Journal of
Risk and Financial Management

MDPI

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Evolution of Financial Development Research: A Bibliometric Analysis

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Abstract: This study aims to analyze publications on financial development between 1986 and 2023 using bibliometric analysis methods. The analysis, based on data obtained from the Web of Science database, utilizes bibliometric tools such as keyword analysis, author collaboration networks, citation analysis, and bibliographic coupling to identify trends, key authors, influential journals, and emerging research topics in the field. The results indicate that financial development research is predominantly concentrated in the fields of economics, environmental sciences, and business finance, with economics having the highest number of publications. A significant increase in publications is observed after 2014, particularly after the COVID-19 pandemic. VOSviewer and R Studio programs were chosen in the study due to their strengths in terms of functionality. According to the results, the countries with the most citations were China, the USA, and Pakistan. The most cited authors are Shahbaz M. with 3926 citations, Zingales I. with 3252 citations, and Oztürk I. with 2710 citations. The authors in the top two are also in the top two in terms of total link strength. The analysis shows that key themes such as economic growth, energy consumption, CO_2 emissions, and renewable energy have increasingly intersected with financial development, highlighting the growing focus on sustainability. China, Pakistan, and the USA are the most active countries in financial development research, with China leading both in terms of publication count and citations.

Keywords: financial development; WOS database; bibliometric analysis

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Academic Editors: Bibhudutta Panda and Badri Narayan Rath

Received: 29 November 2024
Revised: 25 December 2024
Accepted: 26 December 2024
Published: 28 December 2024

Citation: Say, S., Dogan, M., Abdeshov, D., Tekbas, M., Sezal, L., & Erdoğan, B. (2025). Evolution of Financial Development Research: A Bibliometric Analysis. *Journal of Risk and Financial Management*, *18*(1), 10. https://doi.org/10.3390/jrfm18010010

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1. Introduction

Financial development is a multidimensional concept. This concept includes various elements and expresses significant changes in the financial system. Financial development primarily represents the transition from self-financing to external financing. This means increased access to finance for individuals and businesses. Additionally, financial development includes the development of financial institutions and increased financial intermediation. Making financial institutions more effective and efficient makes it easier to direct savings to investments and supports economic growth. However, financial development also refers to the deepening of markets for direct access to credit and easier access to capital markets (Furstenberg & Fratianni, 1996).

Financial development is the development of an economy's institutional structure and financial instruments in the financial system in terms of quality and quantity. Financial development also encourages production in countries. With financial development, there is a decrease in financial risk and borrowing cost rates, higher transparency between borrowers and lenders, an increase in the volume of international financial capital, and an increase in the demand for technological products in terms of energy. Such a development leads to an increase in consumption and an increase in businesses' investments and energy demand (Sadorsky, 2011).

Financial development leads to an increase in investment and production activities by creating lower financing costs, allowing more people to benefit from these opportunities (Khan et al., 2017). According to Harris (2012), numerous econometric studies over the last two decades have revealed a significant amount of knowledge, as well as a wide range of experiences, on the link between financial development and economic growth. The consensus that financial development positively conditions or stimulates economic growth emerged at an early stage. Financial development significantly drives investment in innovative and green technologies, taking into account sustainability and environmental impacts. This is important to reduce environmental impacts, achieve sustainability goals, and support economic growth. For example, financial instruments such as green bonds, social impact bonds, and exchange-traded funds evaluated according to ESG (Environment, Social, and Governance) criteria encourage investors to turn to green technologies.

The aim of this study is to comprehensively analyze the research conducted on financial development between 1986 and 2023. The study seeks to map the progression of the concept of financial development in the literature and identify the key trends, concepts, and methodologies used in this field. By examining publications over a specific period, the research will explore the theoretical and practical developments in financial development, providing a detailed insight into its progression over time.

Financial development is a critical area of research closely linked to economic growth and stability. However, there is a lack of in-depth analysis regarding how the conceptual and theoretical framework of financial development has evolved and the research trends in this area over time. The use of bibliometric analysis methods will help identify the advancement of the concept of financial development and reveal key studies and research networks, offering new directions and perspectives for future research. In addition to strengthening the theoretical foundation of financial development, the study will serve as an important resource for policymakers and academics alike.

This study consists of five chapters. The second chapter presents a comprehensive literature review on the concept of financial development and the key approaches in the relevant literature. This Section discusses different theoretical perspectives, methodologies used, and important findings related to financial development, highlighting gaps in the literature and identifying potential research opportunities. The third chapter outlines the methodology of the study. In this chapter, the bibliometric analysis methods used in line with the study's objectives, the data collection process, and the analysis techniques are explained in detail. The fourth chapter presents the bibliometric analysis results of studies conducted using the keyword "financial development". This Section provides data on publications, authors, citation networks, research trends by country, and the number of publications over the years. The findings are discussed in light of the key trends and developments in the field. The final chapter offers a general evaluation of the study and provides suggestions for addressing the identified gaps in the literature. Additionally, it includes recommendations for future research and discusses practical implications for policymakers in the field of financial development. This study provides valuable insight

into the evolving field of financial development. Therefore, it will make a significant contribution to the literature in terms of guiding future studies.

2. Literature Review

Bibliometric studies in finance literature are grouped on a subject basis and summarized below. It is seen that these studies focus particularly on financial innovation, financial technology, financial inclusion, and green finance. It is stated in the literature that the developing financial system and the ability of innovative companies to sustain their innovative activities are interconnected (Tee et al., 2014). Levine (1997) examined the impact of the development of financial markets on economic growth and argued that these markets support economic growth by ensuring a more efficient distribution of investments and resources. Greenwood and Jovanovic (1990) suggested that financial development increases technological advances and therefore economic growth through investments in innovative projects.

Chen and Peng (2020) aimed to review and analyze the characteristics of the literature on financial innovation. The authors also estimate the effects of financial innovations on bank performance and liquidity risk. The authors used a sample of commercial banks operating in Taiwan during the period 2010–2017. According to the results obtained from the article, financial innovation increases the liquidity risk of banks. Chen and Xu (2021) provided a bibliometric review of innovations in financial risk management. They examined the progression of research in this field, major contributions, and the impact of new technologies and methodologies on financial risk management practices. Wang and Huang (2022) conducted a bibliometric analysis focusing on blockchain technology and cryptocurrency. It identifies key publications, authors, and journals in the field. The study also discusses the research trends and the impact of blockchain innovations on financial systems. Li and Xu (2022) presented a comprehensive analysis of publications in the field of financial innovation up to 2020. In the study, 1341 publications obtained from the Web of Science (WoS) were included in the analysis. Considering the basic characteristics of the publications, citation structure, and collaboration relationship, the bibliometric analysis results are presented at the level of countries/regions, institutions, authors, and publications, respectively.

In another study, Li and Xu (2021) presented a general analysis of publications in the FinTech field until 2020. Based on WoS, they obtained 848 publications; the first document was published in 1996. Although this topic emerged early, with the advancement of the economy and technology, the real research explosion occurred in 2015. This article examined the characteristics of all publications in the FinTech field based on visualization tools from various perspectives. In their study, Campos-Teixeira and Tello-Gamarra (2022) aimed to present a bibliometric study of research conducted in the last 30 years (1991–2020) that includes the concept of fintech. For this study, bibliographic data were extracted from Scopus. Three main results stand out among the results found. First, this article describes a general panorama of research involving fintechs in the subfields of 'Business, Management, and Accounting' and 'Economics, Econometrics, and Finance' in the last 30 years. Second, the authors identified three generations of research related to this field of study. These are discovery (1991–2006), development (2007–2016), and expansion (2017–2020). We also highlighted the connections between the three generations and the evolutionary process of the topics addressed in these different generations. The third outcome was the identification of six themes representing future research trends: 'banking and financial services', 'electronic services and 'e-finance', 'consumer behavior', 'mobile services', 'risk', and 'cryptocurrency'. Kim and Lee (2022) analyzed the bibliometric data related to the

adoption of financial technology (fintech). This study reviews the growth of research in this area, identifies influential papers and authors, and discusses future research directions.

Smith and Johnson (2015) provide a bibliometric analysis of research on green finance and investment. The authors review the current state of the literature, focusing on key contributors, influential articles, and research trends. The study highlights important developments in green finance, including advances in green bonds, sustainable investments, and environmental risk assessment. The paper also suggests future research directions to address evolving challenges in green finance. Chen and Zhou (2015) reviewed the literature on green investment and finance, highlighting the current status and aiming to identify future research trends. The study analyzes publication data and citation metrics to provide an overview of key themes, influential researchers, and significant contributions in the field. The paper discusses the development of green investment strategies and regulatory policies and suggests areas where further research is needed to advance the understanding of green finance. Zhang and Liu (2016) aimed to conduct a bibliometric analysis of sustainable finance, a broad category that includes green finance. The analysis covers publication trends, influential studies, and key research themes in the field. The study reveals significant growth in research output and identifies key contributors and high-impact journals. Insights into evolving focus areas within sustainable finance are presented along with suggestions for future research directions to address emerging challenges and opportunities. Yang and Liu (2017) present a bibliometric and content analysis of green finance research in their study. The study maps the advancement of the field by examining publication trends, citation networks, and major research themes. The findings suggest a shift toward more integrated approaches to green finance, including the incorporation of technological advances and regulatory changes. The paper also discusses future research avenues and emerging issues in the field of green finance. Zhang and Xu (2018) present a bibliometric analysis of green finance research, aiming to provide a comprehensive overview of the development of the field. Using data from major academic databases, the authors identify key trends, influential researchers, and important publications. The analysis reveals that interest in green finance has increased in recent years, focusing on sustainable investment and regulatory frameworks. Li et al. (2023) explored the literature on sustainable finance and green financial innovations. They map the research landscape, identify leading contributors, and highlight key trends in the integration of sustainability into financial innovations.

Wilson and Anderson (2013) conducted a bibliometric analysis to assess the current state of financial inclusion research and identify future directions. The study uses bibliometric indicators to analyze publication trends, citation patterns, and key research areas. The findings demonstrate a growing body of research on financial inclusion, with significant attention paid to microfinance, digital financial services, and policy implications. The paper outlines research gaps and offers recommendations for future work to improve the understanding and implementation of financial inclusion strategies. Fanta and Muli (2018) present a bibliometric analysis of financial inclusion research, aiming to map the development in the field and identify key trends. The analysis covers a range of bibliometric indicators, including publication volume, citation patterns, and influential authors. The study highlights the growing importance of financial inclusion and identifies key research themes, such as digital financial services, policy interventions, and the impact of financial inclusion on economic development. The findings suggest that future research should focus on emerging issues and cross-country comparisons. In their study, Gálvez-Sánchez et al. (2021) aimed to analyze the research advances made in the field of financial inclusion and the main research lines currently addressed through bibliometric analysis. This analysis, focusing on the number of articles published, the authors and co-authors, number of

citations, average number of citations per article, and countries and journals of publication shows there has been a generalized increase in research interest in the concept of financial inclusion, especially since 2006–2010, possibly spurred by the 2009 Pittsburgh Summit and subsequent international initiatives.

Mani (2024) discusses the dynamic nature of financial research and the latest trends in this field, identifying 6 main areas of financial research and 14 prominent areas in these areas. In this study, it is predicted that future research will focus on the use of artificial intelligence, big data, and quantum computing techniques. Liu et al. (2024) systematically review existing publications in the field of fintech and evaluate the future directions and development of this field. His work addresses issues such as the integration and sustainable development of fintech with banking systems. Goldstein et al. (2024) discuss how big data is used in financial research and new directions in this field, addressing issues such as evaluating market microstructure reforms, understanding medium-frequency trading, and improving data deficiencies.

Based on the above statements, it can be said that the studies conducted are generally related to the concepts of financial innovation, financial technology, green finance, and financial inclusion. Therefore, there is a lack of bibliometric articles on financial development in the literature. In addition, a more comprehensive bibliometric study is still needed. In this sense, it is thought that the study will fill an important gap in the literature.

3. Materials and Method

This aim of this study is to map the evolution of the concept of "financial development" and examine the studies carried out on this concept between 1986 and 2023. For keyword selection, the existing literature was examined, the keywords and terms of the relevant publications were determined, and then the concept of financial development was decided. The bibliometric analysis method was used in the study. Bibliometric analysis is a method used to numerically evaluate the contributions and impacts of scientific publications, journals, authors, and institutions. This analysis uses statistical and mathematical methods to understand the impact and prevalence of research in a particular field or period. Since the first study on financial development in the Web of Science database was conducted in 1986 and 2024 has not yet ended, 1986–2023 was chosen as the period. Different bibliometric analysis tools are used in the literature. Open-source statistical R software (Version 4.4.2) was utilized to conduct the bibliometric analysis, and the Bibliometrix R library and the Biblioshiny version (Aria & Cuccurullo, 2017) were used. The VOSviewer program was used to display the keyword co-occurrence network because it employs a consistent framework for mapping and clustering (Waltman et al., 2010).

VOSviewer and R Studio programs were chosen due to their strengths in terms of functionality. These two programs were preferred because they offer convenience to researchers in discovering their evolution, relationships, and new concepts in the literature. Additionally, they enable in-depth analysis of data sets because they provide visualization, mapping, and multi-dimensional analysis.

Web of Science was chosen for this study because it is widely recognized as one of the most credible and trustworthy bibliometric databases, having the largest abstract and citation database of peer-reviewed research. Choosing the Web of Science database for various analyses, including bibliometric analyses, is an important factor in terms of the reliability of the research. The Web of Science database has advanced search indicators for advanced data analysis and uses various control mechanisms. It includes qualified and reliable studies in terms of publication ethics. It also provides access to a comprehensive collection of data from different disciplines.

On 10 December 2023, 2424 results were found in the search conducted by selecting "title" in Web of Science with the keyword "financial development". According to years, 2424 articles from different disciplines, the oldest being 1986 and the newest being 2023, were accessed.

In terms of disciplines, the majority of studies belong to the fields of economics (1158), environmental sciences (679), business finance (334), green sustainable science technology (180), business (165), energy fuels (137), development studies (97), management (68), and international relations (57). The accessed data set was examined through author, citation, journal, country, institution, and keyword analysis. The contents indexed in Web of Science were used as the database.

4. Empirical Findings

Table 1 provides information on all publications on the relationship between "financial development" published in journals indexed in SSCI, SCI-EXPANDED, A&HCI, and ESCI.

Table 1. Main Information About Data.

Description	Results
Timespan	1986–2023
Sources (Journals, Books, etc.)	582
Documents	2424
Annual Growth Rate %	17.61
Document Average Age	5.66
Average citations per doc	30.13
References	50,142
Keywords Plus (ID)	1383
Author's Keywords (DE)	2730
Authors	4463
Authors of single-authored docs	355
Single-authored docs	411
Co-Authors per doc	2.8
International co-authorships %	29.5

Figure 1 below shows the Web of Science categories. Accordingly, most publications regarding financial development have come from the field of economics (1170 articles). This is followed by environmental sciences with 491 articles and business finance with 338 articles.

As shown in Figure 2, publication in the field of financial development obtained momentum after 2014. It is significant to note that publications in the financial development field have increased exponentially from 65 papers in 2014 to 404 pieces in 2023. This may be attributed to COVID-19 (Anser et al., 2021; Ye et al., 2022; Mahssouni et al., 2022), which brought many questions related to financial performance and development to the front desk. Besides the 17 Sustainable Development Goals (SDGs), adopted by the General Assembly of the United Nations in 2015, there is a road map that aims for sustainable development worldwide by 2030. These goals aim to achieve balance in the economic, environmental, and social spheres and are interconnected. In order to achieve the sustainable development goals, financial resources need to be used effectively. For example, SDG 1 (ending poverty), SDG 4 (quality education), and SDG 8 (sustained economic growth and employment) are directly linked to the provision and management of financial resources. Financial development enables investments in critical areas such as infrastructure, education, and health to realize these goals (UNDP, 2020).

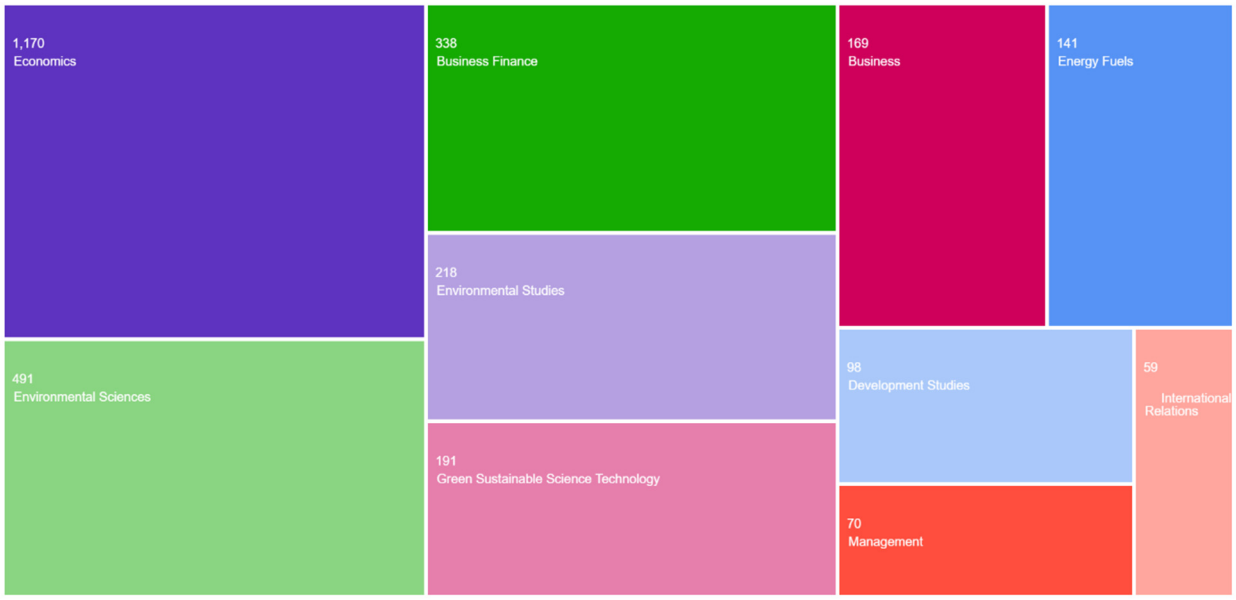

Figure 1. Web of Science Categories.

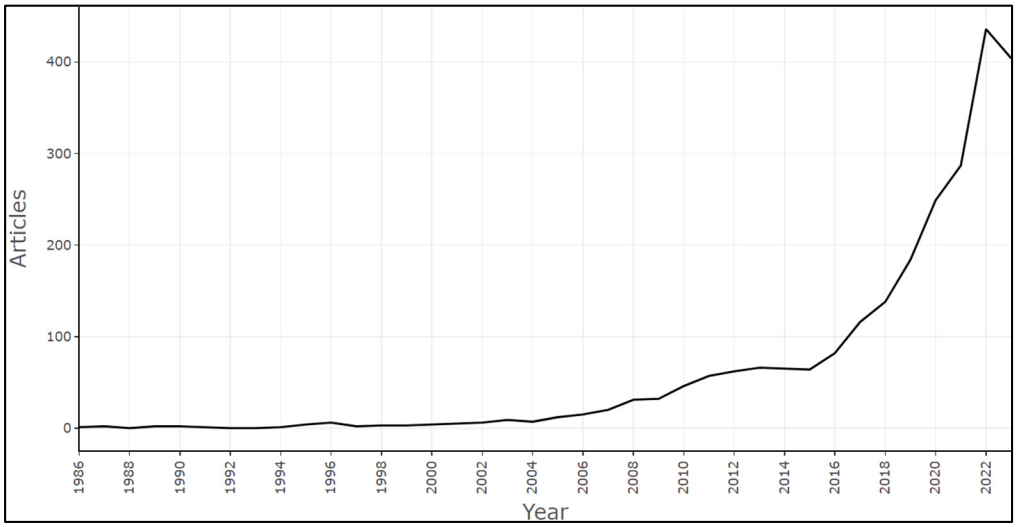

Figure 2. Annual Scientific Production.

Moreover, SDGs do not limit financial development to economic growth alone, they also include elements such as environmental sustainability and social justice. In this context, sustainable financing models encourage investment decisions to be made in a way that is sensitive to environmental and social impacts. This leads to financial development being seen not only as a not-for-profit area, but also as an area that delivers long-term economic, environmental, and social benefits (OECD, 2019).

In order to identify the most connected and collaborating authors, a network map was created by determining at least three publications and at least three citation criteria (see Figure 3). According to the analysis conducted among the authors' names with the highest connections, there are 215 items united in 22 clusters and a total of 481 links.

The three-field plot used in the bibliometric analysis is a type of chart that consists of three main columns and allows the relationship between the columns to be examined more easily. Figure 4 below shows a three-field plot based on country, affiliation, and keywords.

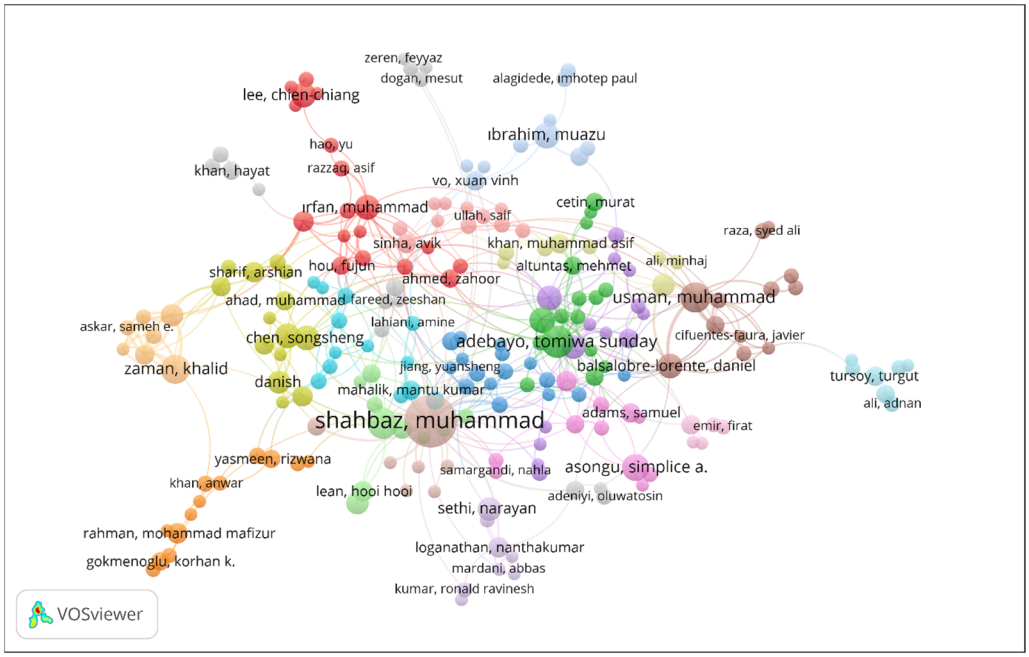

Figure 3. Co-authorship of Authors.

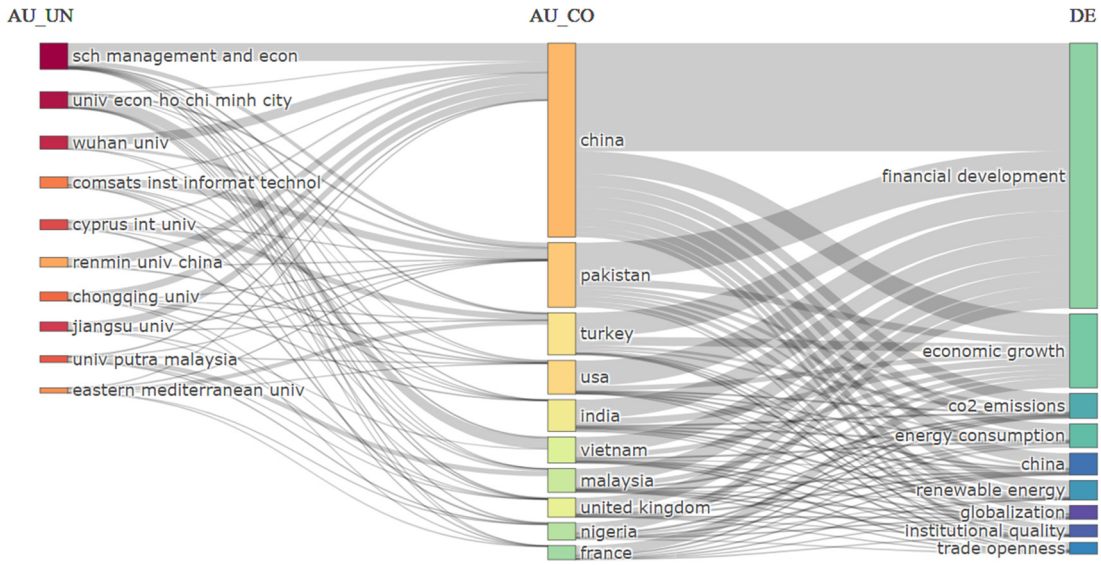

Figure 4. Three-Field Plot for Affiliation, Country, and Keywords.

It is seen Figure 4 that the issue of financial development is mostly discussed in China, Pakistan, and Turkey. It is seen that the majority of the publications in China came from The School of Management and Economics, The University of Economics Ho Chi Minh City, and Wuhan University. Also, financial development, economic growth, and CO_2 emissions were used most as the keywords.

When we look at the most frequently used keywords in publications in Figure 5, the concepts of 1332 "financial development", 387 "economic growth", 100 "energy consumption", 88 "CO_2 emissions", and 82 "renewable energy" concepts take the lead. The strongest keywords in terms of total link strength were financial development, economic growth, and energy consumption. As a result of the analysis conducted with 442 items that were seen at least 3 times and had a relationship between them, a total of 20 clusters, 4019 links, and 8236 total link strength were detected. The frequent use of terms such as "financial development", "economic growth", "energy consumption", "CO_2 emissions", and "renew-

able energy" indicates increasing emphasis on the intersection between financial growth and environmental sustainability.

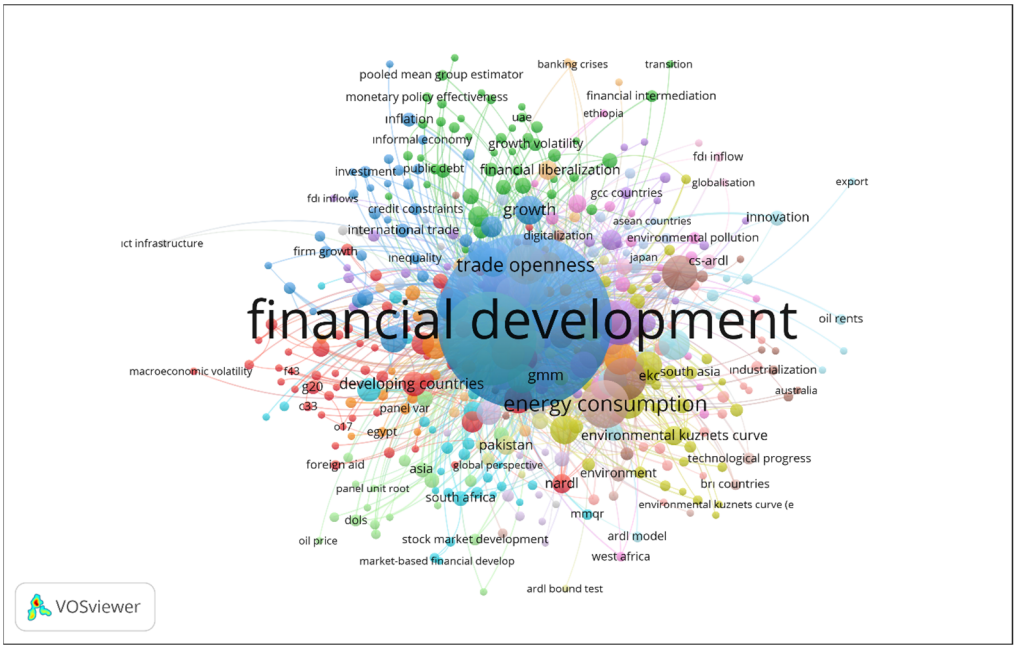

Figure 5. Co-occurrence of Keywords.

Figure 6 shows the word cloud created according to the keywords of studies on financial development. In this context, it can observed that the words financial development, economic growth, energy consumption, CO_2 emissions, and renewable energy stand out the most. Another way to evaluate the theme is to provide a contrasting cluster map, which is presented below. In Figure 6, we have used the authors' keywords, which are based on a specific algorithm exclusive to Clarivate Analytics databases. Figure 7 shows a thematic evaluation between 1986–2010 and 2011–2023.

Figure 6. Word cloud.

Figure 8 depicts the most productive and influential journals, respectively. From the production point of view, the top ten journals can be further divided into two parts, where part 1 consists of *Environmental Science and Pollution Research* and part 2 covers the *Resources Policy, Sustainability, Applied Economics, International Journal of Finance & Economics, Economic Modelling, Emerging Markets Finance and Trade, Renewable Energy, Cogent Economics & Finance,*

and *Energy Economics*. Part 1 solely has approximately 41% coverage among all published papers in the financial development field.

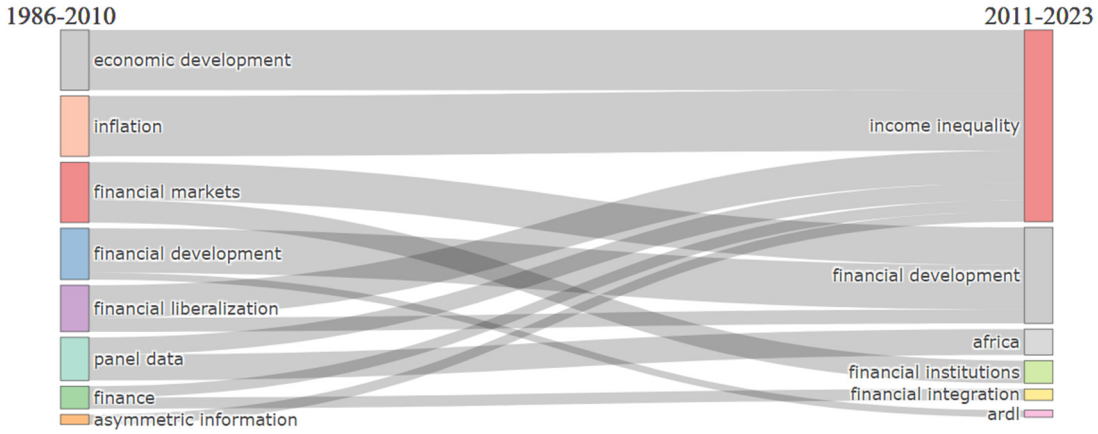

Figure 7. Thematic Evaluation in Authors' Keywords.

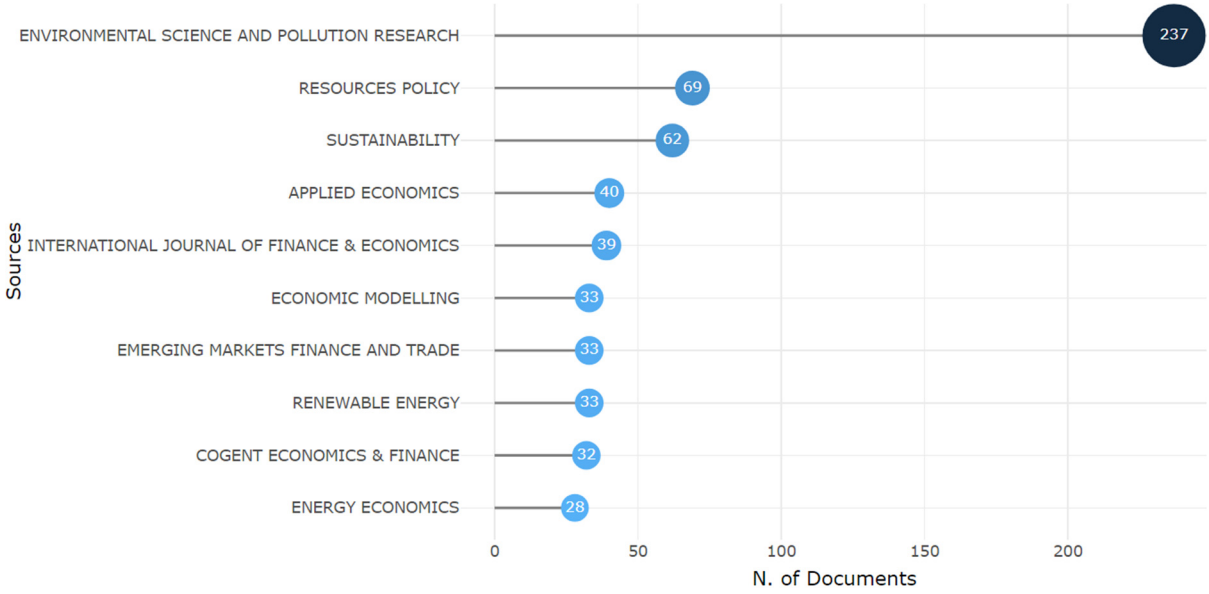

Figure 8. Most Relevant Sources.

To identify citation networks, a network map was created for author citation analysis with at least three publications and at least three citation criteria. In the analysis conducted on 351 items that were seen to be connected to each other, a total of 11 clusters, 8170 links, and a total link strength of 15,134 were detected. According to the Figure 9, the most cited authors are Shahbaz M. with 3926 citations, Zingales I. with 3252 citations, and Oztürk I. with 2710 citations. The authors in the top two are also in the top two in terms of total link strength. Shahbaz M. has made significant contributions in the fields of environmental economics, energy economics, and sustainable finance. By investigating the effects of financial development on energy consumption and environmental pollution, Shahbaz has shown that investments in innovative projects in this field increase economic growth. It also examined how sustainable finance affects the development of financial markets and economic growth. Zingales I. focused on the studies of financial development on economic growth and cultural impacts. Zingales, who researches the development of financial markets and how this development contributes to economic growth, is also known for his work on financial trust and sustainability.

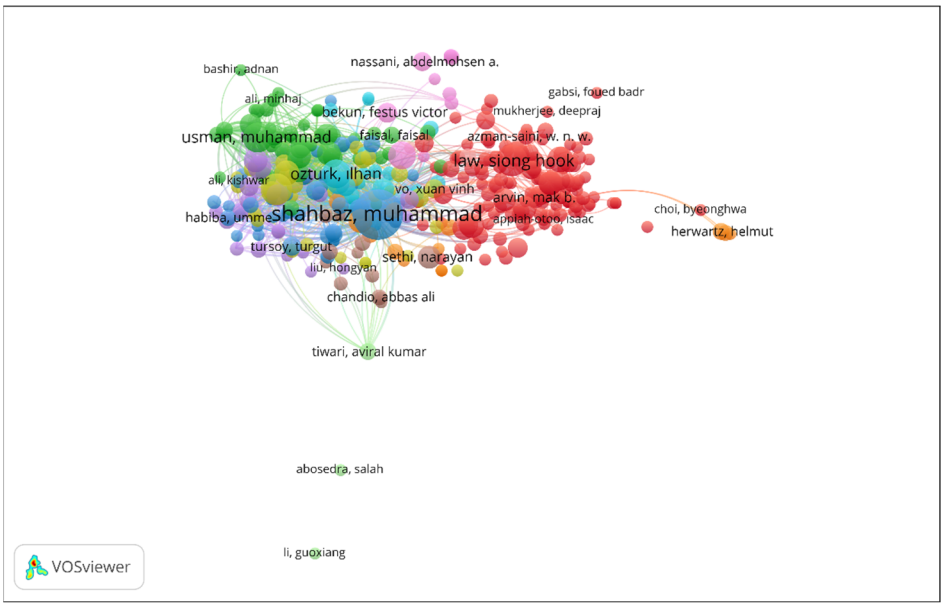

Figure 9. Citation of Authors.

In order to create a network map of the citations received by the publications according to their country of origin, an analysis was conducted on 41 items with relationships between them, within the scope of the criteria of publishing at least 3 publications and receiving 3 citations by a country; 5 clusters, 728 links, and 23,429 total link strength were identified. According to the Figure 10, countries with the most citations were China (19,485 citations), the USA (19,062 citations), and Pakistan (11,276 citations). These countries are in the top three in terms of total link strength. In terms of the number of documents, the order is as follows: China (549 publications), Pakistan (241 publications), and the USA (237 publications).

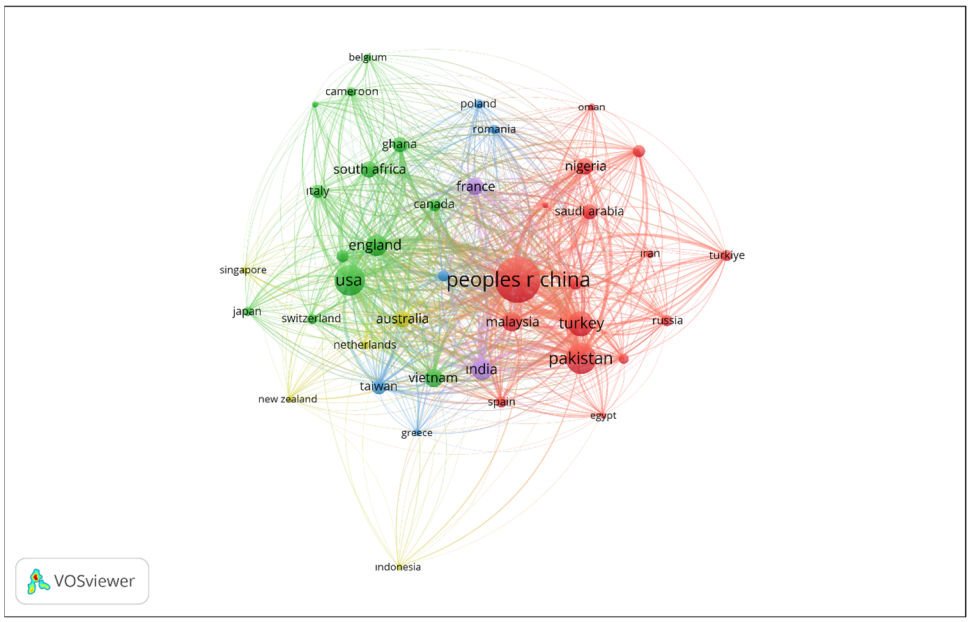

Figure 10. Citation of Countries.

Figure 11 shows a map showing the countries that publish the most, according to the analysis carried out to determine how frequently studies on the subject occur in which countries. The blue color shows the decrease in the number of articles published in countries as it goes from dark to light. In other words, dark blue countries have higher

scientific productivity on target costing. According to the map in Figure 11, China (1238) is the country that has conducted the most studies on the subject. After China, Pakistan comes with 397 studies, the USA with 369 studies, Turkey with 263 studies, and India with 205 studies. After China, Pakistan and the USA are the prominent countries in financial development research, which shows that these countries play an important role in global financial development research.

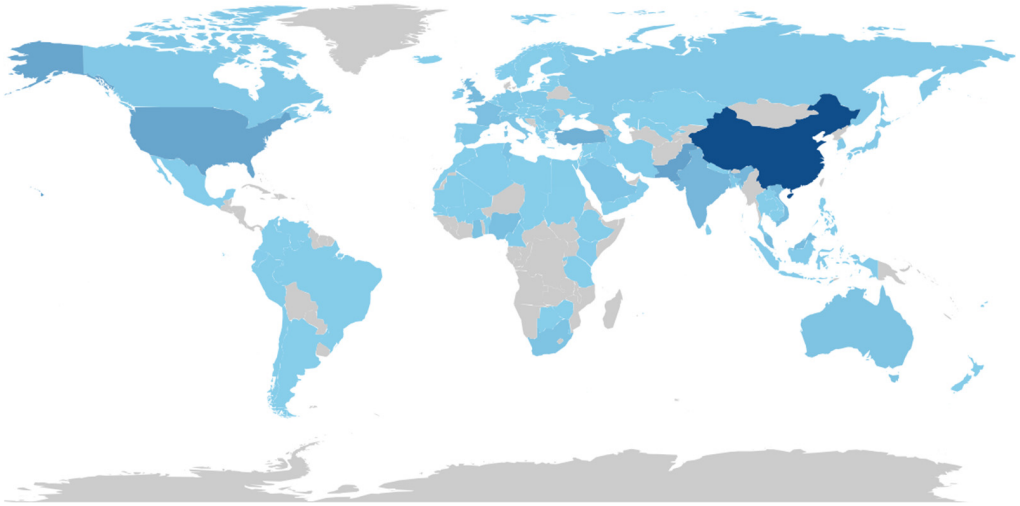

Figure 11. Countries' Scientific Production.

In order to create a network map of inter-organizational citations, an analysis was conducted on 419 items that have a relationship between them, within the scope of the criteria of publishing at least three publications by an institution and receiving three citations. As seen in Figure 12, Beijing Institute of Technology (56 documents), University of Economics Ho Chi Minh City (32 documents), and Jiangsu University (27 documents) are represented by works, while the institutions with the most cited publications are Beijing Institute of Technology (4927 citations), University of Chicago (3329 citations), and the World Bank (2758 citations). In total, there were 13 clusters, 14,379 links, and the total connection strength was determined as 24,598.

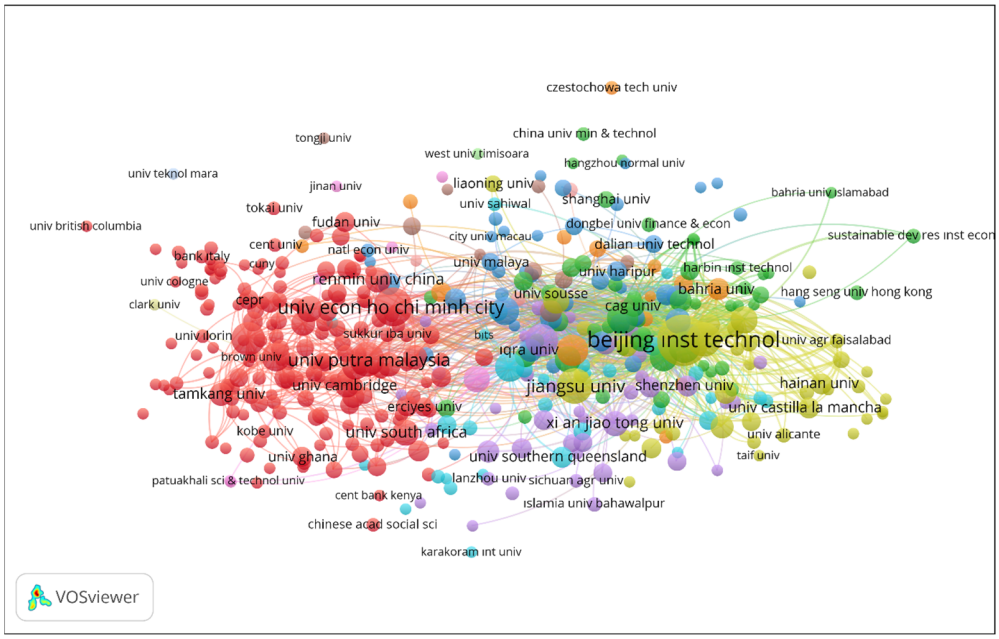

Figure 12. Citation of Organizations.

Bibliographic Coupling of Documents

Bibliographic coupling refers to the citation of a common work cited by two independent sources. According to the analysis conducted with 1000 units of documents selected with the criterion of having at least 3 citations and having links between them, 3 clusters, 254,840 links, and 706,222 total link strength were obtained. According to the Figure 13, publications with the most bibliographic matches were Rajan with 1472 citations, Greenwood and Jovanovic with 1378 citations, and Chinn with 1198 citations. The documents with the highest total link strength were Samargandi et al. (2015), Yasin et al. (2020) and Swamy and Dharani (2018).

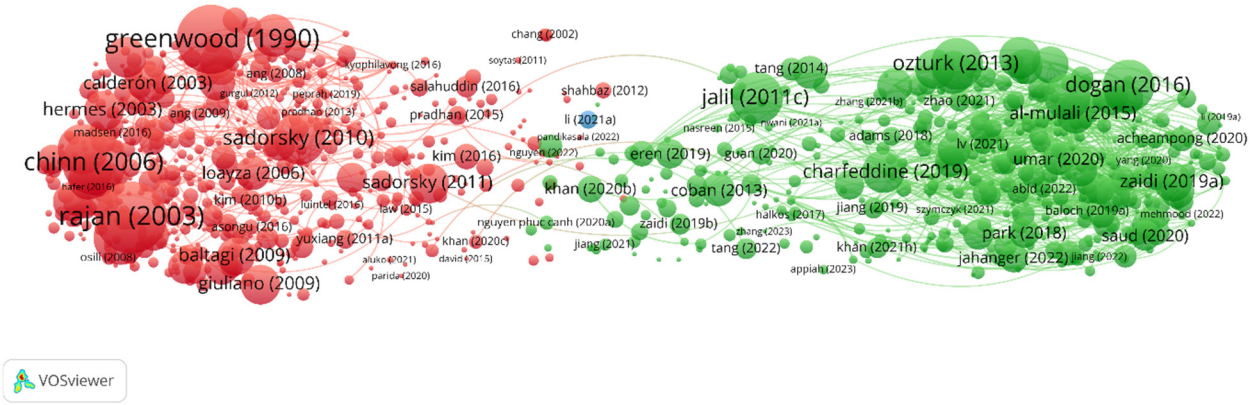

Figure 13. Bibliographic Coupling of Documents.

We have also created a conceptual structure map of a scientific field, performing Coupled Clusters Analysis (CC) of a bipartite network of terms extracted from keywords, which provides further analysis of the common theme(s) in the publications of all journals. The calculated clusters are depicted in Figure 14 below. Here, cluster coupling is measured by keywords, the impact is measured by global citation scores, and cluster labeling is also performed with keywords. We have three clusters (green, red, blue), with CO_2 Emissions–Economic Growth–Financial Development having the greatest degree of global citation impacts. That is, the articles in these clusters are the most impactful articles published by the journals. On the other hand, the cluster of Economic Growth–Energy Consumption–Financial Development has the highest degree of centrality. And Economic Growth–Financial Development–Trade Openness has the lowest degree of centrality and impact and has the least impactful articles in these clusters. Hence, one practical outcome might be that if one is publishing an article in these journals, it would be better to do so on a topic that can be clustered in green and blue. However, having seven closely related clusters is a very suggestive finding as it shows that the journals have delved into only a few broader themes/clusters. This is also verified by the trend topic charts, which is a clustering and mapping scheme for bibliometric analysis. The trend topic chart in Figure 15 shows yearly trend topics based on field tags. Here, we see that the dominating themes in the articles published by the journals change over time. The trend topics also correspond to the findings we presented in the clusters by coupling.

This is also verified by the topic dendrograms, which is a clustering and mapping scheme for bibliometric analysis. The topic dendrogram in Figure 16 shows that there are two broad topics and several sub-topics emerging in the papers published in these journals.

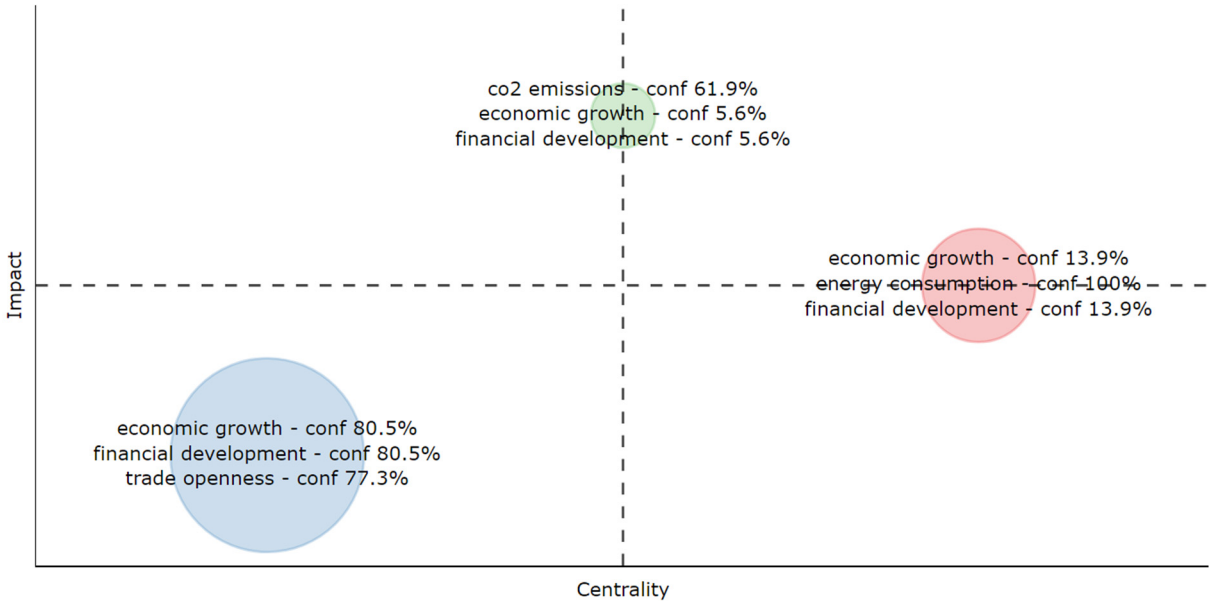

Figure 14. Clusters by Documents Coupling.

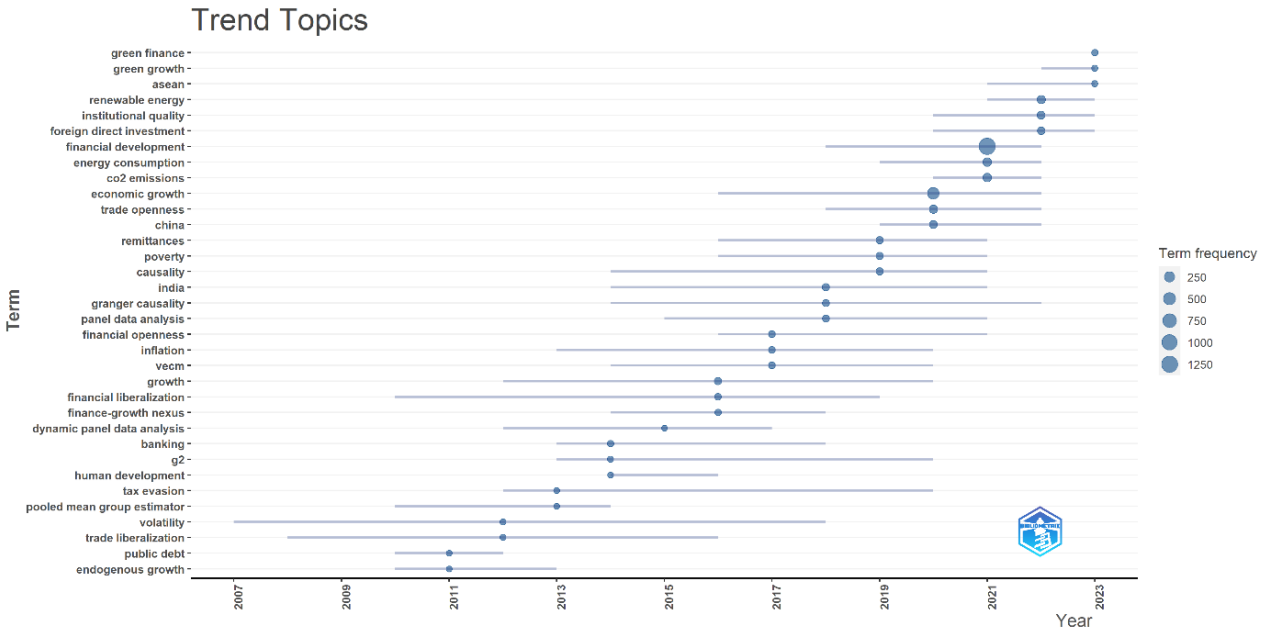

Figure 15. Trend Topics Per Year.

According to the analysis conducted with 356 units with connections between them, selected with the criterion of having published at least 3 publications and receiving 3 citations, 4 clusters, 56,383 links, and 1,345,719 total link strength were obtained. According to the Figure 17, the authors with the most bibliographic matches were Shahbaz Muhammed (80,237 link strength) with 3926 citations, Zingales (1563 link strength) with 3252 citations, and Öztürk (33,324 link strength) with 2710 citations.

Different sources cited in a publication are called co-citation. It is seen in Figure 18, according to the analysis performed on 826 units with a minimum number of citations of 20, a total of 3 clusters, 171,270 links, and 1,134,819 total link strength were detected. The most commonly cited authors were identified as Shahbaz (1762), Levine (1417), and Pesaran (1349).

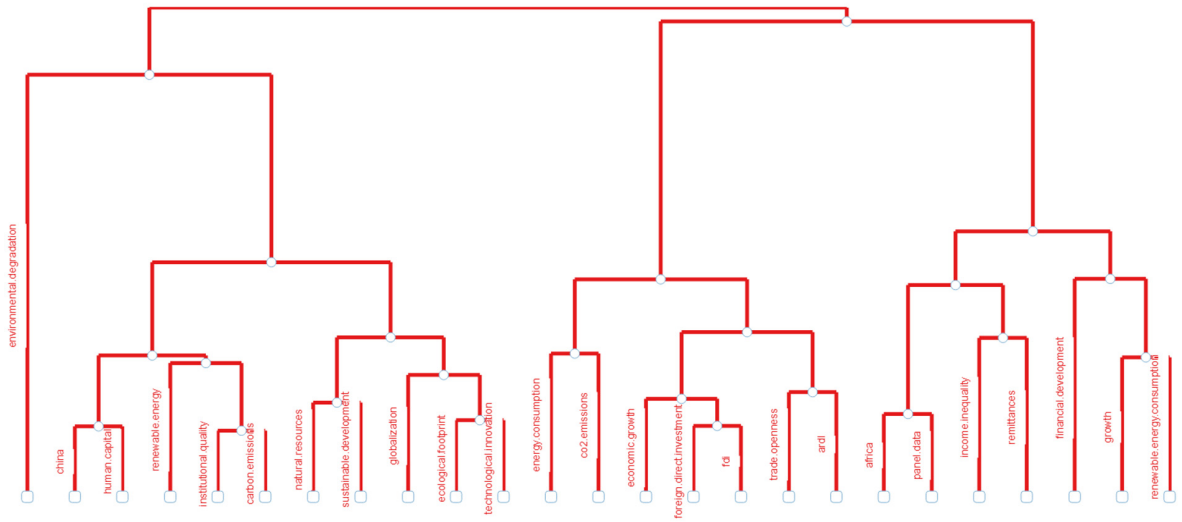

Figure 16. Topic Dendrogram.

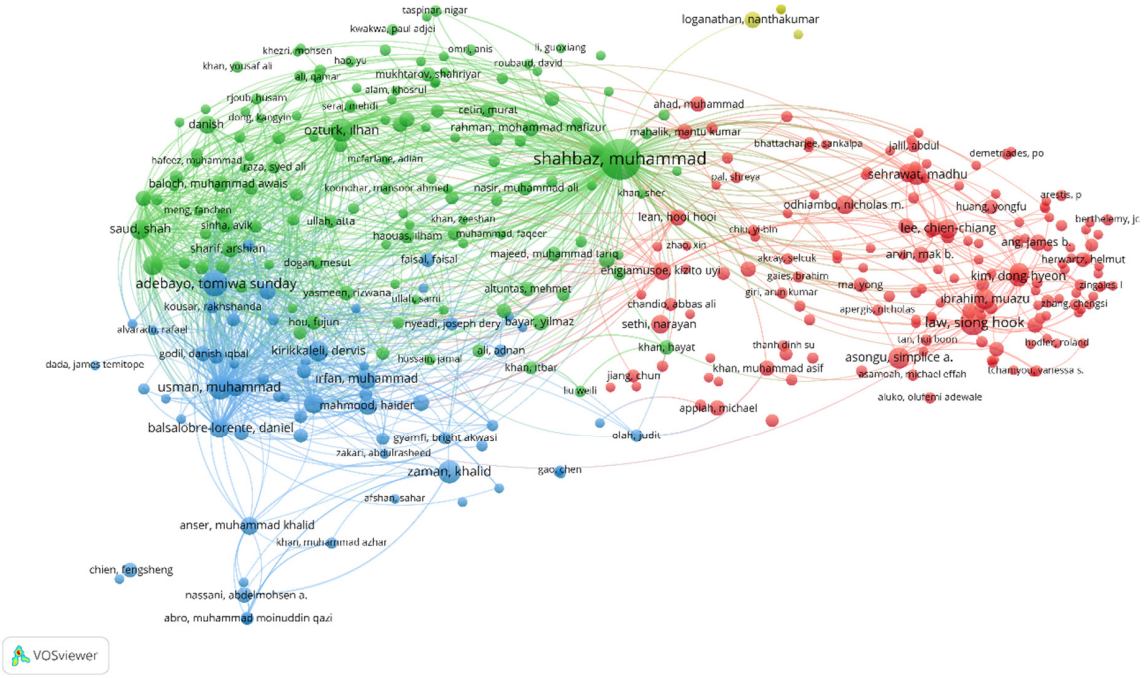

Figure 17. Bibliographic Coupling of Authors.

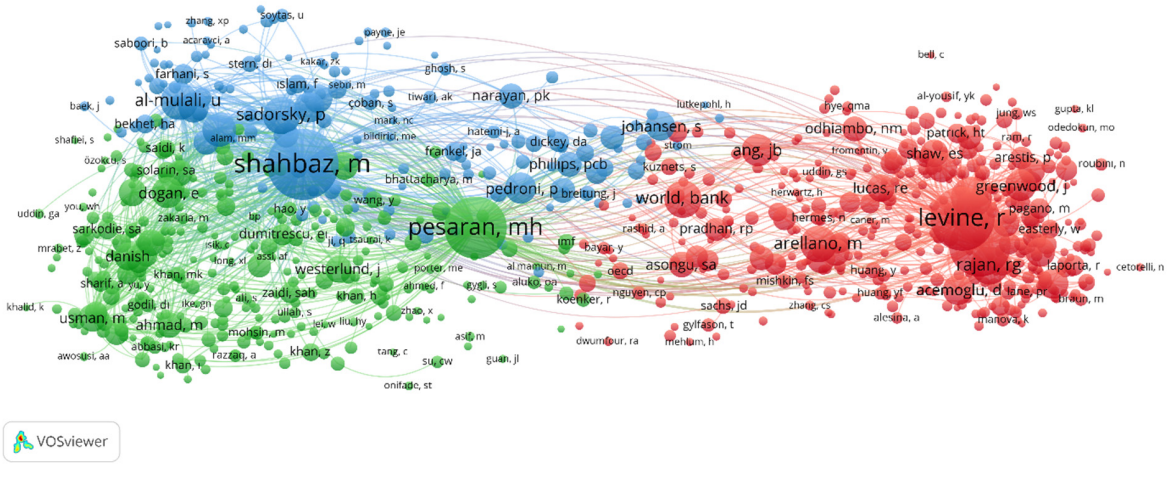

Figure 18. Co-citation of Co-authors.

5. Results and Discussion

This study aims to analyze the evolution of the concept of financial development through bibliometric methods. The results show that research in financial development is primarily concentrated in the fields of economics, environmental sciences, and business finance. Economics holds the largest share of publications, followed by environmental sciences and business finance, suggesting that financial development is increasingly being studied from multidisciplinary perspectives. The relationship between financial development and environmental sustainability is becoming more prominent, indicating a shift toward incorporating environmental issues into financial research.

A significant finding is the sharp increase in publications in the field of financial development after 2014, with a particularly notable spike in the years following the COVID-19 pandemic. This surge is likely attributed to the pandemic, which raised questions about financial performance and development in times of crisis. The rise in publications from 65 in 2014 to 404 in 2023 highlights the growing interest in understanding how financial systems can adapt and evolve during global disruptions.

The analysis of keywords reveals that the most frequently used terms include "financial development", "economic growth", "energy consumption", "CO_2 emissions", and "renewable energy". This shows a growing emphasis on the intersection of financial development with environmental sustainability. Strong links between these terms suggest that research in financial development is increasingly addressing both economic growth and environmental challenges. The presence of these keywords indicates a trend toward examining the role of financial systems in supporting sustainable development, a vital area for future research.

The network map of co-authors highlights the central role of key authors such as Shahbaz, Zingales, and Öztürk, who have made significant contributions to the field. These authors not only lead in terms of publication numbers but also in the number of citations, indicating their influence in shaping the direction of financial development research. Additionally, the co-authorship analysis shows that research in this field is being conducted by a tight-knit group of authors, suggesting a well-established scholarly network.

In terms of geographical distribution, China, Pakistan, and the United States are the leading countries in financial development research. China, in particular, stands out with the highest number of publications and citations, followed by Pakistan and the USA. This indicates that these countries are central to the global research landscape in this field. The significant role of China in financial development research underscores the importance of emerging markets in shaping global financial systems.

From the perspective of journal impact, Environmental Science and Pollution Research and Resources Policy are identified as the most relevant and productive journals in the field of financial development. These journals focus on integrating environmental sustainability with financial practices, offering a platform for research that addresses the pressing challenges of our time, such as climate change and the transition to a green economy.

Financial development should be explored from a multidisciplinary perspective that combines economics, environmental science, and energy studies. Future research could focus on the integration of these fields to better understand the interactions between financial systems and sustainable development. Research frameworks should evolve to address the intersection of finance, environment, and social development. While countries like China, Pakistan, and Turkey have made substantial contributions to financial development research, there is a need for a deeper exploration of financial development in emerging markets. These regions play a critical role in global financial stability, and understanding their specific dynamics will help create more inclusive and equitable financial systems.

This study highlights the importance of integrating economic, environmental, and business finance perspectives in financial development research. This holistic perspective shows that financial systems do not stand alone but are linked to broader social and environmental issues. The study reveals a distinct shift toward incorporating environmental sustainability into financial research. This trend shows that traditional financial development frameworks are evolving to address climate change and sustainability goals.

Energy consumption in industry, transportation, construction, and service sectors increases the sustainability and efficiency of production processes. Access to energy accelerates economic development and improves living standards. Therefore, the positive relationship between energy consumption and economic growth is an important indicator of a country's economic performance. Energy production and consumption rely heavily on fossil fuels, leading to CO_2 emissions. CO_2 emissions are one of the main causes of climate change and threaten environmental sustainability. Increasing energy demand with economic growth causes CO_2 emissions to increase. While this situation leads to environmental degradation, it also emphasizes the importance of sustainable development policies. Renewable energy sources are at the center of sustainable development strategies. Renewable energy reduces environmental impacts and increases energy security as an alternative to fossil fuels. In terms of financial development, investments in renewable energy promote green economies and create new jobs. The relationship between economic growth, energy consumption, CO_2 emissions, and renewable energy is also influenced by political and institutional factors. Government policies, energy pricing mechanisms, carbon tax, subsidies, and regulations determine the direction and magnitude of these dynamics. Effective policies and regulations play a critical role in achieving sustainable development goals.

The COVID-19 pandemic has highlighted the vulnerabilities and resilience of financial systems during global crises. There is a sharp increase in financial development research after 2014, especially after the COVID-19 pandemic. This highlights the significant impact of global crises on financial development research and points to the need for more resilient financial systems. Future research should examine the long-term impacts of such crises on financial development, focusing on policy responses and strategies for building more resilient financial systems that can weather future shocks. A significant body of research in this field is focusing on green finance and the role of financial systems in supporting sustainable economic growth. Future studies should explore the relationship between financial development and environmental factors, such as energy consumption and CO_2 emissions, and how financial systems can be restructured to meet sustainability goals. The collaboration network among authors in financial development is currently limited to specific research groups and regions. Encouraging greater international collaboration and fostering global research networks can contribute to a more diverse and comprehensive understanding of financial development. The most common keywords—financial development, economic growth, energy consumption, and CO_2 emissions—indicate that these areas are becoming central to research in this field. Future studies should examine the interactions between these themes and their impact on financial development. The inclusion of these themes will be crucial for the continued evolution of financial systems that can address both economic and environmental challenges. Factors such as global climate change, environmental problems, sustainable development, renewable energy, technology, and regulatory policies have led to increased research on environmental economics.

Policymakers should prioritize integrating environmental sustainability into financial regulations and frameworks. This can be achieved by promoting green financing initiatives and supporting renewable energy investments. It is important to develop policies that increase the resilience of financial systems against global crises. This can be achieved by

creating contingency plans and promoting various financial instruments. Additionally, encouraging international cooperation and strengthening global research networks can provide more comprehensive and diverse perspectives on financial development issues.

Bibliometric analyses are an important way to align the financial system with sustainability goals and evaluate the results of these policies. These analyses examine the published literature on a particular topic and evaluate it through measurements such as prevalence, impact, and diversity (Smith & Johnson, 2015). It can reveal in which areas academic and policy studies on adapting the financial system to sustainability goals are concentrated, which research attracts more attention, and which issues are less examined (Johnson, 2023). Additionally, these analyses can help determine which approaches are more effective and which strategies are more successful in policy development processes toward the sustainability goals of the financial system (Brown, 2024). In conclusion, this study provides valuable insights into the evolving field of financial development. The findings indicate that financial development research is increasingly embracing a multidisciplinary approach, focusing on the intersections between finance, the environment, and sustainable growth. By expanding research in emerging markets, examining the impacts of crises, and integrating green finance into mainstream financial systems, future studies can contribute to the development of more resilient and sustainable global financial systems.

Author Contributions: The authors have contributed equally to all phases of the article. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data from this study are available in this article.

Conflicts of Interest: The authors declare no conflicts of interest.

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