articles is not strongly dependent on their publication year.

Table 3: Top Cited Articles

Publication Year	Authors	Paper Title	Journal Title	TC	TC/Y
Panel A: Top papers based on total citations					
2022	Tan, Yafei; Zhu, Zhaohui	The effect of ESG rating events on corporate green innovation in China: The mediating role of financial constraints and managers' environmental awareness	Technology in Society	509	127.3
2022	Wang, Quanjing; Wang, Haijie; Chang, Chunping	Environmental performance, green finance and green innovation: What's the long-run relationships among variables?	Energy Economics	290	72.5
2021	Zheng, Guangwen; Siddik, Abu Bakkar; Masukujjaman, Mohammad; Fatema, Nazneen	Factors affecting the sustainability performance of financial institutions in Bangladesh: The role of green finance	Sustainability Switzerland	135	27
2024	Sethi, Litu ; Behera, Biswanath; Sethi, Narayan	Do green finance, green technology innovation, and institutional quality help achieve environmental sustainability? Evidence from the developing economies	Sustainable Development	133	66.5
2024	Hossain, Mohammad Razib; Rao, Amar; Sharma, Gagan Deep; Dev, Dhairya; Kharbanda, Aeshna	Empowering energy transition: Green innovation, digital finance, and the path to sustainable prosperity through green finance initiatives	Energy Economics	125	62.5
2018	Pueyo, Ana	What constrains renewable energy investment in Sub-Saharan Africa? A comparison of Kenya and Ghana	World Development	123	15.38
2022	Yu, Mingzhe; Zhou, Qiang; Cheok, Mui Yee; Kubiczek, Jakub; Iqbal, Nadeem	Does green finance improve energy efficiency? New evidence from developing and developed economies	Economic Change and Restructuring	116	29
2023	Hunjra, Ahmed Imran; Hassan, M. Kabir; Ben-Zaied, Younes; Managi, Shunsuke	Nexus between green finance, environmental degradation, and sustainable development: Evidence from developing countries	Resources Policy	113	37.67
2024	Yiming, Wang; Xun, Liu; Umair, Muhammad; Assilova, Aizhan Sarsenovna	COVID-19 and the transformation of emerging economies: Financialization, green bonds, and stock market volatility	Resources Policy	110	55

2022	Awawdeh, Alaeldin Eldin; Ananzeh, Mohammed; El-Khateeb, Ahmad Ibrahiem; Aljumah, Ahmad Ibrahim	Role of green financing and corporate social responsibility (CSR) in technological innovation and corporate environmental performance: a COVID-19 perspective	China Finance Review International	108	27
Panel B: Top papers based on average citations per year					
2022	Tan, Yafei; Zhu, Zhaohui	The effect of ESG rating events on corporate green innovation in China: The mediating role of financial constraints and managers' environmental awareness	Technology in Society	509	127.3
2022	Wang, Quanjing; Wang, Haijie; Chang, Chunping	Environmental performance, green finance and green innovation: What's the long-run relationships among variables?	Energy Economics	290	72.5
2024	Sethi, Litu; Behera, Biswanath; Sethi, Narayan	Do green finance, green technology innovation, and institutional quality help achieve environmental sustainability? Evidence from the developing economies	Sustainable Development	133	66.5
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2024	Yiming, Wang; Xun, Liu; Umair, Muhammad; Assilova, Aizhan Sarsenovna	COVID-19 and the transformation of emerging economies: Financialization, green bonds, and stock market volatility	Resources Policy	110	55
2024	Behera, Biswanath; Behera, Puspanjali; Sethi, Narayan	Decoupling the role of renewable energy, green finance and political stability in achieving the sustainable development goal 13: Empirical insight from emerging economies	Sustainable Development	106	53
2025	Sun, Xialing; Meng, Zheng; Zhang, Xuchao; Wu, Jiayi	The role of institutional quality in the nexus between green financing and sustainable development	Research in International Business and Finance	52	52
2024	Kirikaleli, Dervis; Adebayo, Tomiwa Sunday	Political risk and environmental quality in Brazil: Role of green finance and green innovation	International Journal of Finance and Economics	93	46.5
2023	Hunjra, Ahmed Imran; Hassan, M. Kabir; Ben-Zaied, Younes; Managi, Shunsuke	Nexus between green finance, environmental degradation, and sustainable development: Evidence from developing countries	Resources Policy	113	37.67
2023	Zhang, Zhenhua; Wang, Jing; Feng, Chao; Chen, Xi	Do pilot zones for green finance reform and innovation promote energy savings? Evidence from China	Energy Economics	102	34
<i>Note(s): "TC" stands for Total citations, and "TC/Y" stands for total citations per year and reflects average citations per year. All citation counts are as of the date of article extraction.</i>					
Source: Compiled by Authors					

4.1.4 Significant Sources

In order to further address RQ3, an analysis of significant sources is conducted to highlight the journals that played an important role in shaping the research domain. Table 4 presents the top-cited journals based on total citation counts, and Table 5 summarises information on several prominent sources based on the number of articles. Analysis revealed that 239 articles out of the 247 retrieved articles were published post 2021. This reaffirms that the COVID-19 pandemic, which began in 2020, acted as a strong catalyst for increased scholarly interest in more sustainable financial approaches. Energy Economics is the most influential source with 654 citations, and Sustainability (Switzerland) tops in terms of productivity with 29 publications. Resources Policy, Sustainable Development, and the Journal of Cleaner Production also contribute substantially to the research domain, as they make their appearance in both tables, highlighting their dual role as highly productive and influential journals.

Table 4: Top sources by citations

Source title	Total Citations
Energy Economics	654
Technology In Society	550
Sustainability (Switzerland)	449
Resources Policy	416
Sustainable Development	364
Economic Analysis and Policy	192
Journal of Cleaner Production	190
World Development	164
Economic Research-Ekonomska Istrazivanja	130
Economic Change and Restructuring	125
China Finance Review International	117
Finance Research Letters	110
Journal Of Sustainable Finance and Investment	108
International Journal of Finance and Economics	105
Global Finance Journal	98
Source: Compiled by Authors	

An analysis of the distribution of publishers was also conducted. Based on all articles in the sample, the most prevalent publisher is Elsevier, with 29.55% of the total articles. The second most noteworthy publisher is Multidisciplinary Digital Publishing Institute (MDPI) with 11.74% contribution. They are followed by Wiley and Emerald Publishing, each accounting for an 8.10% share of total articles published.

Table 5: Top Sources based on Total Papers Published

Source title	2015-2020	2021-2026	TP	TC	TC/TP
Sustainability (Switzerland)	2	27	29	449	15.48
Resources Policy	0	10	10	416	41.60
Discover Sustainability	0	9	9	11	1.22
Finance Research Letters	0	8	8	654	81.75
Energy Economics	0	8	8	110	13.75
Sustainable Development	0	8	8	364	45.50
International Journal of Energy Economics and Policy	0	7	7	47	6.71
Journal of Cleaner Production	1	6	7	190	27.14
Corporate Social Responsibility and Environmental Management	0	6	6	89	14.83

Humanities and Social Sciences Communications	0	6	6	7	1.17
Sustainable Futures	0	6	6	3	0.50
Economic Change and Restructuring	0	4	4	39	9.75
Business Strategy and the Environment	0	4	4	64	16.00
Applied Economics	0	4	4	192	48.00
Global Finance Journal	0	4	4	125	31.25
Economic Analysis and Policy	0	4	4	98	24.50
Technology in Society	0	3	3	6	2.00
Sustainability Accounting, Management and Policy Journal	0	3	3	42	14.00
Journal of Risk and Financial Management	0	3	3	550	183.33
Others	5	109	114	1488	13.05
Total	8	239	247	4944	
<i>Note(s): TC = Total Citations; TP = Total Papers; TC/TP= Total citations per paper</i>					
Source: Compiled by Authors					

4.2 Science Mapping

Science mapping techniques are used to visualise and analyse bibliometric networks, including citation, co-citation, bibliographic coupling, and keyword co-occurrence relationships, to discover the intellectual structure of a research domain (Van Eck and Waltman, 2014).

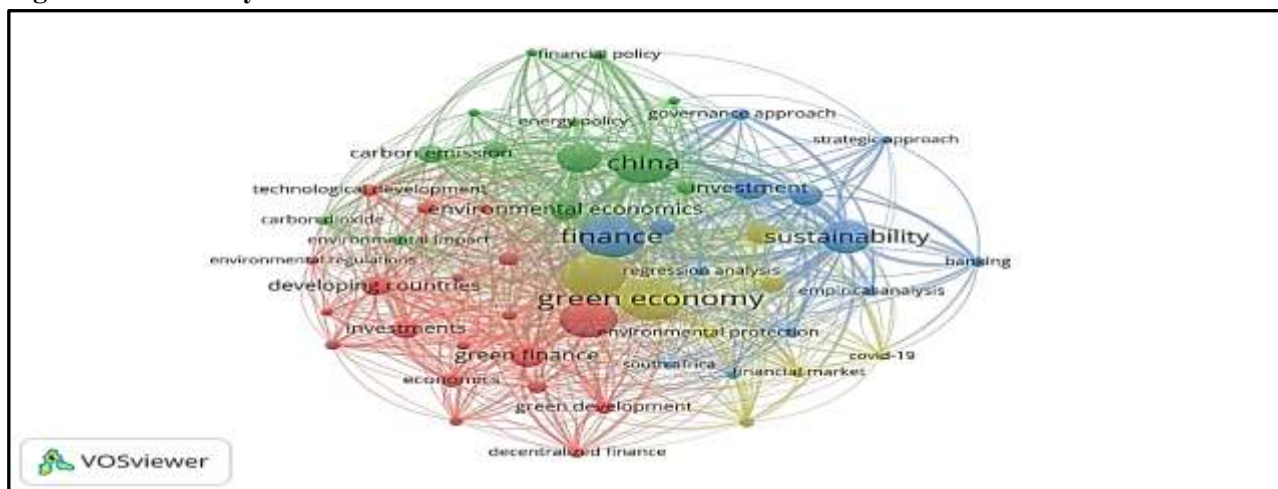
4.2.1 Keyword Co-Occurrence

Keyword co-occurrence analysis is a content-based bibliometric technique that maps relationships among frequently occurring terms, such as author keywords and index words, to uncover the research themes and thematic clusters within the research domain (Klarin, 2024). This method is employed to examine RQ4 and identify the leading themes and thematic clusters of research done on sustainable and green finance in emerging economies. Among the selected articles, a total of 717 keywords were used by authors. Out of them, the most frequently occurring keywords are “green finance”, “sustainable finance”, “sustainable development”, “green innovation”, and “developing countries”. These keywords signify the intellectual backbone of the literature in the research domain. Author keywords with a minimum of five occurrences were included for visualisation in Figure 3, and six major thematic clusters, each representing a distinct and interrelated research theme, were identified with a total of thirty keywords. The bigger nodes denote more frequently occurring keywords, and the thicker lines between the nodes specify higher co-occurrence frequency between two keywords (Kirby, 2023).

The network diagram contains six major clusters, namely red (Cluster 1), green (Cluster 2), blue (Cluster 3), yellow (Cluster 4), purple (Cluster 5), and pink (Cluster 6). Cluster 1 (red) focuses on sustainable finance and development mechanisms, including sustainable development, green bonds, carbon emissions, fintech, and BRICS economies. This cluster reflects research based on the theme of financial instruments and macro-economic dimensions for sustainability. The green cluster explains the relation between renewable energy, environmental sustainability, and financial development. Cluster 3 (blue) captures the theme of sustainability-focused innovation, covering green innovation, ESG, green technology innovation, and policy-related studies in emerging markets. The thematic focus of the yellow cluster is climate change and sustainability-oriented growth, connecting climate change, green growth, sustainability, and climate finance in developing countries. The purple cluster emphasise on market-oriented studies with the prominence of China, emerging markets, and their innovation dynamics within the green finance literature. Finally, cluster 6 (pink) centres on the theme of environmental performance outcomes. Overall, the network depicts an evolving research domain with green finance and sustainable finance as its core theme.

Source: Compiled by Authors

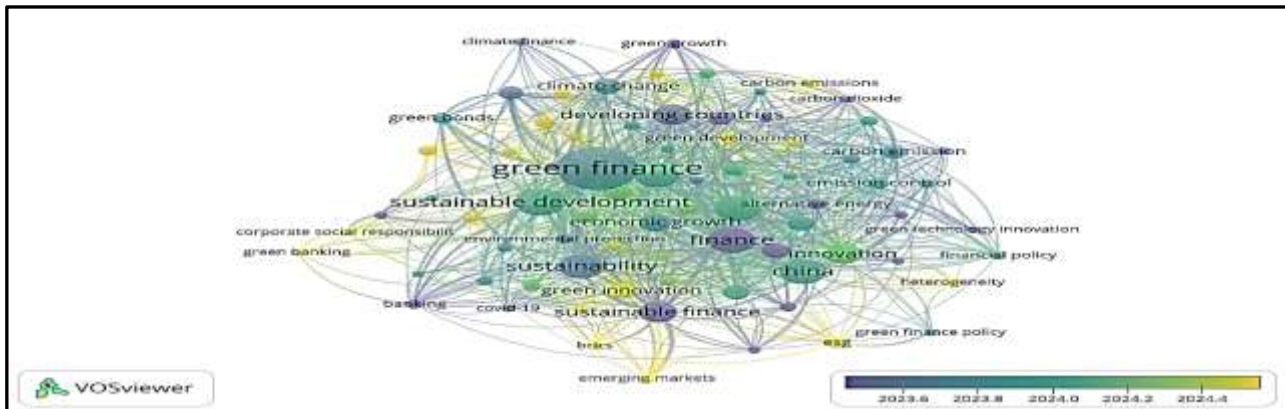
Figure 4: Index Keywords Co-Occurrence Network Visualisation



Source: Compiled by Authors

Finally, to understand the temporal evaluation of research themes in the field, an overlay visualisation is depicted in Figure 5 using both keywords and index words. All keywords with a minimum of 5 occurrences have been included in the visualisation after eliminating generic terms like “dataset” and “panel data”.

Figure 5: Keywords Co-Occurrence Overlay Visualisation



Note : This figure created using fractional counting in VOSviewer, visualises the overlay of co-occurrence network within both authors and index keywords, with minimum occurrence of 5.

Source: Compiled by Authors

Node size specifies the frequency of the keyword, and the colour gradient from blue to yellow depicts the average publication year of keyword usage. The depiction reveals themes like green finance and sustainable finance, coupled with developing countries, investments, and alternative energies as the core foundational research areas. In contrast, thematic areas like ESG, green innovation, green banking, environmental sustainability, and financial inclusion are more contemporary research directions. Overall, the overlay visualisation shows a progression in green and sustainable finance research from foundational sustainability-based finance themes toward innovation-oriented, ESG-integrated investigations.

4.2.2 Bibliographic Coupling

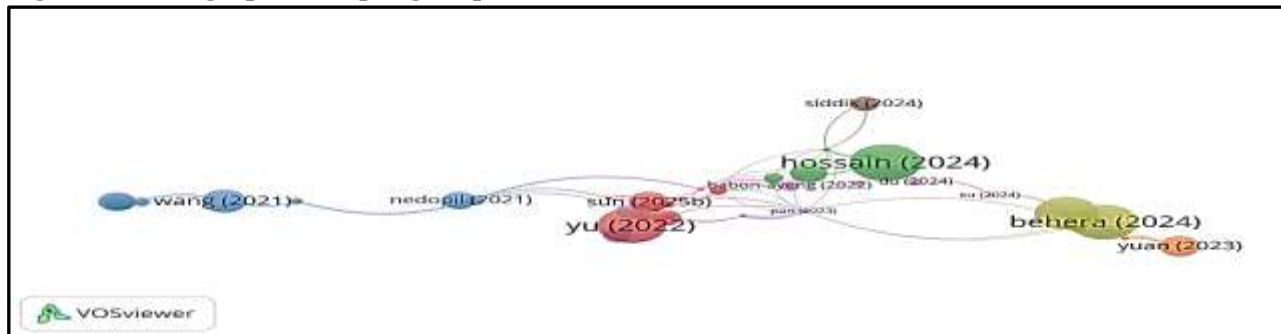
To examine RQ5, bibliographic coupling is employed. Bibliographic coupling is recognised when two research works cite common references, indicating intellectual similarity between them (Donthu et al., 2021; Van Eck and Waltman, 2014). The rationale is that when two articles cite the same references, they are expected to address related themes, which helps to uncover the underlying intellectual structure of the research domain. For the analysis, documents with a minimum of one citation and the top 50 articles based on link strength are used in Figure 6 for visualisation. Node sizes are determined based on total citations, and the link strength is visualised through the thickness of lines connecting the nodes.

The bibliographic coupling map revealed an integrated knowledge structure in green and sustainable finance literature in emerging economies. The major networks are organised around recent studies published between 2021 and 2024, demonstrating the development of a new research domain. The overlay mapping in Figure 7 depicts the evolution of the intellectual structure of the green and sustainable finance literature in the context of emerging economies. The colour progression from blue to yellow indicates the movement from earlier to more recent studies.

The network diagram in Figure 6 identified 8 major clusters. Cluster 1 (red), being the biggest cluster with 14 documents, addresses the present intellectual core of green finance research centred around sustainability, institutional quality, and energy efficiency outcomes in developing and emerging economies. Cluster 2 (green) consists of 7 articles that relate to the role of green finance in progressing sustainable development and environmental transition. The 7 studies in cluster 3 (blue) concentrate on the nexus between green innovation, technological progress, and environmental performance outcomes. The 6 articles in cluster 4 (yellow) study the linkages between green finance and political stability within emerging economies. Cluster 5 (purple), entailing the same number of articles, depicts the interconnected role of green finance, natural resources, and innovation in improving environmental quality and supporting sustainable development. Cluster 6 (pink) consists of 5 studies delving into the application of green finance in resources and infrastructure projects in developing nations. The last two clusters are the smallest, with 3 articles each. Cluster 7 (orange) studies the relation

of green finance with ESG performance, and cluster 8 (brown) focuses on the green banking practices and sustainable banking frameworks.

Figure 6: Bibliographic Coupling Map based on Documents

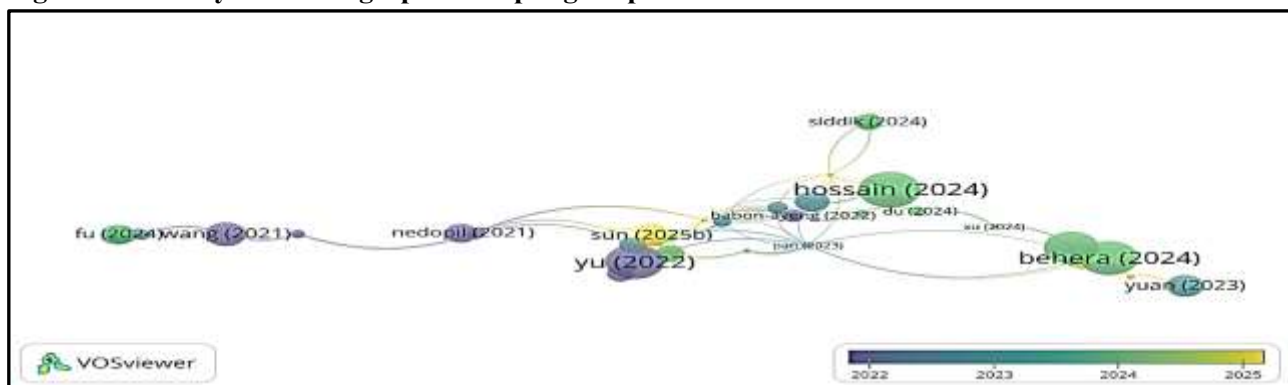


Note: This figure, created using fractional counting in VOSviewer, visualises the bibliographic coupling network based on documents

Source: Compiled by Authors

Overall, based on the bibliographic coupling network presented in Figure 6, it can be inferred that green and sustainable finance research in the context of emerging economies is in an early intellectual developmental stage, with limited cumulative knowledge building, but substantial scope for future theoretical consolidation. Notably, few influential studies are acting as bridging nodes and actively contributing to the evolving intellectual structure of the research field; these studies are stated in Table 6.

Figure 7: Overlay the Bibliographic Coupling Map based on Documents



Note : This figure was created using fractional counting in VOSviewer and visualises the bibliographic coupling network of documents, with colours representing the average publication year.

Source: Compiled by Authors

Table 6: Notable Studies identified through Bibliographic Coupling

Label	Authors	Publication Year	Paper Title	Journal Title	Total Citations	Cluster
yu (2022)	Yu, Mingzhe; Zhou, Qiang; Cheok, Mui Yee; Kubiczek, Jakub; Iqbal, Nadeem	2022	Does green finance improve energy efficiency? New evidence from developing and developed economies	Economic Change and Restructuring	116	Cluster 1 (Red)

sun (2025b)	Sun, Xialing; Meng, Zheng; Zhang, Xuchao; Wu, Jiayi	2025	The role of institutional quality in the nexus between green financing and sustainable development	Research in International Business and Finance	54	Cluster 1 (Red)
hossain (2024)	Hossain, Mohammad Razib; Rao, Amar; Sharma, Gagan Deep; Dev, Dhairya; Kharbanda, Aeshna	2024	Empowering energy transition: Green innovation, digital finance, and the path to sustainable prosperity through green finance initiatives	Energy Economics	125	Cluster 2 (Green)
wang (2021)	Wang, Chan; Li, Xinwu; Wen, Hongxing; Nie, Pu-yan	2021	Order financing for promoting green transition	Journal of Cleaner Production	63	Cluster 3 (Blue)
behera (2024)	Behera, Biswanath; Behera, Puspanjali; Sethi, Narayan	2024	Decoupling the role of renewable energy, green finance and political stability in achieving the sustainable development goal 13: Empirical insight from emerging economies	Sustainable Development	115	Cluster 4 (Yellow)
kirikkaleli (2024)	Kirikkaleli, Dervis; Adebayo, Tomiwa Sunday	2024	Political risk and environmental quality in Brazil: Role of green finance and green innovation	International Journal of Finance and Economics	105	Cluster 4 (Yellow)
yuan (2023)	Yuan, Huaxi; Zou, Longhui; Feng, Yidai	2023	How to achieve emission reduction without hindering economic growth? The role of judicial quality	Ecological Economics	55	Cluster 7 (Orange)

Note: Articles with a minimum of 50 citations are included in this table to highlight the most prominent studies in the bibliographic coupling network.

Source: Compiled by Authors

5. Conclusion

This study provides a comprehensive bibliometric synthesis of scholarly research on sustainable and green finance in emerging economies. The 247 articles selected for the analysis provide an overview of the prevalent scenario of research in the given field. The analysis provides insights into how there has been a rapid development of a new research domain through a substantial increase in the publication trend. The paper also highlights influential authors, important institutions, significant sources, and landmark studies that serve as the key sources of knowledge in the domain. The diverse interconnected thematic clusters identified through keyword co-occurrence analysis provide insights into the multifaceted nature of the field. It depicts a broad range of themes such as innovation-led sustainability, the energy-sustainable finance nexus, green growth, and several emerging areas of analysis. However, despite this thematic expansion, bibliographic coupling analysis revealed that the intellectual structure of the domain is still at a formative

stage, characterised by limited theoretical integration. This suggests that there is a substantial scope for future studies to contribute to stronger theoretical consolidation. These findings emphasise together the growing relevance of research on sustainable and green finance in emerging economies and capture the growing scholarly interest in the research area. Further, it underscores the evolution of the research domain into an expanding area of study with a shift from core foundational themes to more analytical and policy-driven investigations.

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