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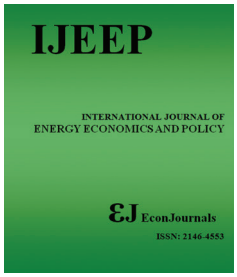
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A Bibliometric Analysis of Green Financing and Renewable Energy Research for 2000-2023

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ABSTRACT

This bibliometric analysis examines the research on green financing and renewable energy from 2000 to 2023. The study analyses the publication trends, most productive countries and institutions, frequently occurring concepts, and active and cited authors in this field. The findings reveal a significant increase in publications on green financing and renewable energy in recent years which highlights the increasing interest and investment in these fields, with China being the most productive country. The analysis of keywords highlights the focus on renewable energy, sustainability, and climate change. The study also identifies the most active and cited authors, as well as the top journals in this research area. Overall, the analysis underscores the growing interest and importance of green financing and renewable energy in addressing climate change and promoting sustainable development. The analysis presents future opportunities for research in the areas of green financing and renewable energy, as well as the development of sustainable finance and renewable energy solutions.

Keywords: Bibliometric Analysis, Green Financing, Renewable Energy, Sustainability
JEL Classifications: O13, P18, Q01

1. INTRODUCTION

In recent years, there has been a growing emphasis on green financing due to heightened global recognition of environmental issues like climate change, pollution, and resource depletion. Governments, financial institutions, investors, and businesses increasingly acknowledge the imperative to shift towards a more sustainable and low-carbon economy (Uwuigbe et al., 2018). The significance of green financing is increasing as the shift towards renewable energy sources promotes sustainable alternatives to traditional energy sources, thereby bolstering environmental conservation efforts (Abbasi et al., 2022a). The 21st century presents several global challenges, including climate change, which calls for greater global cooperation (Andreeva et al., 2018). The growing recognition of environmental and social hazards in conventional investment methods is driving the growth of green financing. Businesses, economies, and societies face risks from climate change, resource scarcity, pollution, and ecosystem degradation, affecting their sustainability, financial performance, and reputation (Uwuigbe et al., 2018). Global environmental concerns have prompted policymakers in developing and emerging economies to transition from non-renewable to renewable energy sources, despite the high costs involved (Abbasi et al., 2022).

Over the past few decades, there has been a significant increase and focus on environmental protection, with ecologists and other stakeholders playing a significant role in pressuring countries, institutions, and enterprises to switch to green energy sources

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(Al-Qudah et al., 2022). As the global community battles with the challenges of climate change and carbon emissions issues, green financing tools become crucial for mobilizing capital for sustainable projects, particularly in the development and deployment of renewable energy infrastructure (Eluyela et al., 2022). The importance of green finance in promoting sustainability and a low-carbon economy has grown due to the urgent need to address climate change and environmental degradation (Sun et al., 2023). Similarly, it has become increasingly crucial to direct capital towards projects that support environmental sustainability, reduce climate risk, and accelerate the transition to an eco-friendly project. The concept of green financing therefore can be described as a financial instrument that supports environmentally friendly enterprises, projects, and initiatives. It includes energy-efficient improvements, green building, clean transportation, renewable energy projects, and resource conservation. The primary goal is to direct funds towards climate adaptation, environmental preservation, and a low-carbon, sustainable economy.

Addressing climate change and accomplishing sustainable development objectives requires shifting to renewable energy. Nonetheless, one of the biggest obstacles is finding sufficient funding. Green finance, which allocates funds to environmentally friendly projects, can assist in resolving this problem, but it still has a way to go before reaching its full potential. Transitioning to renewable energy sources is crucial for sustainable development, climate change mitigation, and reducing greenhouse gas emissions. However, the success of these projects often depends on the availability of sufficient funding. Green finance remains a key tool in facilitating this shift and directs capital towards environmentally sustainable projects. Despite its potential, numerous obstacles (such as investor awareness, financing costs, regulatory uncertainty, project risks, and access to finance) need to be overcome to fully utilize green financing for renewable energy. Collaboration between governments, financial institutions, industry stakeholders, and civil society is vital for developing green financing strategies and achieving global renewable energy targets. Thus, to achieve this, there are a series of calls for a multi-stakeholder strategy that incorporates financial resources, regulatory frameworks, and capacity-building initiatives.

As an emerging concept, green financing has gained traction globally at both micro and macro levels. Countries, institutions, multinational corporations and investors must be proactive in adapting to providing solutions that will address climate change challenges by offering new ways to evaluate environmental risks and opportunities (Arellano and Bover, 1995). The concept focuses on controlling environmental and social risks, creating economic possibilities with decent returns and positive benefits, thus assuring accountability. This initiative will in the long run aim to boost funding from public, private, and non-profit sectors for sustainable development (Han and Li, 2022). The notion of green financing is described as a set of financial instruments designed to support environmentally sustainable projects, such as green bonds, loans, and impact investments, by directing capital towards projects that promote environmental benefits like reduced emissions and energy efficiency. It is a notion that is targeted at transferring financial resources from polluting industries to those using advanced technology, enhancing ecological sustainability, and managing environmental damage (Zhang et al., 2021). Green finance innovation modernizes environmental governance, improving green economic growth capacity (Hao and Chen 2022). It also enables developed and developing nations to jointly combat pollution (Muganyi et al., 2021).

The perception of green financing entails providing money, investments, and funding mechanisms to aid efforts at climate mitigation and adaptation while encouraging long-term sustainability (Barber et al., 2021). It is described as a sustainable financial approach, that involves public funding, private investments, loans, grants, and green bonds issued for projects meeting specific sustainability criteria. International Finance Corporation (2023), describes it as investment products that promote social justice, environmental protection, and economic prosperity, supporting environmentally beneficial activities like eco-friendly products and infrastructure development (Bebbington and Unerman, 2018). It enhances access to environmentally friendly products and services, accelerates the transition to a low-carbon society, and promotes socially inclusive growth, benefiting both the environment and global economies. It is an environmentally oriented financial product or service that focuses on improving human well-being, social equity, and ecological integrity by reducing environmental risks and promoting climate change investment. It is a financial strategy that links the financial sector to environmental advancement and economic growth, promoting sustainable development investments in renewable energy across public, private, and non-profit sectors.

Emerging from the 2008 global financial crisis, the notion of green financing has become a critical financial strategy and a key reference for governmental policy in the context of climate change and biodiversity loss. According to Berensmann and Lindenberg (2016), green financing is a financial innovation that protects and supports the environment and creates value for economies. In recent years, the concept of green financing has drawn attention from all over the globe, as the international community is searching for more resolute, forward-looking, and creative solutions because of the pressing need to slow down climate change and move to a low-carbon economy. One of the most important factors in promoting the uptake of renewable energy technologies among these solutions is green financing. Green financing accelerates the renewable energy transition, reducing risks and aligning incentives. Cooperation between governments, financial institutions, and the private sector is crucial for advancing sustainable energy technologies.

Renewable energy and green financing are crucial tools for promoting positive change in a world of environmental concerns. Renewable energy, produced from renewable sources like sunlight, wind, and water, offers a clean, limitless alternative to finite fossil fuels, while green financing focuses on supporting environmentally sustainable projects. Renewable energy, derived from natural resources like sunlight, wind, water, and geothermal

heat, is sustainable and inexhaustible, ensuring present energy needs are met without compromising future generations' needs (Alharbi et al., 2023). Renewable energy sources like solar, wind, and biomass harness Earth's natural processes to generate electricity and heat, offering a cleaner, greener, and more sustainable alternative to fossil fuels. Renewable energy offers numerous benefits, including reduced carbon emissions, improved air quality, energy security, and economic development due to its scalability and versatility. The concept of renewable energy has gained significant attention in recent decades due to its lower greenhouse gas emissions and smaller environmental impact. Despite being used for thousands of years, renewable energy sources have gained widespread use in recent centuries, becoming a top priority for governments, industries, and individuals (Farhad and Naoyuki, 2020). They contribute significantly to the global energy mix and are essential for environmental preservation and sustainable development globally. Investment in green finance and renewable energy offers a solution to energy deficits, overreliance on fossil fuels, and climate change. With abundant renewable resources, it can stimulate economic growth, job creation, and environmental preservation. Also, investment in renewable energy globally is expected to serve as incentives to assist sustainable energy initiatives, lowering emissions and fostering economic development.

Nevertheless, despite recent global efforts to promote investment in renewable energy, there is a growing concern that the net-zero corporate commitments are not delivering the emissions reductions needed to meet the 1.5°C global target (Bernstein, 2017). In addition, the current downturn in the global competitive market has significantly decreased worldwide expenditures on green projects which could upsurge the threat to climate targets. Thus, encouraging green investment globally becomes imperative for integrity and transparency in the transition and sustainable finance market. Likewise, with increased demand for energy access, climate change mitigation, and energy security, it remains unclear if green finance mechanisms are effective enough to support these initiatives. More so, there is a dearth in the literature that synthesizes, summarizes, and identifies trends in green finance and renewable energy investment from a global perspective. To address these gaps, this study conducted a bibliometric analysis of green financing and renewable energy for the period 2000-2023. The choice of the period is based on the fact that the significant development in green financing. In addition, the period marked a significant technological advancement in renewable energy technologies.

2. LITERATURE REVIEW

2.1. Historical Development on Green Financing

Agricultural disruptions, global warming, droughts, and water-related geopolitical tensions are just a few of the many effects of climate change on the environment and economies. According to Li et al. (2021), Froehlich et al. (2021) and Bernstein (2017), it is intractable in the short term and calls for international cooperation and policy to address its long-term threats. Combating climate change, which jeopardizes food security, economic resilience, and global peace, urgently requires international cooperation and alignment. Despite these avalanches of challenges, coordinated efforts have been made to reduce the dangers posed by climate change, including the U.N. Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement (Bernstein, 2017).

Due to the widespread support for environmental preservation, climate change mitigation, and the accomplishment of the United Nations Sustainable Development Goals by 2030, green finance also known as sustainable finance is gaining popularity (Amidjaya and Widagdo, 2019; Dörry and Schulz, 2018; Bernstein, 2017). It became well-known during the eleventh G-20 summit in Hangzhou, China, where it was extensively discussed and covered by the media (Liu et al., 2019; Schäfer, 2018). The United Nations Climate Change Conference (COP 21) highlighted renewable energy and energy efficiency as crucial for climate change. Despite ambitious goals and policies, renewable energy generation still falls short of net zero emissions by mid-century. Financing remains a significant obstacle (International Energy Agency, 2021).

2.2. Prior Studies on Green Finance and Renewable Investment

Climate change is a complicated problem that affects water availability, global warming, droughts, and geopolitical tensions. Because the problem is global in scope and calls for global cooperation and policy, some academics (Abbasi et al., 2022b; Alharbi et al., 2023) contend that it cannot be resolved soon. According to Li et al. (2021), there is no easy fix for climate change, and everyone must work together to find a solution. The threat to food security, economic resilience, and world peace is highlighted by Froehlich et al. (2022), underscoring the urgent necessity for global measures to eliminate this menace. Gross et al. (2003) discovered a correlation between clean energy stocks and technology stocks, highlighting investors' preference for energy-based products, forming a transmission chain between energy and finance. Pathania and Bose (2014) in a related study, opine that government regulation of green finance can enhance the efficiency of renewable energy projects, as unbridled growth can lead to inefficiency.

The effect of green finance and the use of renewable energy on climate change has been noted in prior research. Qi et al. (2014) in a related study observed that renewable energy development in China from 2010 to 2020 showed a positive correlation with CO_2 emissions, confirming its immediate impact. Conversely, Damianova et al. (2018), in a related study in Russia observed several obstacles to the growth of green financing, including a lack of a public sector agency, a lack of legal framework, a lack of funding for green projects, a lack of funding for procurement, and a lack of funding for green projects due to low targets (Berensmann and Lindenberg, 2016). Similarly, He et al. (2019) emphasize the importance of green policies, including green bonds and credits, in driving renewable energy development and achieving sustainable development goals. According to CBI (2019), despite obstacles such as a lack of information, legislation, and awareness, UK businesses and financial institutions are progressively embracing green finance. To promote green finance, they advise fostering the sector and reviewing current financial

regulations. According to Sokolova et al. (2019), the Ukrainian government has not demonstrated a strong interest in the green economy, which has allowed non-governmental organisations to exert a more direct effect. Nevertheless, while not being a government-led project, the establishment of the Ukrainian Green Bank, or "Ukrgasbank," has improved Ukraine's prospects for green financing.

New Pathways (2020) reports that the Netherlands has green funds for individuals to donate money for green initiatives like renewable energy, wildlife protection, and organic farms, with a minimum of 70% of the total grant amount going to eligible green projects. Over €7.3 billion in funding from a quarter of a million individual investors went towards 6,066 projects between 2000 and 2009 (New Pathways, 2020). Feyen et al. (2021) and Yang et al. (2022) found that clean energy demand and environmental regulations positively impact green finance development in both the long and short terms. While Zhou and Xu's (2022) in their study found a U-shaped relationship between green finance and regional ecological enhancement in China using the GMM model.

Irfan et al.'s (2022) study in China found that green finance positively impacts green innovation across all regions, using VAR technique and annual data from 2010 to 2019. Chuah (2020) critiques an EU green shipping finance facility, arguing that despite its green credentials, it still faces contractual and policy constraints. Jena and Dhruba (2020) draw attention to the necessity of educating India's financial sector about the advantages of green finance as well as the necessity of consistent, market-led action to speed up green capital flows. They propose defining green finance, creating incentives for it, and enacting sanctions against carbon-intensive investments.

Overall, despite the growing importance of green financing and renewable energy in addressing climate change and achieving sustainability goals, there remains a lacuna and dearth in the academic landscape (literature) that explores the dynamics and trends of green financing and renewable energy. It is against the backdrop that this study will attempt to provide answers to the following research questions.

2.3. Research Question

Based on the dearth of literature, the following research questions will be considered in this study.

RQ_1: Which country is the most productive in terms of publication on green financing and renewable energy?

RQ_2. Which institution (University) is the most productive in terms of publication on green financing and renewable energy?

RQ_3. What are the most frequently occurring concepts (keywords) that are shaping the current drive for green financing and renewable energy?

RQ_4: Who are the most active authors on green financing and renewable energy?

RQ_5: Who are the most cited authors on green financing and renewable energy?

3. MATERIALS AND METHODS

3.1. Data Source, Keywords and Search Strategy

The data for this bibliometric review was obtained from the Scopus database. The Scopus database is the largest collection of multidisciplinary scholarly published works with over 41,000 titles (Vieira and Gomes, 2009). The Scopus database was launched in 2004 by Elsevier and is considered one of the major relevant sources of information within the academic research community.

The first step is conducting keyword search (Linnenluecke et al., 2020). A keyword search utilising words and phrases such as "green finance" OR "renewable energy" OR "green investment" OR "sustainable finance" was conducted on the Scopus database for all papers indexed from January 2000 to December 2023 in order to identify relevant manuscripts for this bibliometric review. The keywords was selected from the review of manuscripts published on green financing and renewable energy. The subject area considered for this study is business, finance, accounting and management. The primary search was conducted on 3rd February 2024.

A two-stage methodological approach was applied in this study. In the first stage, the inclusion and exclusion criteria presented in Table 1 was applied on Scopus database and this resulted into 5401 documents published on green finance and renewable energy between 2000 and 2023. In the second stage, the authors performed manual screening on the 5374 documents generated in stage 1. The aim of the manual screening is to remove non-related articles from the study (articles published in subject areas like engineering, environmental science, art and humanities). The final sample used for this study is 4631 articles. This means that 743 articles relating to other subject areas was excluded from the final sample.

The flow chart of the search strategy is presented in Figure 1. The flow chart shows the topic, scope and criteria applied for this study.

3.2. Tool for Data Analysis

After applying the inclusion and exclusion criteria stated in Table 1, the final sample of the data was downloaded in Microsoft excel (csv) format from the Scopus database. This data was uploaded into the VOSviewer software for the bibliometric analysis. The VOSviewer is a software tool used for bibliometric analysis to build networks for scientific publications and visualisation of author keywords, countries, citations maps and journals (Van Eck and Waltman, 2020). The bibliometric analysis can be divided into two parts: Descriptive and network analysis. The descriptive analysis provides a summary of the study's fundamental facts, such as citations and publications, journals, countries and institutions. The network analysis includes the co-citations, co-authorships and keywords co-occurrence.

4. RESULTS AND DISCUSSION

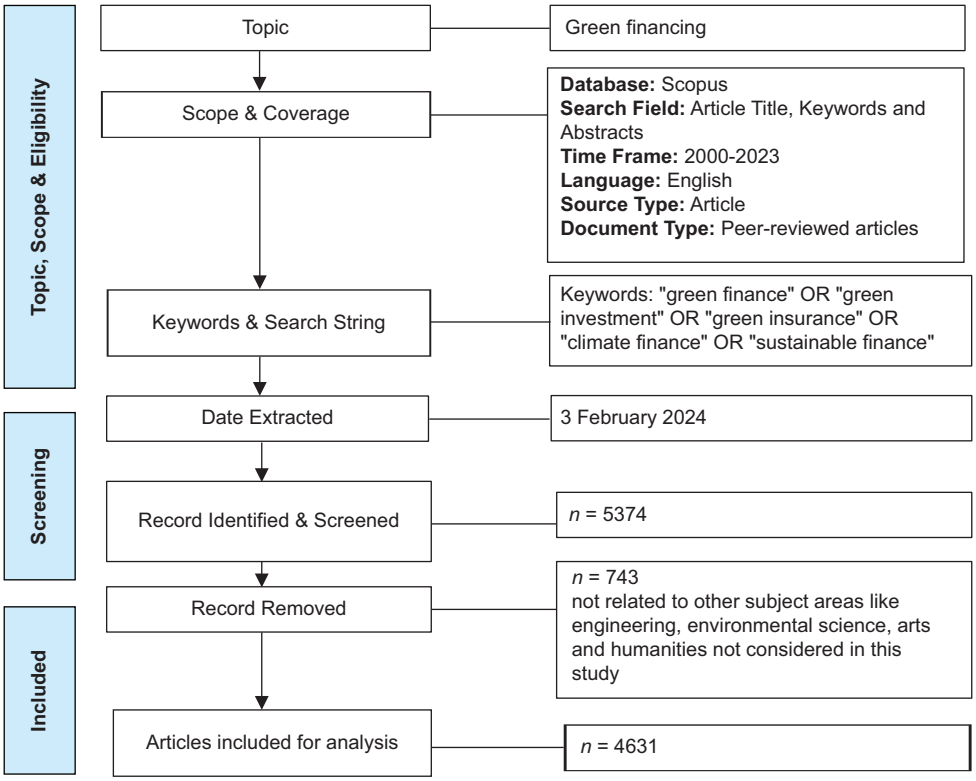
4.1. Annual Publication Trends

Figure 2 presents the annual publication trends on green finance and renewable energy. In 2000, the number of publications

Table 1: Inclusion and exclusion criteria for this study

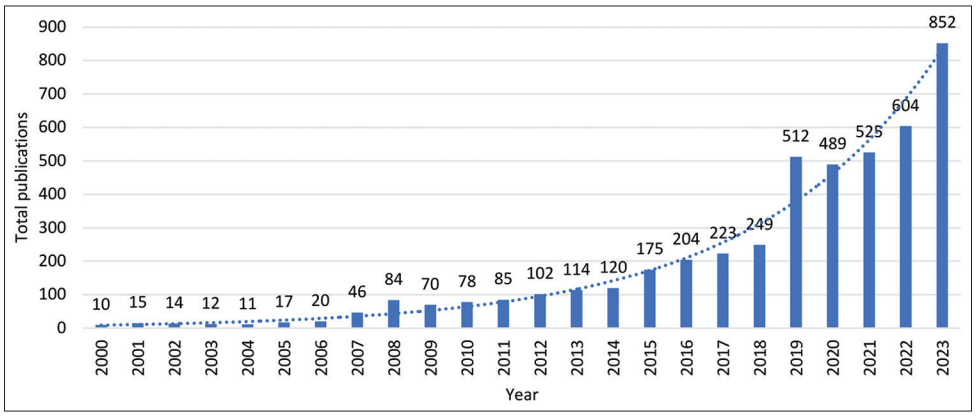
Inclusion criteria	Exclusion criteria
Manuscripts that have any of the following keyword in their title, abstract and keywords. These keywords are "green finance" OR "renewable energy" OR "green investment" OR "sustainable finance"	Manuscripts that do not have any of the following keyword in their title, abstract and keywords. These keywords are "green finance" OR "renewable energy" OR "green investment" OR "sustainable finance"
Subject area- Business, finance, management, and accounting	Other subject areas like engineering, decision sciences, environmental science, arts and humanities
Manuscripts published between 2000 and 2023	Manuscripts published before 2000 and after 2023
Publication or document type: Only peer-reviewed journal articles	Other publication or document types, e.g., editorials, conference papers and book chapters
Full text is accessible	Full text is not accessible
Articles published in English language only	Articles published in other languages

Figure 1: Flow chart of the search strategy



Source: Fayad et al. (2023)

Figure 2: Annual publication trend



Source: Developed by authors

was 10. The growth rate between 2000 and 2014 is low with an average of 53 publications. From 2015, the number of publications began to increase, with the number notably higher from 2019 to 2023. The is because the level of research on green finance and renewable energy was high with a steady increase on a yearly basis. This is evident in the urgent call for action by all countries adopting the United Nations Sustainable Development Goals (SDG 7- affordable and clean energy and SDG 13-climate action).

4.2. Most Productive Country

The research findings as indicated in Table 2 shows that analysis by the number of publications from the list of countries covered in this research publication, the study observed that the top ten countries that contributed most in terms of publication in green financing and renewable energy were China (855), United States (400), India (384), the UK (308), Italy (220), Germany (212), Spain (157), Australia (155), Iran (144), and Malaysia (137). Also, in terms of total citations as indicated in Table 2 shows that China has the highest record of citations totalling 29,085. This is followed by the United States, United Kingdom and India with citations of 8797, 8071, and 6145 respectively. From this result, it is indicative of China awareness of her role in curbing there to Co2 emissions and the general level of public awareness to reduce carbon emissions to a more sustainable alternative which is in line with the recommendation of the outcome of the just concluded conference Co2 emission in UAE.

Table 2: Top 10 most productive countries

Number	Country	Documents	Total citations
1	China	855	29085
2	United States of America	400	8797
3	India	384	6145
4	United Kingdom	308	8071
5	Italy	220	5258
6	Germany	212	4625
7	Spain	157	3997
8	Australia	155	4360
9	Iran	144	4906
10	Malaysia	137	3364

Table 3: Top 10 selected institutions

Number	Institutions	Countries	Documents	Total citations
1	Beijing institute of technology	China	33	3762
2	Duy tan university	Vietnam	13	790
3	University of Tabriz	Iran	11	687
4	North China Electric Power University	China	10	235
5	Nanjing University	China	9	504
6	Tianjin University	China	8	161
7	Sichuan University	China	7	327
8	Istanbul Gelisim University	Turkey	7	580
9	Shanghai Jiao Tong University	China	6	312
10	Bucharest University of Economic Studies	Romania	5	10

4.3. Analysis by Institution/Affiliations

Research findings in terms of the most productive institutions as indicated in Table 3 provide insight into the level of academic awareness on the subject area. Notably, out of the top selected institutions, six (6) were from China. This was evident in the total number of publications (73) from the six institutions. This result corroborates earlier outcomes as shown in Table 3. This outcome further gives credence to the fact that there are more research efforts targeted at reducing carbon emissions and adopting sustainable renewable energy in China. Similarly, the study observed that the number of publications for the remaining top ten (10) affiliated institutions were from Vietnam (13), Iran (11), Turkey (7), and Romania (5).

4.4. Keyword Analysis

The analysis of the keywords used by prior literature is presented in Figure 3. The most trending keywords are renewable energy, sustainability, life cycle assessment, sustainable development, climate change, sustainable finance, renewable energy sources, green finance, economic growth, and solar energy. The high level of visualization of these keywords is because they are commonly associated with the United Nations sustainable development goals (SDGs). In addition, the identified keywords are in line with the core teams often associated with the concept of green financing and renewable energy.

4.5. Most Active Authors Based on the Number of Publications

Findings based on the most productive authors as shown in Table 4 suggest that Streimikiene, D; Weijun, S; Schulte R. H and Flecher, F.C; and Sweeney, S. had the highest number of publications on the concept of green financing and renewable energy. From Table 4 Streimikiene, D is ranked first with a total of five (5) publications in the subject area. The followed by Weijun, S with a total of four (4) publications in the subject area. This was followed by Schulte R. H and Flecher, F.C, and Sweeney, S ranked third and fourth respectively with three (3) publications each. The remaining authors (initials ranked fifth (5^{th}) to tenth (10^{th}) respectively with two (2) publications each.

4.6. Most Cited Authors Based on the Subject Area

Findings from the study as indicated in Table 5 indicates that Wang Q, Zhang F. from (university) was the most cited author in this subject area of research with a total citation of 567. This was also followed with Zafar M.W.; Shahbaz M.; Hou F., and Sinha A. with a total citation of 363 in the subject area. The remaining top cited authors are Zafar M.W.; Shahbaz M., Sinha A.; Sinha A: Shahbaz, M.; Bollore, D.; Yao S, Zhang, S, Zhang Xi; Sharma R: Sinha A, Kautish P.; Zhang F; Deng X Phillipst Yip A.W.H, Bocken N.M.P.; Wang Z; Danish: Zhang B Wang B.; Schmidt T.S; and Sewern, S. with a citation of (233, 228, 216, 205, 191, 188, 183, and 175) respectively.

Figure 3: Analysis by keywords

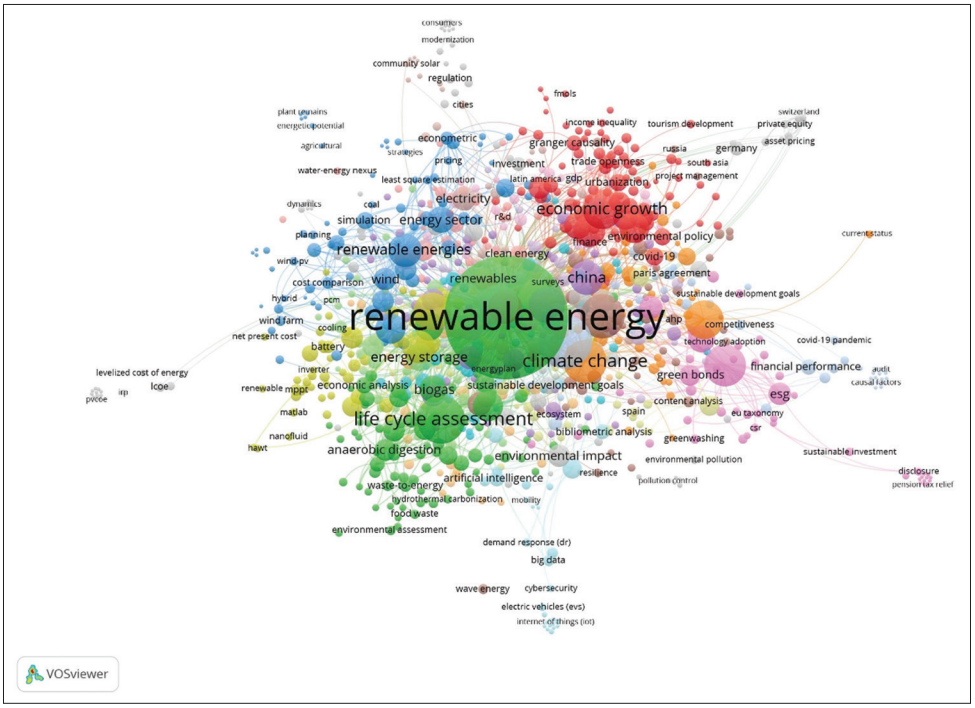


Table 4: Most active authors

Number	Author names	Affiliations	Documents	Citations
1	Streimikiene, D.	Vilnius University, Lithuania	5	16
2	Weijun S	Chinese Academy of Sciences	4	0
3	Schulte R. H; and Flecher, F.C.	Schulte Associates LLC, United States	3	8
4	Sweeney, S.	Murphy Institute, United States	3	2
5	Sarma, *P* and Roy A.	Tezpur University, India	2	7
6	Sgobba, A. and Meskell, C.	Trinity College Dublin, Ireland	2	20
7	Siedschlag, I. and Yan, W	Trinity College Dublin, Ireland	2	33
8	Singh, A. and Suhag, S.	Thapar Institute of Engineering and Technology, India	2	6
9	Singh, B and Sharma, A.K.	National Institute of Technology, India	2	4
10	Song Y.J and Lee J.K	Dongguk University at Gyeongju, South Korea	2	16

Table 5: Most cited authors

Number	Author names	Affiliations	Documents	Citations
1	Wang Q, Zhang F.	School of Economics and Management, China University of Petroleum, China	2	567
2	Zafar M.W.; Shahbaz M; Hou F; Sinha A.	College of Management, Shenzhen University, China	1	363
3	Sinha A; Shahbaz M.E; Balsalobre D	Centre for Economics and Finance, Administrative Staff College of India, India	1	233
4	Yao S, Zhang S, Zhang Xi	School of Economics and Business Administration, Chongqing University, China	1	228
5	Sharma R; Sinha A; Kautish P.	School of Business, Mody University of Science and Technology, India	1	216
6	Zhang F; Deng X; Phillips F; Fang, C	Institute for Energy Economics and Policy, China University of Petroleum, China	1	205
7	Yip A.W.H; Bocken N.M.P	Lund University, Sweden	1	191
8	Wang Z; Danish; Zhang B; Wang B	School of Management and Economics, Beijing Institute of Technology, China	1	188
9	Schmidt T.S; Sewern S.	Department of Humanities, Social and Political Sciences, Energy Politics Group, Switzerland	1	183
10	Wu B; Liu P; Xu X	School of Economics and Management, Southeast University, China	1	175

4.7. Analysis by Journals

Table 6 presents the analysis by journals. This analysis focuses on the diversity of publishers and the productivity of the journals in terms of document count. The journals are published by a variety of publishers, indicating a broad interest and investment in research related to cleaner production, technology, energy

Table 6: Analysis by journals

Number	Journal name	Publisher	Documents	JIF 2022
1	Journal of cleaner production	Elsevier	1932	11.1
2	International Journal of Recent Technology and Engineering	Blue eyes intelligence engineering and sciences publication	153	1.0
3	Technological Forecasting and Social Change	Elsevier	146	11.14
4	Electricity Journal	Elsevier	140	0.6
5	International Journal of Energy Sector Management	Emerald	137	3.1
6	Clean Technologies and Environmental Policy	Springer	86	4.9
7	International Journal of Scientific and Technology Research	International Journal of Scientific and Technology Research	82	8.14
8	Business Strategy and the Environment	Wiley	58	10.8
9	Eastern European Journal of Enterprise Technologies	Technology Center PC	34	1.07
10	Futures	Elsevier	31	3.429

JIF: Journal impact factor

management, and environmental policy across different publishers. The analysis reveals a diverse landscape of publishers contributing to research in cleaner production, technology, and environmental policy. The Journal of Cleaner Production emerges as a leader in both productivity and impact, highlighting its central role in disseminating influential research in this area. The wide range of document counts across the journals may reflect various factors, including the journals' focus, acceptance rates, and publication frequency.

5. CONCLUSION

The paper examined a bibliometric analysis of green financing and renewable energy research from 2000 to 2023. Based on the analysis of the findings conducted, the paper observed that the number of publications on green financing and renewable energy has increased extensively in the last 10 years, most notably the publication output has increased exponentially since 2015. This is as a result of the global urgency for sustainable development as emphasized by the adoption of United Nations sustainable development goals. Also, research analysis shows that the study reveals China is the top contributor to green financing and renewable energy publications, with the highest number of citations, indicating public awareness of China's role in reducing CO_2 emissions, aligning with the recommendations of the COP28 UAE - United Nations Climate Change Conference (UNCCC) held in the UAE.

Similarly, the study also observed that in terms of analysis by institutions six out of the top ten institutions are from China, with a higher level of academic awareness and publications on carbon emissions reduction and sustainable renewable energy adoption. This supports previous data indicating China's active role in carbon emission reduction and renewable energy research.

Likewise, the research output based on the keyword analysis, shows that the main research areas discussed by authors are renewable energy, sustainability, life cycle assessment, sustainable development, climate change, sustainable finance, renewable energy sources, green finance, economic growth, and solar energy.

Therefore, based on this analysis of the findings, the paper observes that green financing and renewable energy research have made progress, but knowledge gaps and opportunities remain. The paper concludes that despite the increase in publications for the period under consideration, there is a need for more concerted research efforts globally on green finance and renewable energy which will bring about awareness in promoting sustainability, and reducing climate change risk, and accelerating the transition to a low carbon sustainable economy.

This research is limited by the fact that only the period 2000-2023 was considered for this research. Also, this research is limited in terms of the study area. The research only focused on accounting, business management and finance areas of research. Finally, since bibliometric indices always perform analyses retrospectively, the paper recommends that future research could be extended to cover 2024.

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