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Green Economy And Green Finance: A Bibliometric Analysis

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ABSTRACT

This study examines research trends on the green economy and green finance during 2015–2025 through a bibliometric approach using Scopus data, processed with R-Packages and Biblioshiny. The analysis involves mapping publication trends, identifying key authors, journals, collaboration networks, and emerging themes, while ensuring systematic literature selection through the PRISMA method. The findings reveal a significant increase in publications, particularly after 2020, with strong links to sustainable development, technological innovation, environmental policy, and sustainability-oriented investment, as well as a high level of international collaboration (30.63%). The novelty of this study lies in integrating both topics within a single analytical framework, enabling a more comprehensive understanding of their interrelation and revealing underexplored areas, such as the alignment of green financial instruments with green economy policies in developing countries. These results provide strategic insights for policymakers, industry, and academia in formulating sustainable financing strategies and guiding future research to support the transition toward a low-carbon, inclusive, and resilient economy.

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INTRODUCTION

In the era of globalization and rapid technological progress, the issue of sustainable development has become one of the biggest challenges faced by global society. Sustainable development is defined as efforts to meet the needs of the present generation without compromising the ability of future generations to meet their own needs (United Nations Development Programme, 2014). This phenomenon encompasses a balance between economic growth, environmental sustainability, and social justice. In the context of 2024, global environmental issues such as air pollution, climate change, and overexploitation of natural resources remain a major focus of attention for world leaders. Data shows that in Indonesia, the renewable energy mix in 2024 only reached around 11.5% of the total electricity supply, far below the national target of 23% by 2025 as mandated in the

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National Energy Master Plan (Aditya et al., 2025). This low achievement is caused by several factors, including limited financing, regulatory uncertainty, disparities in infrastructure between regions, and unequal technical capacity.

One widely recommended strategic approach to addressing this challenge is the implementation of the green economy concept. A green economy refers to a development model oriented toward low-carbon economic growth, resource efficiency, and social inclusion, while minimizing the risk of environmental damage Chaaben et al., (2022) This model not only emphasizes sustainable natural resource management and emission reduction but also facilitates the creation of green jobs, increased environmentally friendly investment, and reduced health costs due to reduced pollution. Research conducted by Chaaben et al. (2022) shows that implementing green economy indicators through the EEPSE Green Economy Index can help countries monitor the achievement of the Sustainable Development Goals (SDGs). Meanwhile, a UNDP study (2014) using the Indonesia Green Economy Model (I-GEM) emphasized the importance of integrating cross-sectoral policies and strengthening partnerships between the government, the private sector, and communities to accelerate the transition to a green economy. In contrast, research by (Prasetya & Ali, 2024) highlights the need for regional strategies to harness local renewable energy potential and waste management, while Rahyono (2024) discusses the challenges of financing and multi-stakeholder collaboration in green economy development. These studies confirm that the success of the transition to sustainable development is determined not only by technological innovation and financing, but also by policy stability, infrastructure availability, community participation, and high environmental awareness. Therefore, integrating a green economy approach into national and regional development strategies is a strategic step towards achieving a balance between economic growth, environmental sustainability, and social welfare in the future.

The concept of a green economy has become a key area of development policy in many countries around the world (Bogovic & Grdic, 2020). This idea was first introduced by British environmental activist Pearce in his work, Blueprint for a Green Economy, which emphasized that a green economy is an alternative form of economic development that integrates social development with ecological environmental protection, in contrast to traditional economic growth approaches (Pearce et al., 1989). Over time, the United Nations Environment Programme (UNEP) has defined a green economy as an economic system that promotes social equality and human well-being, while minimizing the risks of environmental degradation and natural resource scarcity. Through green transformation, this approach seeks to achieve economic growth that is aligned with environmental sustainability, thus being believed to be a comprehensive solution to global problems and pushing civilization towards a more inclusive, equitable, prosperous, and sustainable order (Azzahra, 2020). However, in reality, increasing national income in several countries still relies on intensive exploitation of natural resources without considering ecosystem balance, which actually exacerbates environmental degradation (Ariningtyas Prabawati, 2022). In this context, Zhuo & Deng (2020) emphasized that the fundamental goal of a green economy is to reduce economic disparities between regions while building a society oriented toward environmental sustainability. Economic efficiency can only be achieved through the implementation of targeted policies focused on environmental protection, which in turn provides strategic benefits for policymakers in promoting low-carbon development and the development of sustainable green areas.

A green economy is a development model that emphasizes achieving long-term social benefits through short-term economic activities, with the aim of improving human well-being and reducing inequality without creating significant environmental risks or ecological deficits for future generations. This concept aligns with the principles of sustainable development, which place environmental sustainability as the primary boundary in economic activity (UNEP, 2011; UNCTAD, 2011). Previous research has shown that a green economy is a key strategy in supporting sustainable development in Indonesia through the application of renewable energy, efficient use of resources, and the implementation of a circular economy. This approach has been proven to have positive impacts such as reducing carbon emissions, creating jobs in the clean energy sector, and increasing the competitiveness of local products. Although it still faces challenges such as limited incentives, weak coordination between stakeholders, and limited funding Amar et al., (2024) From a global perspective, a green economy is considered capable of addressing environmental challenges by reducing carbon emissions, increasing resource efficiency, and protecting biodiversity, while simultaneously providing social benefits in the form of improved community welfare and more equitable access to resources. Although requiring significant initial investment, the transition to a green economy has the potential to generate long-term cost efficiencies, encourage technological innovation, and open up new market opportunities (Judijanto et al., 2024). The implementation of this concept in Indonesia is reflected in the 2020–2024 National Medium-Term Development Plan (RPJMN), which emphasizes low-carbon

development and the application of sustainability principles, encompassing the energy, landscape, and sustainable infrastructure sectors.

Meanwhile, green finance is gaining increasing attention from industry, academics, and policymakers due to its significant sustainability in balancing environmental sustainability with economic development. This instrument has a significant contribution to addressing climate change and encouraging the transition to a low-carbon economy (Berrou et al., 2019). Given its multidimensional scope, studies on green finance encompass perspectives from various disciplines, such as banking (Akomea-Frimpong et al., 2022),economics and the environment (Zhou et al., 2020), monetary policy (Dziwok & Jäger, 2021), and regulation (Tariq & Hassan, 2023). Scientific publications on this topic have shown a significant increase, covering a wide range of issues, including environmental, social, and sovereign governance (Athari, 2024); financial development and green banking and environmental performance (Gulzar et al., 2024); financial development and renewable energy; government economic policy and renewable energy; green bonds and energy prices (Yan et al., 2022); renewable energy and CO_2 emissions (Saliba et al., 2022); and environmental demand, globalization, and wind power consumption (Özbay et al., 2022)

Research conducted by Nhung & Hang, (2024) shows that green finance experienced rapid development from 2000 to 2023, with significant publications in the last decade triggered by the Paris Agreement and the Sustainable Development Goals. Key research themes include green bonds, sustainable investment, renewable energy financing, and climate finance, as well as emerging issues such as the role of fintech and the impact of regulatory frameworks. Bibliometric analysis reveals increasingly intensive international collaboration and interdisciplinary research approaches. Influential journals were identified through network visualization maps. Despite the rapid growth of research in this field, challenges remain, such as regulation and the need for clear metric standards. This study recommends strengthening regulations and developing measurable indicators to encourage the advancement of green finance in the future.

Furthermore, a study conducted by Mohamad, (2025) entitled "Green and climate finance research trends: A bibliometric study of pre- and post-pandemic shifts" shows that green finance and climate finance play a crucial role in addressing global climate challenges and promoting sustainable development, with a significant increase in the number of publications since 2020, reflecting the growing urgency of sustainable finance mechanisms. A bibliometric analysis of 1,039 Scopus articles from 1997–2024 found that China has become a hub for global research collaboration, while the journal Environmental Science and Pollution Research was the most productive and influential. Thematic analysis revealed a shift in research focus from adaptation and food security issues before the COVID-19 pandemic to green finance, renewable energy, and the Sustainable Development Goals during the pandemic. However, there is a significant research gap in aspects of climate finance, particularly adaptation strategies. The study recommends increasing strategic investment in green finance mechanisms, integrating them into economic recovery frameworks, strengthening interdisciplinary research, and equitable global collaboration to achieve a sustainable and resilient future. Research conducted by Alsmadi & Alzoubi, (2022) provides insights into the development of research related to the green economy between 1990 and 2020 through a bibliometric analysis approach. The results indicate that although attention to the green economy has increased along with the global focus on sustainable development and climate change, there is no clear consensus among researchers regarding the definition of the concept. This study summarizes development trends and current conditions related to the green economy and presents a conceptual framework that can serve as a reference and guide for future research.

To explore this, it is necessary to conduct a study and research by mapping articles on the concept of green economy and green finance through the database of articles that have been collected in the Scopus database during the period 2015-2025. This study aims to provide a comprehensive overview of how this topic is developing in the scientific literature, especially amidst global challenges related to environmental conditions. This study is important because it provides an explanation of the latest green economy and green finance trends and finds research experts who are concerned with green economy and green finance research, and the most influential authors, journals and countries, as well as collaboration trends and research subjects of primary interest. In addition, the use of the PRISMA flowchart in this study ensures that the process of selecting and screening studies is carried out systematically and transparently, so that the results obtained have strong validity.

The novelty of this research is that it utilizes a bibliometric study that simultaneously maps the literature on the green economy and green finance within a single, integrated analytical framework. While most previous studies have examined only one topic separately, this study provides a more comprehensive perspective on the conceptual relationships and research developments in both fields.

Unlike previous studies, which generally utilize limited timeframes or datasets, this study utilizes the international Scopus-indexed database with a long and recent period of coverage from 2015 to 2025. This allows for the identification of research development patterns from the initial stages to the latest trends, while also capturing the dynamics of changing research focuses due to global factors such as the climate crisis and sustainability policies. The literature mapping results in this study reveal underexplored research areas, such as the integration of green financial instruments with green economy policies in developing countries and the influence of global regulations on sustainable financing innovation. This information provides an empirical basis for researchers and policymakers to guide future research focus and implementation. This research contributes to the literature on the green economy and green finance by offering a comprehensive mapping of publication trends, leading authors, key journals, research collaborations, and emerging themes. The findings are expected to provide strategic information for policymakers, industry players, financial institutions, and international organizations in formulating sustainable financing policies and strategies, and serve as a reference for future research and policymaking. Therefore, this research focuses on a bibliometric analysis of the green economy and green finance to answer the following questions

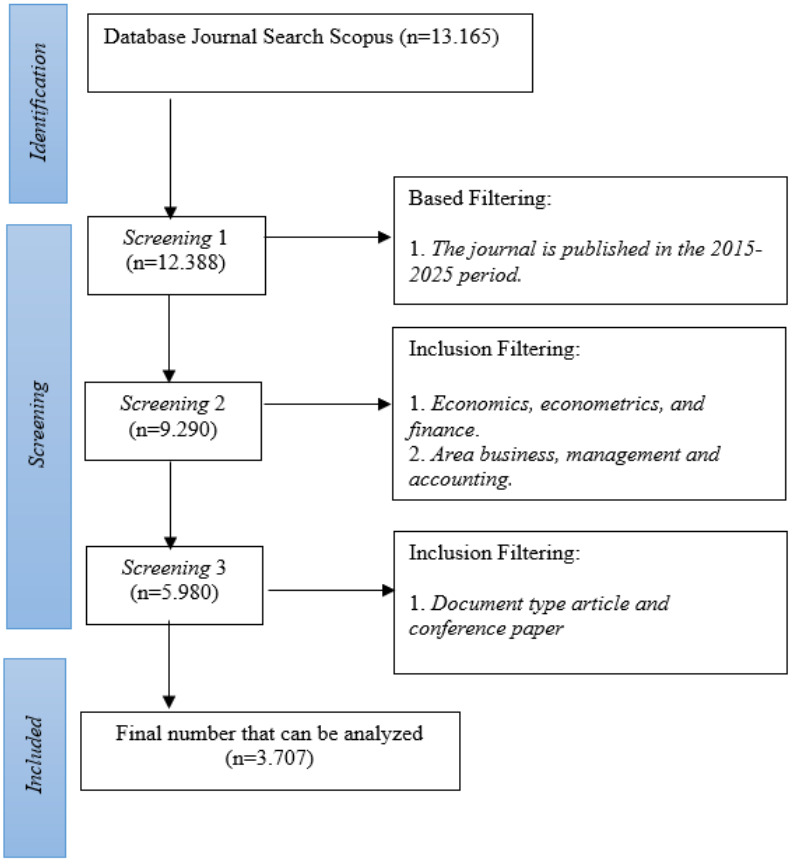
RQ: What are the future research directions in light of the most popular topics involving the green economy and green finance?

MATERIALS AND METHODS

This study uses a qualitative approach to explore trends and developments in green economy and green finance studies. This approach was chosen to obtain a comprehensive picture, not only in terms of the quantity of publications, but also the context and relevance of existing studies in the field (Singh & Dhir, 2019). The research method used is a combination of bibliometric and content analysis. Bibliometric analysis is used to quantitatively measure, map, and visualize the development of the literature, while content analysis is used to identify dominant themes, patterns, and research focuses. All data is obtained exclusively from the Scopus database, which was selected for its broad international coverage, rigorous indexing, and standardized publication metadata, facilitating a systematic analysis process (Rahman & Kebijakan, 2023).

Data processing and visualization were performed using R-Packages software and the Biblioshiny Web Interface (Ulfatun, 2023) .These tools were selected based on their ability to comprehensively process bibliometric data and produce informative visual representations, such as author collaboration maps, citation networks, and keyword trends. The research was carried out through five systematic steps. First, keywords relevant to the research topic were identified, taking into account common terminology used in international literature. Second, a data search was conducted in the Scopus database using predetermined keywords, along with the application of filters such as publication year range, document type, and field of study, to ensure data relevance. Third, article selection was conducted based on title, abstract, and keyword observations, so that only publications directly related to the green economy and green finance were further analyzed. Fourth, data validation was conducted to check metadata accuracy, eliminate duplication, and ensure data suitability for analysis with the tools used. Fifth, data analysis was conducted, where bibliometric analysis was used to map publication trends, influential authors, primary publication sources, and collaboration patterns, while content analysis was used to interpret research focus and developments in key issues discussed in the literature.

The keywords used by researchers in this study are "Green Economy and Green Finance" to produce more specific data searches with research topic categories. Data searches that match keywords are carried out through international publications that have been published from 2015 to 2025, and are limited to using two types of documents, namely articles and conference papers. Data search using keywords or keywords using the Scopus database whose data collection was carried out on February 23, 2025, after that select articles that match the specified criteria. Then validate the data to ensure the quality and accuracy of the information used in the study. Finally, conduct data analysis by identifying trends, patterns, and other important aspects that emerge from the data that has been collected. Researchers use the PRISMA flowchart to visualize the article selection process from the initial search stage to the final screening stage. This diagram includes the total articles found, the total articles screened at each stage, and the reasons for rejecting the article. This prism flow diagram illustrates the journal selection process used in systematic research from the Scopus database. This process begins with an initial identification stage, where a search in the Scopus database produces 13,165 journals with the initial keywords “Green Economy OR Green Finance”.



Source: processed by researchers

Figure 1. Prisma Flow Diagram

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart shown above illustrates the systematic process of screening and selecting scientific articles from the Scopus journal database for bibliometric analysis. This process begins with the identification stage, where an initial search of the Scopus database yielded 13,165 documents, and then 777 documents were eliminated early on for not meeting the basic criteria. This figure includes all types of publications found based on specific keywords, regardless of publication period, scientific field, or document type. Therefore, the next step is to carry out a gradual screening process with more specific criteria so that only relevant articles are included in the final analysis.

The first screening stage was conducted using publication-time-based filtering, where only articles published between 2015 and 2025 were retained. This initial screening resulted in 12,388 documents being selected. The purpose of this timeframe restriction was to ensure that the articles analyzed were part of the current, relevant literature, and reflected the latest developments in the academic world, particularly in the fields of economics, finance, business, and accounting. Articles published outside this timeframe were deemed less reflective of the current research context and needs and were therefore eliminated. Next, in the second screening stage, selection was carried out based on scientific fields (inclusion filtering). Only articles falling within the fields of Economics, Econometrics, and Finance, as well as Business, Management, and Accounting were included in this stage. This process resulted in 9,290 documents deemed relevant to the study's focus. This filtering was carried out to eliminate documents from other disciplines not directly related to the research object, such as engineering, health sciences, or pure science. Thus, the articles retained were those that truly fell within the intended research scope.

The third stage of the screening process further tightened document selection using additional criteria, namely document type. Only documents categorized as journal articles and conference papers were retained. These types of documents are considered to have undergone peer-review and possess academically sound scientific merit. After this screening stage, 5,980 articles remained. Other documents, such as editorials, book chapters, review papers, or stand-alone abstracts, were excluded from the analysis due to their perceived lack of relevance. After going through three stages of rigorous

screening, the final number of documents that met all criteria and were suitable for analysis was 3,707 articles. These articles then became the primary basis for the bibliometric analysis process in this study.

RESULTS AND DISCUSSION

RESULTS

The growth of journal publications in 2015-2025 has changed every year with a total of 3307 documents analyzed from 625 sources, including journals and books. Table 1 shows the growth of journal publications.

Table 1. Main Information

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2015:2025
Sources (Journals, Books, etc)	625
Documents	3307
Annual Growth Rate %	17,6
Document Average Age	2,6
Average citations per doc	23,62
References	166400
DOCUMENT CONTENTS	
Keywords Plus (ID)	7384
Author's Keywords (DE)	7784
AUTHORS	
Authors	6513
Authors of single-authored docs	336
AUTHORS COLLABORATION	
Single-authored docs	383
Co-Authors per Doc	3,22
International co-authorships %	30,63
DOCUMENT TYPES	
Article	3177
conference paper	130

Source: R-Packages and WebInterface Biblioshiny

Based on Table 1, the annual growth rate of publications in the fields of green economy and green finance reached 17.6% per year, indicating a trend of increasing attention from academics and practitioners to sustainability issues in the last decade. This growth aligns with the findings of Nhung & Hang (2024) and Mohamad (2025), who noted a significant surge in publications following the ratification of the Paris Agreement and the strengthening of the Sustainable Development Goals (SDGs) agenda, particularly in the post-pandemic era, which triggered a shift in research focus toward green recovery and sustainable financing. The average age of documents, 2.6 years, reflects the dynamic and responsive nature of research to developments in global environmental policy, technological innovation, and trends in sustainable finance markets. As Zhou et al. (2020) noted, the evolution of green finance policies and instruments demands rapid adaptation from the academic community. Meanwhile, the average citation per document reaching 23.62 indicates that publications in this field have a high academic impact, reinforced by the total number of references reaching 166,400 sources indicating a broad theoretical and empirical basis, in line with the view of Alsmadi & Alzoubi (2022) regarding the importance of a solid conceptual framework to support the development of cross-disciplinary research in the field of sustainability.

This phenomenon reflects the fact that the issue of green economy and green finance has become the center of global attention, not only because of the urgency of mitigating climate change and environmental degradation, but also because of its potential to encourage innovation, create green jobs,

and strengthen economic resilience, as mandated in international strategic documents such as the United Nations Environment Programme (UNEP, 2011) and the United Nations Conference on Trade and Development (UNCTAD, 2011). Furthermore, the 30.63% level of international collaboration indicates an active global knowledge exchange network, exceeding the average for cross-border collaboration in the social sciences and economics, which is generally around 20–25% (OECD, 2023). This high figure indicates accelerated technology transfer, the dissemination of best practices, and the adoption of uniform policy standards across countries. Berrou et al., (2019) and Akomea-Frimpong et al., (2022) emphasized that the transition to a low-carbon economy requires multi-country engagement in financing environmentally friendly projects, developing green financial instruments, and harmonizing regulations. In this context, the involvement of developing countries is crucial for addressing gaps in technology, regulatory capacity, and access to international funding, while cross-border research networks contribute to the formation of an inclusive research agenda so that the results can be utilized to support public policies in various socio-economic contexts (Mohamad, 2025). Therefore, the figures listed in Table 1 not only represent quantitative trends, but also illustrate the integration of global knowledge that is an important foundation in realizing the transition to an effective, inclusive, and equitable green economy throughout the world.

In terms of document content, the presence of 7,384 Keywords Plus and 7,784 Author's Keywords demonstrates a wide variety of themes, indicating multidisciplinary integration between economics, public policy, finance, and technology. This finding reinforces Alsmadi & Alzoubi (2022) assertion that the development of a green economy and green finance requires cross-disciplinary collaboration to address the complexity of global environmental and economic challenges. The involvement of 6,513 authors, with an average of 3.22 authors per document, and the percentage of international collaboration of 30.63%, demonstrates the existence of a fairly robust global research network, although there is still room to expand the involvement of researchers from developing countries. This level of collaboration is consistent with literature emphasizing that cross-border knowledge exchange is crucial for harmonizing policy standards and accelerating green technology innovation (Berrou et al., 2019). The types of documents analyzed, namely 3,177 articles and 130 conference papers, indicate a predominance of publications that have undergone formal peer review, thus possessing high academic credibility. Journal-based publications tend to provide in-depth conceptual and empirical contributions, while conference papers are often the initial medium for presenting recent findings and building research networks.

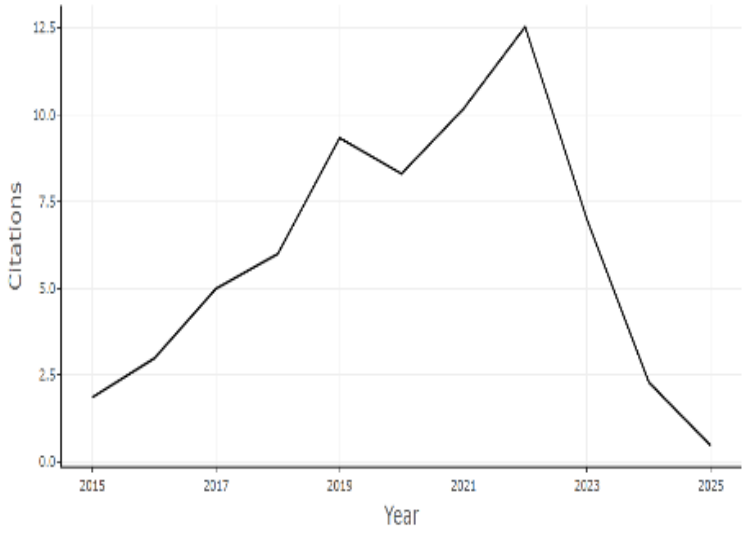
Table 2. Annual Scientific Production

Year	Articles
2015	51
2016	69
2017	86
2018	107
2019	126
2020	126
2021	201
2022	413
2023	731
2024	1139
2025	258

Source: R-Packages and WebInterface Biblioshiny

During the 2015-2025 period there was a significant increase in the number of articles published. In 2015 there were 51 articles published. In 2016, the number of articles published increased to 69, and continued to increase to 86 in 2017, 107 in 2018, and 126 in 2019.

The number of articles published in 2020 remained stable at 126. However, in 2021, there was a significant spike with 201 articles published. This increase continued with the number of articles published reaching 413 in 2022 and 731 in 2023. The peak occurred in 2024 with 1139 articles published. However, in 2025, the number of articles published decreased to 258. The decrease in the number of articles in 2025 may be due to various factors, such as changes in publication policies, a decrease in the number of studies conducted, or other external factors.



Source: R-Packages and WebInterface Biblioshiny

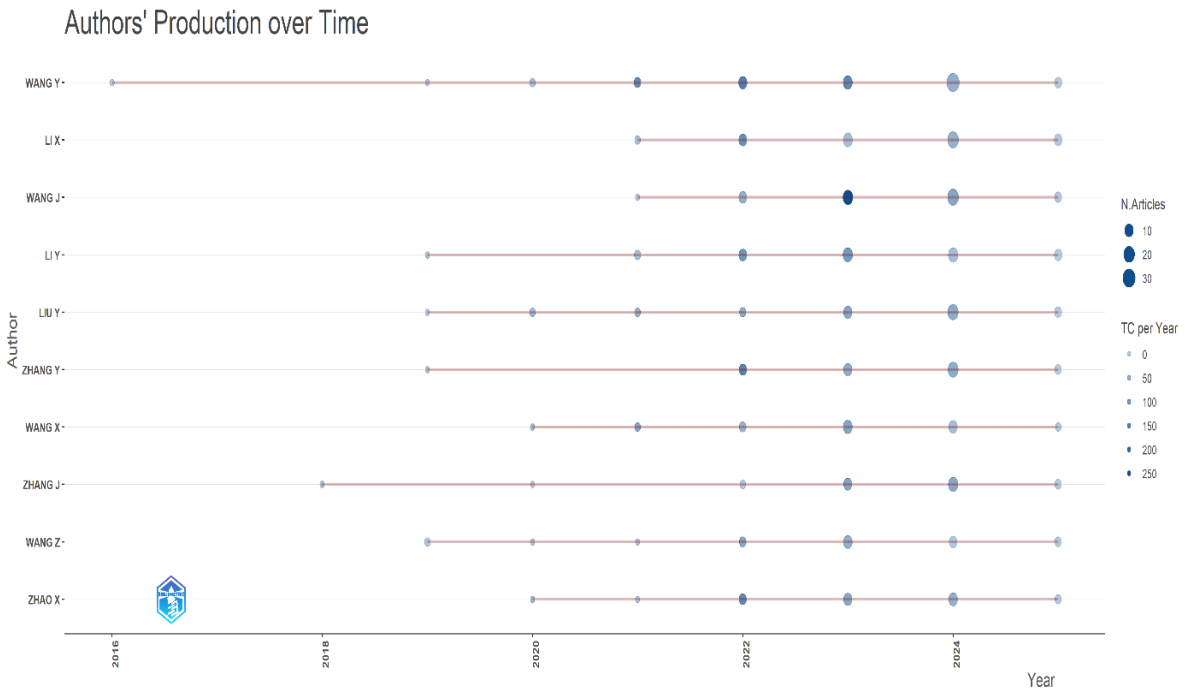
Figure 2. Citations Trend

Table 3. Citations Trend

Year	Mean TC per Art	N	Mean TC per Year	Citable Years
2015	20.41	51	1.86	11
2016	29.77	69	2.98	10
2017	44.87	86	4.99	9
2018	47.93	107	5.99	8
2019	65.31	126	9.33	7
2020	49.81	126	8.3	6
2021	50.8	201	10.16	5
2022	50.11	413	12.53	4
2023	20.93	731	6.98	3
2024	4.57	1139	2.29	2
2025	0.47	258	0.47	1

Source: R-Packages and WebInterface Biblioshiny

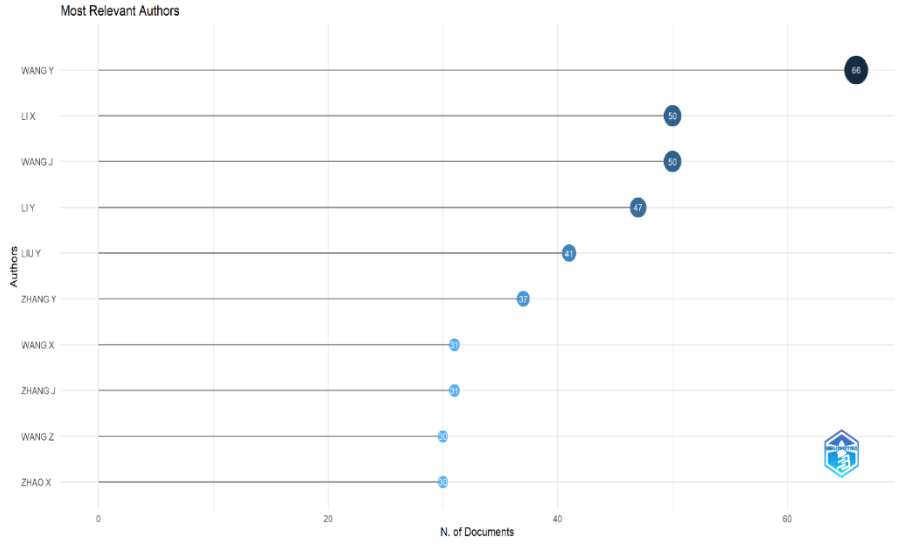
Figure 2 shows the trend graph of the number of citations and the number of articles in recent years, although it has experienced significant fluctuations. The average number of citations per article (Mean TC per Art) with the highest value of 65.31 and the lowest value of 0.47. This shows that there is quite a large variation in the level of citation between articles. In addition, the average number of citations obtained per year (Mean TC per Year) is 5.99, with a range between 0.47 and 12.53. The increase in this value indicates that publications in the analyzed field are getting more attention among academics. Meanwhile, the number of articles published each year (N) shows quite a large variation, this reflects the fluctuation in the number of publications from year to year, with a maximum value reaching 1,139 articles.



Source: R-Packages and WebInterface Biblioshiny

Figure 3. Productive Authors

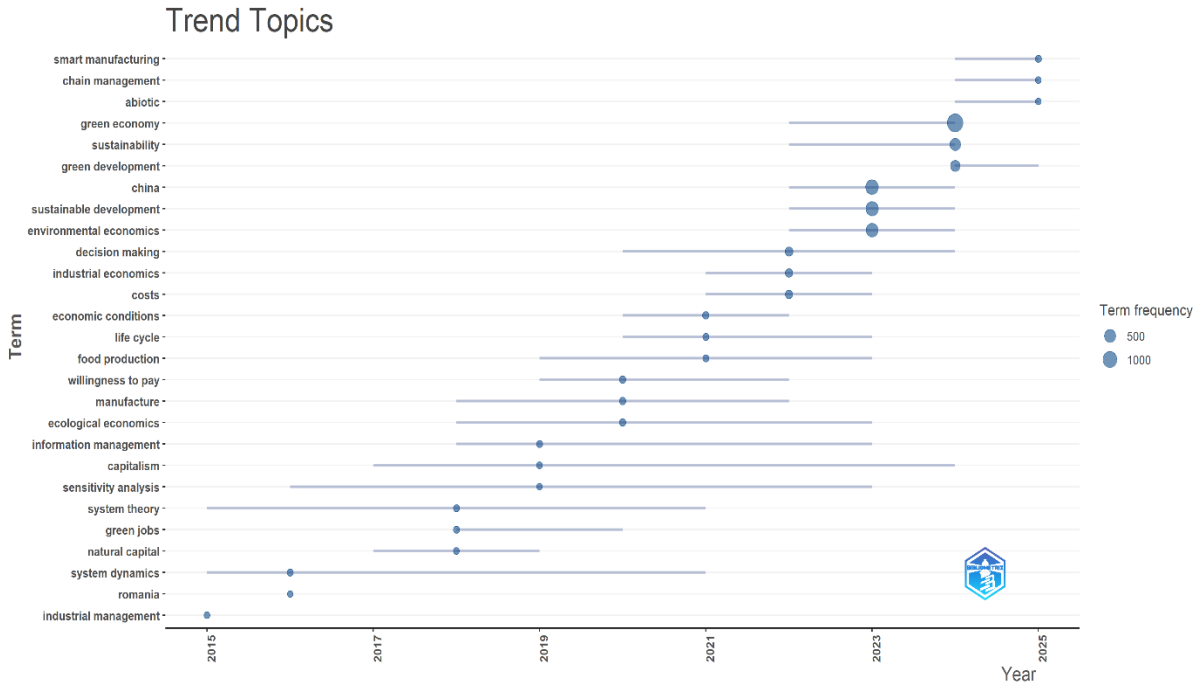
Figure 3 illustrates the most productive authors from 2015 to 2025. The most consistent author in publication is WANG Y, who has actively published articles almost every year since 2016, with a significant increase in the number of publications and citations in 2023 and 2024. Other authors such as WANG J, LI X, and LI Y also show high levels of productivity and influence, especially in 2023 and 2024. This indicates that these years are peak publication and citation activity among the authors shown. In addition, authors such as LIU Y and ZHANG Y appear to show consistency in publication since 2019, albeit with a relatively smaller number of articles. Authors ZHAO X and WANG X, although becoming active in 2020, show increased productivity and have obtained high numbers of citations in recent years. Authors such as ZHANG J and WANG Z have contributed fewer articles, but still recorded significant numbers of citations in certain years. In general, this visualization shows an increasing trend in scientific publications among authors since 2019, with a peak in 2023. This image is very useful in identifying the most active and influential authors in the analyzed scientific field, both in terms of the quantity of publications and their academic impact through citations.



Source: R-Packages and WebInterface Biblioshiny

Figure 4. Most Relevant Author

Figure 4 displays a data visualization of the most relevant authors based on the number of publications or documents they have produced in a particular field of study. Based on this visualization, it can be seen that the author with the highest contribution is WANG Y with a total of 66 documents, making him the most productive author in the field being analyzed. Furthermore, authors LI X and WANG J are in second and third place, respectively, with the same number of documents, namely 50 documents. Other authors such as LI Y (47 documents), LIU Y (41 documents), and ZHANG Y (37 documents) also show significant contributions. Authors with lower contributions, but still considered relevant in this analysis, include WANG X and ZHANG J (31 documents each), and WANG Z and ZHAO X (30 documents each). In general, this graph shows that publication contributions are dominated by authors with surnames such as Wang, Li, and Zhang. This indicates that most publications are likely to come from researchers with a Chinese cultural background, which is often found in academic literature in certain fields such as computer science, engineering, or natural sciences. This information is very important in the context of bibliometrics because it can help researchers to identify key figures in a field of study, establish collaborations, or refer to the most influential works in their research.

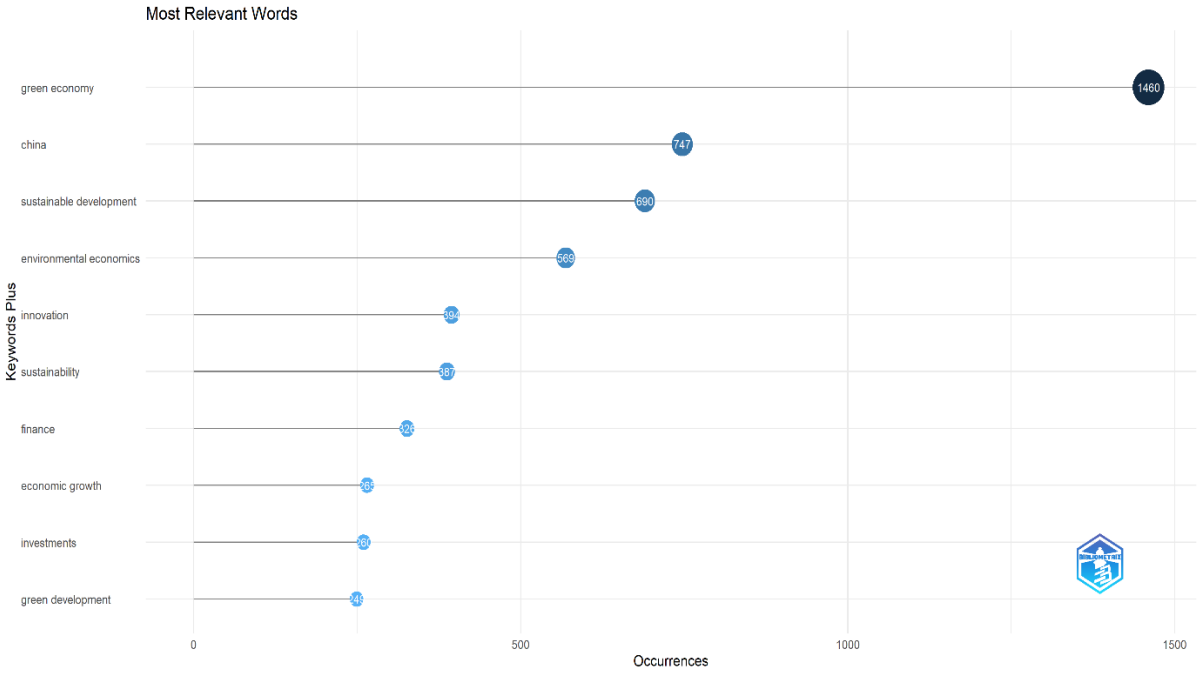


Source: R-Packages and WebInterface Biblioshiny

Figure 5. Trend Topics

This visualization provides a clear picture of the dynamics of research topic development over the years. Topics related to extinction, the green economy, and environmental management have been prominent and have become a focus of attention in recent years. Several topics such as smart manufacturing, chain management, and abiotic have only emerged in recent years (2023–2025), indicating a growing interest in these areas, likely driven by developments in Industry 4.0, supply chain innovation, and environmental science. Although their current frequencies are relatively low, these terms show potential for further exploration and increased academic focus in the near future. In contrast, terms such as green economy, sustainability, and environmental economics are between 2022 and 2024. This suggests that issues surrounding sustainable development, ecological awareness, and environmental policy have become central themes in recent academic discourse.

Additionally, the chart highlights several topics that have maintained a consistent presence across multiple years. Terms like system theory, system dynamics, capitalism, and sensitivity analysis appear across a broad timeline, reflecting their foundational relevance in both theoretical and applied research. Their persistence underscores the importance of systems thinking and macroeconomic perspectives in understanding and addressing complex environmental and economic challenges. Conversely, certain terms such as Romania, industrial management, and natural capital appear only briefly and do not continue into recent years. This may imply a decline in academic interest or a shift in focus toward more globally relevant or emergent issues.



Source: R-Packages and WebInterface Biblioshiny

Figure 6. Most Relevant Words

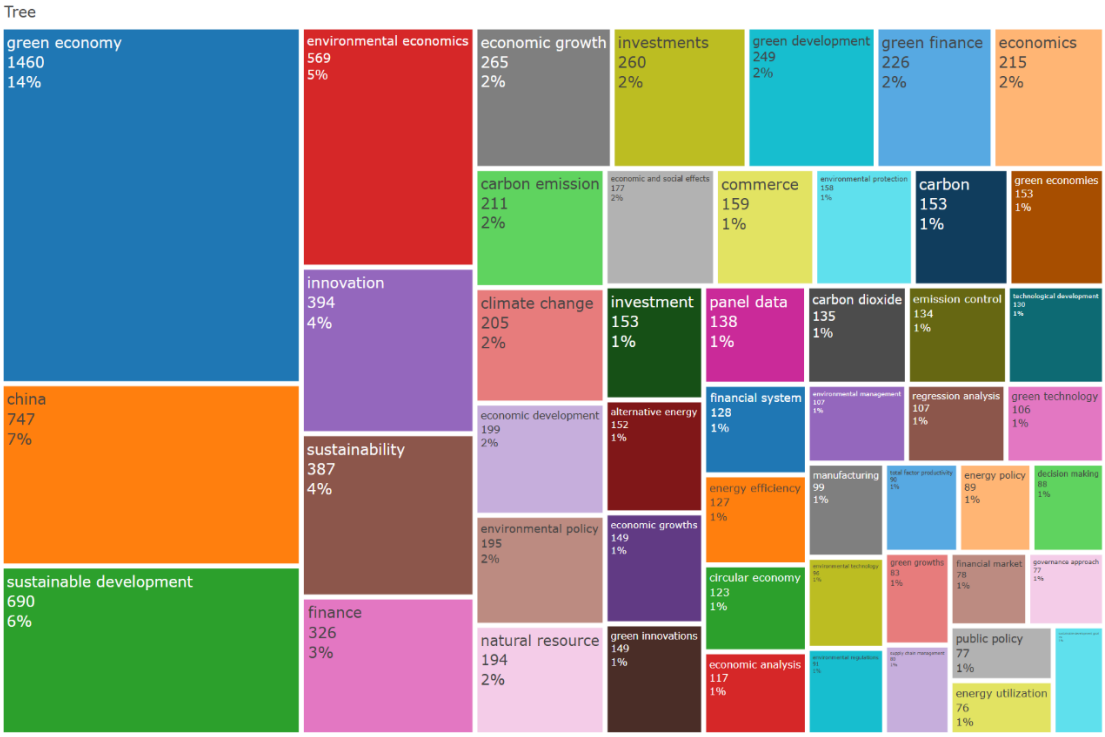
This figure presents a visualization of the ten most relevant keywords identified through the Keywords Plus method, depicting their frequency of occurrence across the analyzed literature. The keyword “green economy” emerged as the most dominant, appearing 1,460 times, indicating that it is a central theme in the reviewed academic discourse. It was followed by “China” with 747 occurrences, indicating that China is the main geographic focus of studies related to the topic of green economy. Other important keywords include “sustainable development” (690 occurrences), “environmental economics” (569), “innovation” (394), and “sustainability” (387). In addition, terms such as “finance” (326), “economic growth” (264), “investment” (260), and “green development” (244) further reflect the integration of finance and development aspects in the literature.

This visualization reveals that the contemporary academic landscape is largely focused on issues related to the transition toward a green economy, sustainable development, and environmental economics. The dominance of the term "green economy" suggests a strong scholarly emphasis on transforming economic systems to be more environmentally friendly. The high frequency of the term “china” also highlights the country's significant role in global green development efforts. Furthermore, the presence of terms such as “innovation” and “finance” underscores the importance of technological advancements and financial support in driving sustainable economic growth. Collectively, these findings offer valuable insight into prevailing research trends and the global scientific community's commitment to fostering an inclusive and environmentally conscious economic future

Source: R-Packages and WebInterface Biblioshiny

Figure 7. Word Cloud

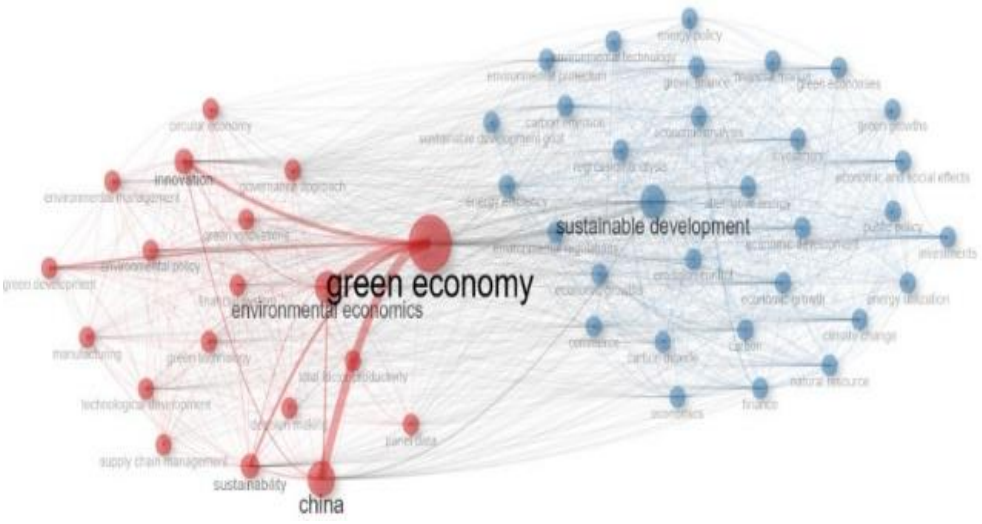
This word cloud illustrates the distribution of keywords related to the most frequently discussed topics and themes in a collection of documents or literature related to the green economy. The words displayed vary in size, with larger words indicating the main focus areas, such as “green economy”, “sustainable development”, and “environmental economics” which are the most dominant topics and themes, indicating that discussions related to the green economy are closely related to sustainable development and environmental economics.



Source: R-Packages and WebInterface Biblioshiny

Figure 8. Tree Map

Word tree maps can provide a clear visualization of the various topics and themes discussed in the literature on green economy. Topics such as “green economy” are the main focus because they have 1,460 occurrences with a percentage of 14% of the total keyword occurrences. By analyzing this tree map, researchers can identify which areas are most researched, as well as to reveal which areas are less noticed and require further research.



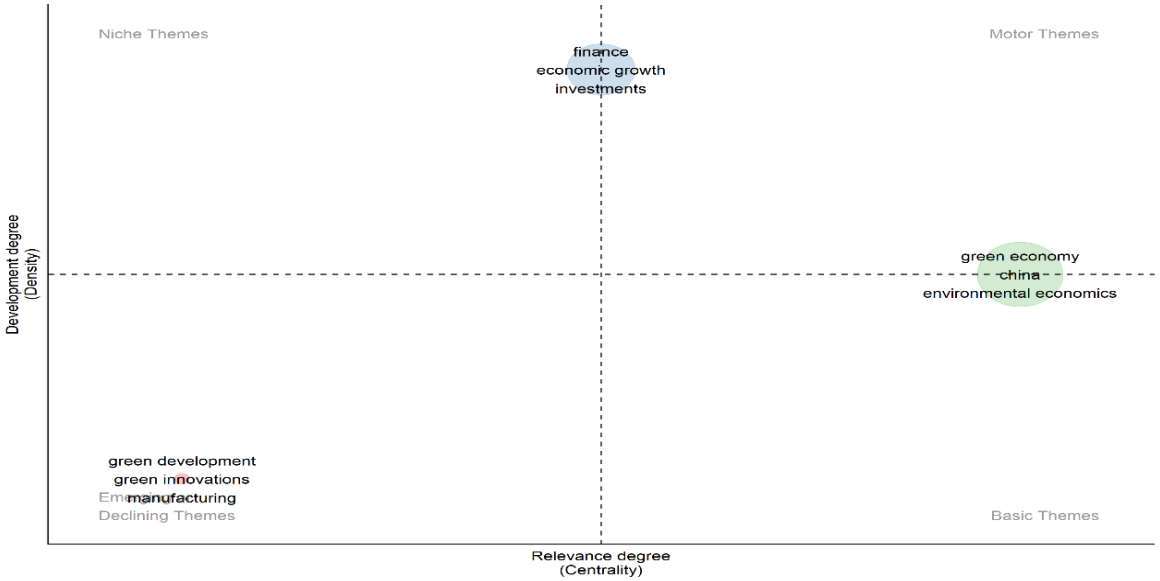
Source: R-Packages and WebInterface Biblioshiny

Figure 9. Co-Occurrence Network

Co-occurrence Network is a bibliometric network visualization that illustrates the relationship between keywords in a collection of scientific publications. Each node in this network represents a keyword, with the size of the node reflecting the level of relatedness or frequency of occurrence of the keyword in the research being analyzed. Larger nodes indicate that the keyword is more dominant in the literature being reviewed. The color of the node indicates a cluster or group of topics that are closely related, where the red cluster focuses on "green economy", "environmental economics", and the role of China, while the blue cluster focuses more on "sustainable development", climate change, energy policy, and economic growth.

The relationship between keywords is depicted through connecting lines (edges), where the thicker the line, the stronger the relationship between the two keywords in scientific publications. From this visualization, it can be seen that "green economy" and "sustainable development" are the two main keywords that dominate research in this field. The red cluster related to the green economy shows a close relationship with innovation, environmental policy, and the influence of countries such as China in research on the green economy. On the other hand, the blue cluster focuses more on sustainable development related to climate change, environmental regulation, and financial and investment aspects.

The overall network shows that research on the green economy and sustainable development is closely linked, reflecting the global focus on the transition to a green economy. Furthermore, the links between innovation and environmental policy in the green economy and the links between sustainable development and economic growth and climate change indicate that economic sustainability is a major focus in academic research. This also shows the importance of regulation and public policy in supporting the achievement of sustainable development goals at the global level.



Source: R-Packages and WebInterface Biblioshiny

Figure 6. Thematic Map

Thematic Map is used to help group research topics and themes based on two main dimensions: degree of development (density) on the vertical axis and degree of relevance (centrality) on the horizontal axis. In the upper right quadrant (Motor Themes), themes that have high relevance to other research and have been well developed such as the themes of "green economy", "China", and "environmental economics". Meanwhile, the upper left quadrant (Niche Themes) shows themes that have high development but have less connection with other themes. Themes in this category are very specific and develop in certain academic communities, such as the themes of "finance", "economic growth", and "investments".

The bottom right quadrant (Basic Themes) includes themes that have high relevance but still have a low level of development. These themes are generally the basis for further research and have great potential to develop in the future. However, in the thematic map there is no dominant theme in this quadrant.

The bottom left quadrant (Emerging or Declining Themes) depicts themes that have a low level of development and relevance. This may indicate that these themes are still in the early stages of research or are starting to decline in scientific studies, themes such as "green development", "green innovations", and "manufacturing" fall into this category, indicating that research related to green development and innovation is still in the early stages or has received little attention in the current literature.

DISSCUSSION

Bibliometric results for the 2015–2025 period show a significant increase in the number of publications related to the green economy and green finance, with an average annual growth rate of 17.6% and a marked surge in publications from 2021 to a peak in 2024. This finding aligns with previous bibliometric studies that reported an acceleration in publications in the last decade, particularly following global events such as the signing of the Paris Agreement, the strengthening of the SDGs agenda, and the COVID-19 pandemic that triggered a shift in research focus towards green recovery and sustainable finance (Nhung & Hang 2024; Mohamad 2025). The surge in citations and relatively young publications (average document age = 2.6 years) confirms that this field is dynamic and responsive to policy changes and technological developments. The dominance of keywords such as "green economy," "sustainable development," "environmental economics," and the emergence of the geographic term "China" as one of the largest nodes reinforces the evidence that countries with active green policy agendas and high research capacity are becoming hubs for the generation and dissemination of ideas in this field. This is consistent with previous research demonstrating China's central role in the production of literature and international collaboration on green finance and renewable energy (see international bibliometric review). The presence of keyword clusters linking innovation, environmental policy, and financing indicates a multidisciplinary integration between economics, public policy, and technology, a finding that aligns with conceptual studies on the role of green finance as a driver of low-carbon economic transformation. The 30.63% international collaboration rate indicates a relatively high level of cross-border collaboration, but it does not dominate all scientific production. This finding opens up two interpretations: first, the existence of cross-border networks that accelerate knowledge exchange and standardization of concepts; second, there is still room for increased collaboration, particularly connecting developed and developing countries to address issues of technology transfer, regulatory capacity, and access to finance. Previous studies have underscored the importance of international collaboration in addressing global challenges such as climate finance and low-carbon development (a frequent recommendation in green finance literature).

The research thematic map identifies several established “motor themes” (green economy, environmental economics) as well as “niche” and emerging themes (green innovations, green development, green manufacturing). The position of relevant but less developed basic themes indicates a strong conceptual foundation but requires further empirical and applied research—for example, evaluating the effects of green finance policies on achieving sustainable development targets in developing countries. As identified in these results, a key research gap exists: the integration of green finance instruments with green economy policies in the developing country context—a gap also identified by several previous studies as an underexplored area. The analysis of author productivity indicates a concentration of contributions from a few highly productive authors (e.g., WANG Y and other authors), which also implies potential geographic/academic bias in the formation of research agendas. This phenomenon needs to be taken into account when generalizing the results: the dominant research agenda may be influenced by national priorities and research capacities in specific countries. Previous literature has emphasized the importance of diversifying study contexts (comparative studies between developed and developing countries) to make policy recommendations more contextual and applicable.

CONCLUSIONS AND SUGGESTION

Based on the results of a bibliometric analysis conducted on publications related to the green economy and green finance in the period 2015–2025, this study shows that the publication trend in this field has experienced significant growth, with an average annual growth of 17.6%. This finding indicates the increasing attention and interest of practitioners in economic and environmental issues, reflected in the high number of publications, international collaborations of 30.63%, and the involvement of productive authors who have a significant influence on the development of this topic. Dominant keywords, such as green economy, sustainable development, and environmental economics, indicate

that the focus of global research remains on the transition to a green economy, supported by public policies, technological innovation, and sustainable financial instruments.

The implications of these findings are strategic for policymakers, financial institutions, and industry players, as the resulting research map can serve as a reference in formulating sustainable investment policies and strategies. Furthermore, the analysis reveals underexplored research areas, such as the integration of green financial instruments with green economy policies in developing countries and the impact of global regulations on sustainable financing innovation. This opens up opportunities for more targeted research to address these knowledge gaps. However, this study has limitations that warrant consideration. First, all data is sourced from the Scopus database, thus potentially relevant publications outside of Scopus are not included in the analysis. Second, the research period, which ends in early 2025, may not fully represent the latest trends, particularly given the highly dynamic nature of policy and technological developments. Third, the bibliometric approach provides a quantitative overview but does not delve deeply into the content and methodological quality of each publication.

Future research, it is recommended that studies utilize more than one database, but rather combine multiple sources such as Web of Science or Google Scholar for a more comprehensive coverage. Furthermore, the analysis can be expanded with a systematic literature review or meta-analysis approach to evaluate the empirical contributions of existing studies. Further research can also focus on the direct influence of green finance policies on the successful implementation of a green economy in various country contexts, including comparative studies between developed and developing countries, as well as examining the link between digital transformation and sustainable financing as an effort to accelerate the achievement of the Sustainable Development Goals.

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