

# Sustainable Financing Initiatives and Banking Performance: A Bibliometric Analysis

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## Abstract

*Background:* Because of seeing the emerging challenges of sustainability, there is a need to broaden a firm's objective by considering stakeholders, the planet, and the environment rather than only focusing on the value maximization of shareholders. Accordingly, the financial institutions providing finances help the firms achieve such broad objectives by designing products and services considering environmental protection, social welfare, and stakeholders' expectations. This will mean that these institutions should think of newer ways to develop a sustainable model for sustainable finance. To explore to what extent such objectives are achieved and what are the challenges in sustainable finance are the focus of this paper.

*Objectives:* This paper aims to conduct a bibliometric analysis on sustainable financing and banking performance and suggest a future research agenda.

*Design/methodology/approach:* This study is based on a bibliometric analysis of scientific production found on the Web of Science and Scopus database from 1989 to 2023 March on sustainable finance and bank performance. VoSviewer and Biblioshiny software was used to analyze the bibliometric data. The study explored the prominent authors, journals, articles and countries in this field. The collaboration map and thematic map were also prepared and analyzed.

*Findings:* The paper finds that sustainable financing and banking performance is an emerging area. Most research is happening in China. Further, the research is moving from developed countries to developing countries. Green investment, credit and innovation are more popular research areas from 2021. Sustainability is a prominent journal in this area.

*Research limitations/implications –* This analysis can serve as a reference guide for future research in sustainable finance and bank performance. Only quantitative analysis based on VosViewer and Biblioshiny software, taking bibliometric data from the Web of Science and the Scopus database, is being done in this paper, but the qualitative analysis would be valuable for future research.

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## INTRODUCTION

The banking sector is vital in channelling an economy's financial resources and contributing to economic growth (Bhegawati & Utama, 2020). Emerging concepts such as the internet of things, blockchain, artificial intelligence, and cryptocurrency influence banking activities and force financial institutions to update and design

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### Keywords:

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products accordingly (Mora et al., 2021) migrations, sustainable development challenges, governance, etc.. Further, the initiatives by the United Nations of the organization towards sustainable development influence the activities of banks (Bebbington & Unerman, 2018; Scheyvens et al., 2016) which are regarded as the most salient point of departure for understanding and achieving environmental and human development ambitions up to (and no doubt beyond as they have to design and develop the product focusing on the target of maintaining the carbon emissions of 2°C within 2030. Additionally, financial institutions should follow the agenda of the Paris Agreement 2015. Furthermore, many initiatives were taken concerning sustainability after the 1980s, such as Kyoto Protocol, 1997; United Nations Conference on Environment and Development, 1992; Brundt Report, 1987 (Keeble, 1988). The focus of all initiatives was sustainable development and protecting the environment

Moreover, the government sector took many initiatives to focus on banking activities towards sustainability, such as European Union made a different sustainable finance strategy (Brühl, 2021) and the Chinese Banking regulatory committee issued green credit guidelines. The main objectives of these strategies and guidelines are promoting sustainable investment considering Environmental, Social and Governance (ESG) activities. Regulatory authorities also changed their governance mechanism to the bank and financial institutions, directing the activities of financial institutions towards sustainable development. Many leading banking organizations, such as the Global Alliance for Banking on Values (GABV), the European Banking Authority, and Banks for International Settlements (BIS) concerned with sustainable banking activities to mitigate the impact of climate change (Galletta et al., 2021). The objectives of all initiatives mentioned above are maintaining sustainable financing practices and encouraging financial institutions to innovate environment-friendly products and services to promote sustainability, achieve sustainable development goals and minimize financial risks.

Based on the developments mentioned above, banks and financial institutions should focus on their activities towards sustainability. Bank can do so by considering ESG factors besides financial factors in its business (Brooks & Oikonomou, 2018). Although some scholars said investing in ESG creates cost, most scholars equally said that ESG investment creates long-term stability, value creation, and trust and confidence among the

public (Edmans, 2022). Further, scholars equally said that both capitalism and communism do not work. Hence, the objectives of an organization are long-term value-creating, focusing on ESG factors for long-term value creation and stability (Aich et al., 2021).

Financial institutions can do so by improving their operational practices and changing policies focusing on sustainability. They can create green funds, deposits, and investments focusing on environmental, social and governance issues (H. Zhang et al., 2022). Besides, the bank can use less paper and focus on internet banking, mobile banking, and Automatic teller machine (ATM) to generate fewer carbon emissions and increase efficiency (H. Zhang et al., 2022). Further, the bank can promote sustainable banking activities by spending less on transportation and using environment-friendly infrastructure (Brühl, 2021). Additionally, banks can suggest their customer towards investment in sustainable businesses. Using microfinance activities in the rural setting and promoting small businesses in the rural setting is another way to promote sustainability. Besides, focusing on corporate social responsibility, empowerment activities, proper employee training, following the prudential rules and regulations, and proper disclosure of financial and non-financial information are other ways towards sustainable banking activities (Jeucken, 2010).

This paper will help to identify and map the existing literature on sustainable financing initiatives and banking performance. This paper will help regulators, managers, governments, and academicians to identify recent trends. The recent trends will be a source for the corrective mechanism in their activities if there is some discrepancy. Besides, this paper will try to identify the key theme and their relationship with bank performance.

Although there is enough literature towards sustainable finance, sustainable finance and its impact on bank performance has been a new issue in bibliometric analysis. Some researchers did a systematic literature review on sustainable banking (Galletta et al., 2022); however, they used only one data source, either Scopus (Mohanty et al., 2023) or Web of Science (Secinaro et al., 2021). This paper uses the papers published on Scopus and Web of Science databases. The objectives of this study will be who are the prominent authors in sustainable financing and bank performance? Which are the prominent journal in this area? Which is the most cited paper in the area of sustainable banking? Which are the most used keywords? What are the intellectual connections among

the researchers? Furthermore, what is the intellectual structure of sustainable banking topics?

The rest of the paper will be organized as research methods, data analysis and conclusions.

## RESEARCH METHODS

This study uses bibliometric data from Scopus and Web of Science databases. The bibliometric analysis is quite popular as it gives the statistical analysis of bibliometric data in a particular field (Donthu et al., 2021).

Since the study collected bibliometric data from Scopus and the Web of Science database, it covers most scientific papers on sustainable financing and bank performance (Secinaro et al., 2021). After defining the database, the study identified the main keywords for searching the papers. The keywords used were green finance, sustainable finance, sustainable financing, sustainability, performance, bank, and banking. After that, we used the search strategy “green finance” OR “sustainable finance” OR “Sustainable financing” OR “ sustainability” AND “ performance” AND “ban\*” both in Scopus and Web of Science database on March 12, 2023. We used this strategy based on the strategy used by other researchers in bibliometric analysis (Aich et al., 2021; Bae et al., 2018; Koo, 2021; Merigó & Yang, 2017; Secinaro et al., 2021; J. Z. Zhang et al., 2021).

Since all the materials from the databases were not suited to our study, we selected the papers focusing on environmental science, social science, business management and accounting, economics, econometrics, and finance. Further, we filtered out the unpublished paper and books, and articles and review papers written in English were selected to make the study more valid (Galletta et al., 2022; Mohanty et al., 2023). Finally, we got 765 papers from Scopus and 696 from the Web of Science. Combining both databases, we have 1461 papers. After removing the duplicated papers, we have 1285 papers for analysis. For analysis purposes, we used VOS viewer and Biblioshiny software.

The study divided the analysis into two parts. The first part analyzed basic information about the efficiency and impact of publication using specific bibliometric pointers such as total citation, average citation, and the number of publications according to sources, authors, countries, and documents. In the second part, the interconnection and linkage of authors, documents, and sources were visualized and analyzed to identify how the trend of research is going on (Mohanty et al., 2023). After analyzing the network, and intellectual network, a key

theme is generated and explained based on empirical literature.

## DATA ANALYSIS

### Descriptive Bibliometric Analysis

Table 1 presents the descriptive result of the data used for this study. Relevant information on data, document types, document contents, authors, and author collaborations are presented in Table 1. 1285 documents published between 1989 and March 12, 2023, from the Scopus and Web of Science databases, were used for the study. Documents were published in 528 sources, mainly in scientific journals. The number of keywords used by authors was 1921. The average citation per document is 16.17; single document authors are 148; co-author per document is 3.22. Moreover, the annual growth rate is 12.91%. Further, the international co-authorship percentage is 20.78%.

**Table 1: Main Information of bibliometric data**

Description	Results
<b>MAIN INFORMATION ABOUT THE DATA</b>	
Timespan	1989:2023
Sources (Journals, Books, etc.)	528
Documents	1285
Annual Growth Rate %	12.91
Document Average Age	4.33
Average citations per doc	16.17
References	37567
<b>DOCUMENT CONTENTS</b>	
Keywords Plus (ID)	3909
Author’s Keywords (DE)	3921
<b>AUTHORS</b>	
Authors	3316
Authors of single-authored docs	148
<b>AUTHORS COLLABORATION</b>	
Single-authored docs	157
Co-Authors per Doc	3.22
International co-authorships %	20.78
<b>DOCUMENT TYPES</b>	
Article	1206
article; early access	47
article; proceedings paper	2
review	27
review; early access	3

**Performance Analysis**

Performance analysis deals with the descriptive representation of the research activities of constituents (authors, journals, documents and countries). Through this analysis, we explore the productivity, impact and influence by seeing the number of publications, citations of the documents, and countries-wise publications (Naeem et al., 2022). In this paper, we measure the performance of the top ten authors, top ten journals and top ten documents and countries mainly producing in our topic. The results are provided below.

**Most relevant authors, according to publication**

The authors’ performance is measured by the number of papers published (Merigó & Yang, 2017). The top 10 authors, according to the paper publication, are shown in Table 2.

**Table 2: Top 10 authors according to publication**

Authors	Articles	Articles Fractionalized
RAHMAN M	11	2.66
WEBER O	11	4.83
ALIS	10	1.83
HOSSAIN M	10	2.87
ISLAM M	10	3.25
LIU Y	10	1.79
PAUL S	10	2.18
ZHANG Y	9	3.37
CHOWDHURY M	8	2.06
LI Z	8	1.43

Table 2 shows the famous authors on the topic of sustainable finance and the performance of financial institutions. The result shows the top ten reputed authors regarding article publication and fractionalized articles. Rahman M remains first in this area with a total of 11 publications and articles fractionalized percentage of 2.66. Similarly, other top 10 authors in this area are presented in Table 2. Results show that the area is new, as top authors have limited productions. However, it is in growing trend (Secinaro et al., 2021)

**Relavent source:** Relavent source measures the top ten journals on sustainable finance and bank performance. This information helps to target the journal to read and future publication. The results of the most relevant journal are shown in Table 3.

**Table 3 Most Relevant Source**

Sources	Number of Paper
Sustainability	186
Sustainability (Switzerland)	59
Journal of cleaner production	49
Environmental science and pollution research	37
Business Strategy and the Environment	34
Corporate social responsibility and environmental management	27
Journal of business ethics	13
Environment development and sustainability	12
Finance research letters	11
Frontiers in psychology	9

Table 3 shows the most relevant journals on sustainable finance and bank performance. The table shows the top 10 journals and their number of publications. The table shows that sustainability takes the first position, with 186 publications. Sustainability (Switzerland) is in rank second with 59 publications. Further, Frontiers in Psychology ranked as the 10<sup>th</sup> most popular journal with nine publications.

Similarly, other popular journals with their number of publications are shown in Table 3. The results depict that leading journals are highly specialized in environmental sustainability (Sustainability, Sustainability (Switzerland), Journal of Cleaner Production, Environmental Science and Pollution Research, Business Strategy and the Environment, Environment Development and Sustainability) and corporate governance and business management (Corporate social responsibility and environmental management, Journal of Business Ethics, Finance Research Letters and Frontiers in Psychology) (Galletta et al., 2022). The same type of finding was found in the study of Mohanty et al. ( 2023)

**RELEVANT DOCUMENTS**

The top cited documents, their total citation and average citation, are given in Table 4. It helps to identify the most popular documents so that it will be helpful for future research.

**Table 4: Most Relevant Documents**

Paper	Total Citations	TC per Year	Normalized TC
Hug H, 2014, Appl Energy	304	30.4	8.24
Hartarska V, 2007, Appl Econ	254	14.94	3.5
Huq F, 2014, Int J Oper Prod Manage	200	20	5.42
Wang H, 2018, ACS Sustainable Chem Eng	200	33.33	6.68
Cucari N, 2018, Corp Soc Responsib Environ Manag	199	33.17	6.65
Moktadir M, 2018, J Clean Prod	190	31.67	6.35
Blackman A, 2011, Conserv Biol	184	14.15	6.54
Scholtens B, 2006, J Bus Ethics	178	9.89	2.26
Flammer C, 2021, J Financ Econ	178	59.33	13.27
Casey R, 2015, Audit-J Pract Theory	177	19.67	5.03

Table 4 shows that the paper of Hug et al. (2014) is the most prominent document, with 304 total citations and total

citations per year of 30.4. Hug et al. (2014) explain that solar energy innovation helps reduce energy production costs and increase cleanness and sustainability. Sustainable financing is essential for environmental, social and governance performance, improving the firm's financial performance. Regulation from the government is necessary (Taghizadeh-history & Yoshino, 2020), and the role of other financial institutions, except for banks such as insurance companies and pension funds, should also increase. Hartarska & Nadolnyak (2007) explain that decentralizing microfinance activities increases profit and performance. So, it is suggested to make a policy to reach more villages rather than to control microfinance activities.

Further, Cucari et al. (2018) explain that corporate social responsibility and the number of independent directors positively affect the sustainability disclosure of the firm. Flammer (2021) explains that green bond issuance increases the company's credibility towards sustainable performance. Scholtens (2006) we assume that it may affect corporate social responsibility (CSR explores sustainable development and corporate social policy relies on the firm's financing policy. Based on the authors' evidence, sustainability is required to increase financial institutions' performance and protect the world for future generations.

## COUNTRY WISE PRODUCTION

Country-wise production shows which country has more products in sustainable finance and the performance of banks (Ellegaard & Wallin, 2015). The dark blue colour in the figure shows enormous production, and the grey colour shows no production in the area by country. The production strength of the countries is shown in the figure below.



**Figure 1: Country-wise Production**

Figure one shows that research on sustainable finance and financial institution performance mostly happens in China (461 publications, followed by Italy (139 publications). Other countries producing are the UK (118 publications), USA (121 publications), Spain (115), Australia (100 publications), Pakistan (91 publications), India (81 publications), Bangladesh (78 publications), and Malaysia (79 publications).

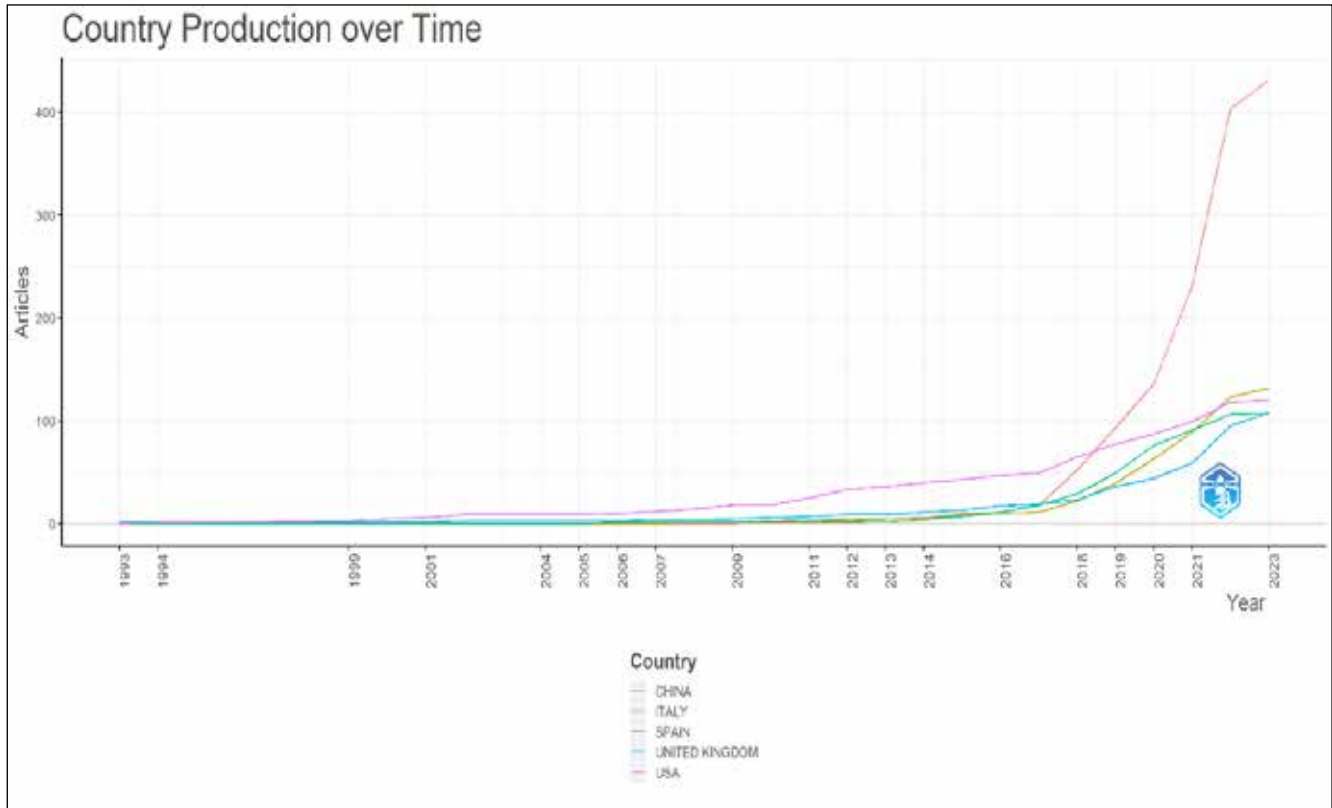


Figure 2: Country wise Production growth

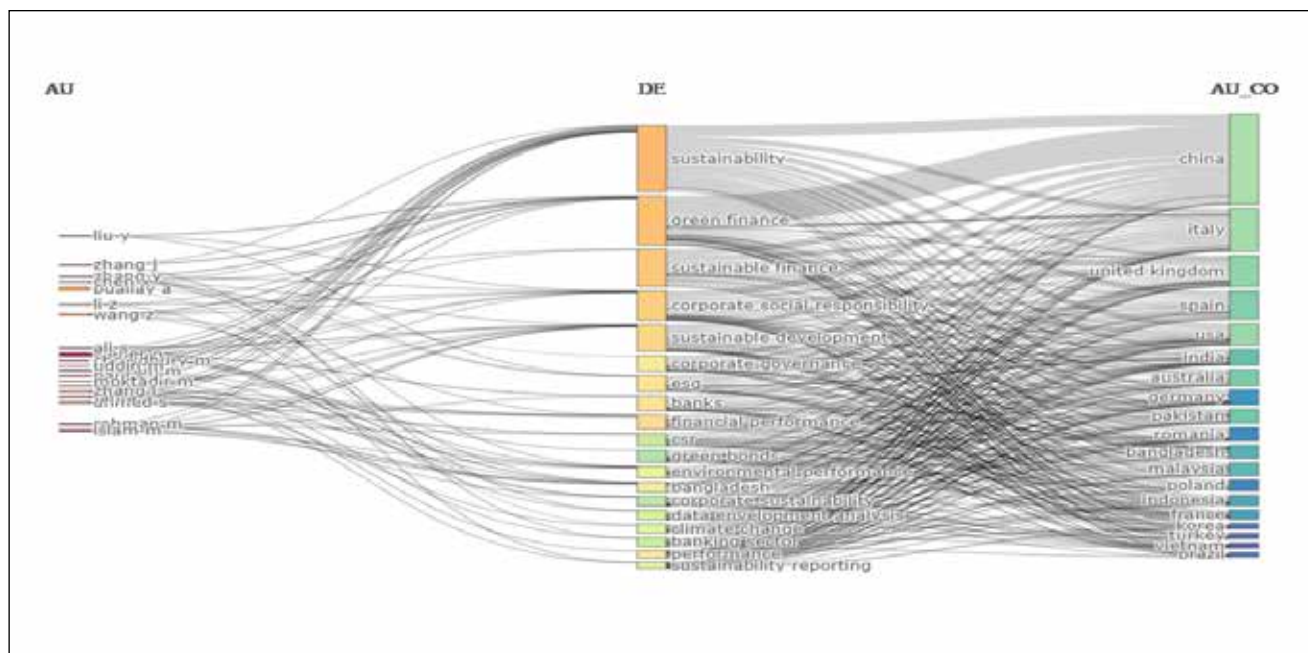
As shown in figure 1, developed countries have worked more in sustainability, followed by South Asian countries. Further, there is less work done in African countries.

Further, the Figure 2 shows that the publication trend was negligible before 2015. The USA was the leading country according to the number of publications before 2015. However, the publication on sustainability started to increase after 2015. The reason may be the Paris Agreement and the United nation’s sustainable development goal set in 2015. After 2016, China was the leading country in production (with 4035 citations, 17.7 average article citations). Other four countries named Italy(with 1198 citations, 17.9 average article citations), Spain (with 697 citations, 12.4 average article citations), the United Kingdom (with 1352 citations, 22.20 average article citations), and the USA (with 1747 citations, 17.4 average

article citations) were also competing on publishing on sustainability. The increasing number of publications in China may be the green credit policy implemented in 2007, focusing on environment-friendly credit and investment (Oyegunle & Weber, 2015). Similarly, there are similar rules and regulations in European countries, and the European Commission and European Banking Supervisory Authority show the paths for investment in sustainable growth (Galletta et al., 2022). The results confirm that the least-developed countries are still far from working on sustainability.

### Three Field Plot

Three field plot based on the Shankey diagram with top Authors, keywords and countries is shown in Figure 3. The rectangle’s height shows the number of occurrences of that term (Koo, 2021).



**Figure 3: Three fields showing authors(left), Keywords (middle) and Authors (Right)**

Three field plots presented the relationship between the prominent 20 contributing authors, the top 20 keywords used in the study and the top 20 countries working in sustainable finance and bank performance. The authors' names are shown on the left-hand side, keywords are in the middle, and the names of the countries are on the right. The results show that the frequently used keywords are green finance, sustainability, sustainable finance, and climate change. Additionally, mainly the research on this topic is happening in China, the United Kingdom, Germany, USA. Many authors are working on Green finance, primarily famous in China. However, researches are in declining trend on other countries. The keyword sustainable development goals are now moving upward in countries such as the USA, Canada, France, Germany, the United Kingdom and China. In the figure, the size of the rectangles shows the popularity of a given country, keywords and authors. It can be further inferred from the figure that developed and developing countries are mainly active in sustainable banking and financing research. They may have formulated policies and established institutions and have sufficient budgets and technology to achieve sustainability. Still, less developed countries and authors from these countries are not producing and contributing to sustainability. The reason may be a lack of focus of the government, less innovative

capacity, and poor infrastructure and budget (Regmi, 2022). Our study's results are similar to those of Jeucken (2010) and Mohanty et al. (2023).

#### Science Mapping:

This section shows the collaboration network among authors, countries, institutions, co-word analysis, trending topics, world cloud and thematic map. This section deals with the intellectual network among the research constituents (Donthu et al., 2021).

#### COLLABORATION AMONG AUTHORS

Figure 4 presents the co-authorship network of authors having at least three documents. We found a total of 23 authors having at least three documents. Among them, only five authors have a collaboration network. Among these four authors, there is one cluster. Authors Ali Syed Mithun has eight documents with 496 citations; Paul Sanjay Kumar has five documents with 333 citations; Aracil Elisa has five documents with 177 citations; and Weber Olaf has eight documents with 417 citations. The authors' collaboration shows that sustainable banking finance is an emerging area. The less collaboration among the authors means the area is fertile for new researchers (Naeem et al., 2022).

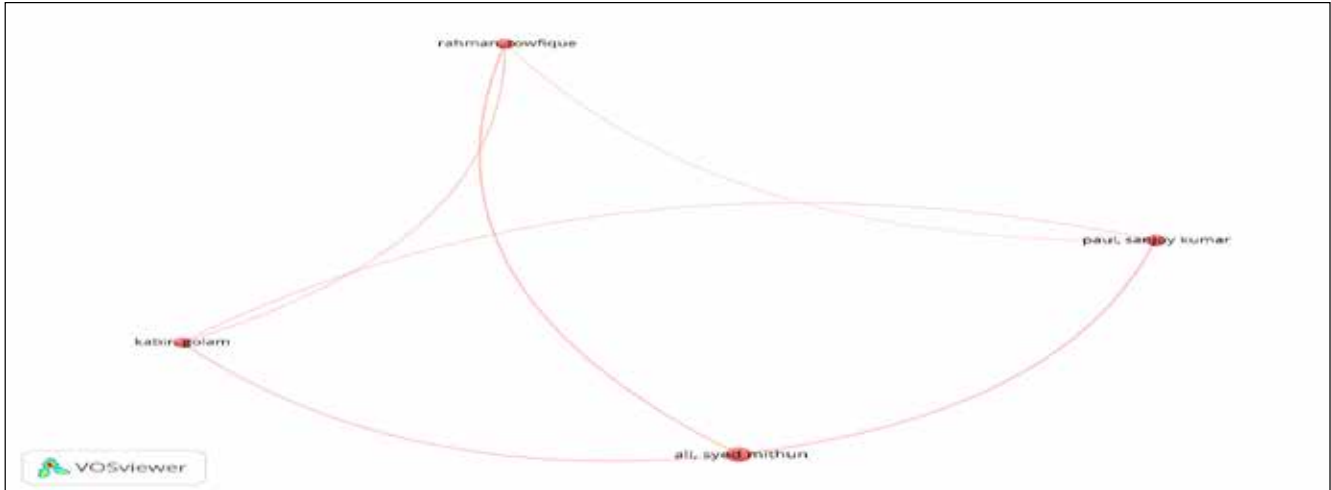


Figure 4: Collaboration Network of Authors

### COLLABORATION AMONG COUNTRIES

Further, the collaboration between countries with at least ten documents with at least 120 citations is found between 25 countries out of 89 countries that are collaborating. The result shows that there are four clusters of countries. Among the collaboration, China is collaborating with most countries. Mostly China is collaborating with South Korea, Bangladesh, Australia and Canada. These countries have one cluster.

Similarly, England collaborates with countries such as Germany, South Africa, Sweden, New Zealand, Italy, Spain, Sweden, and the USA. These countries have a second cluster. Finally, there is a third cluster in which countries India, Ireland, Malaysia, Saudi Arabia, Pakistan, Poland, Turkey, and the United Arab Emirates lie. In the fourth cluster countries, Vietnam and Indonesia lie. Figure 5 shows that research collaboration is moving from developed to developing countries. Still, there is less research in most African and Asian countries. Results further proved that most developed and emerging economies collaborate more (Mohanty et al., 2023; Secinaro et al., 2021).

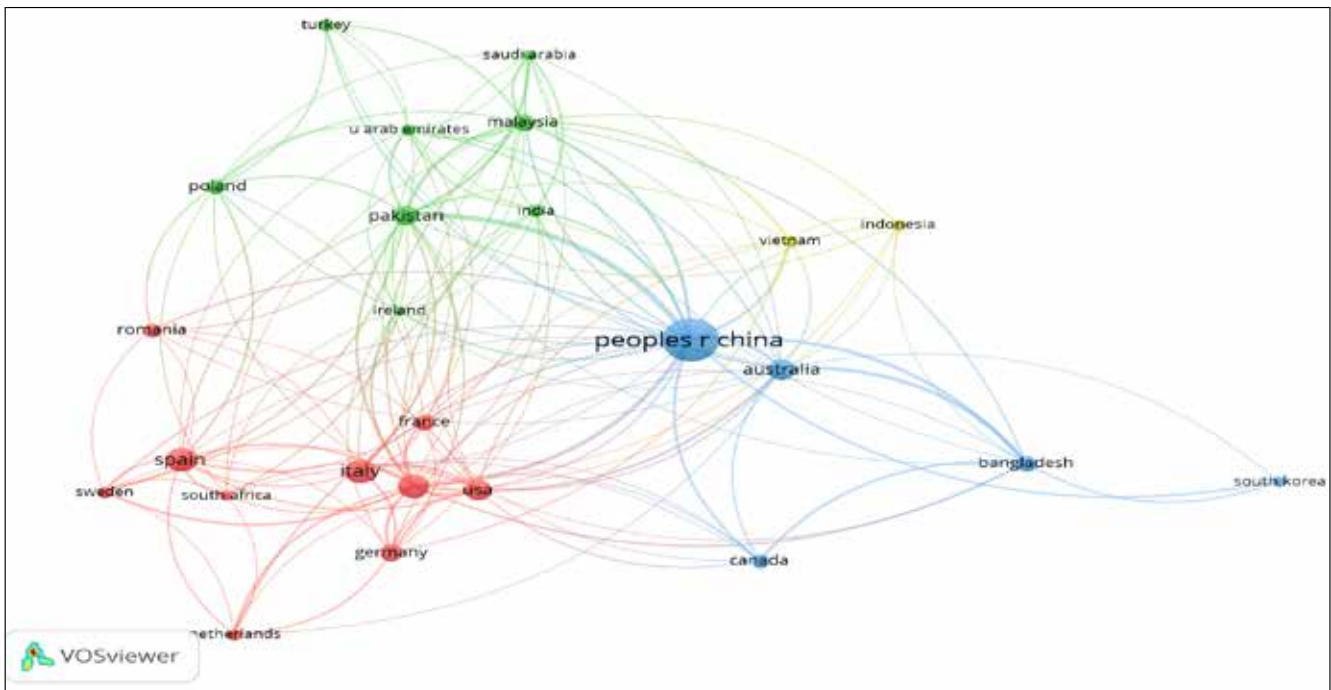


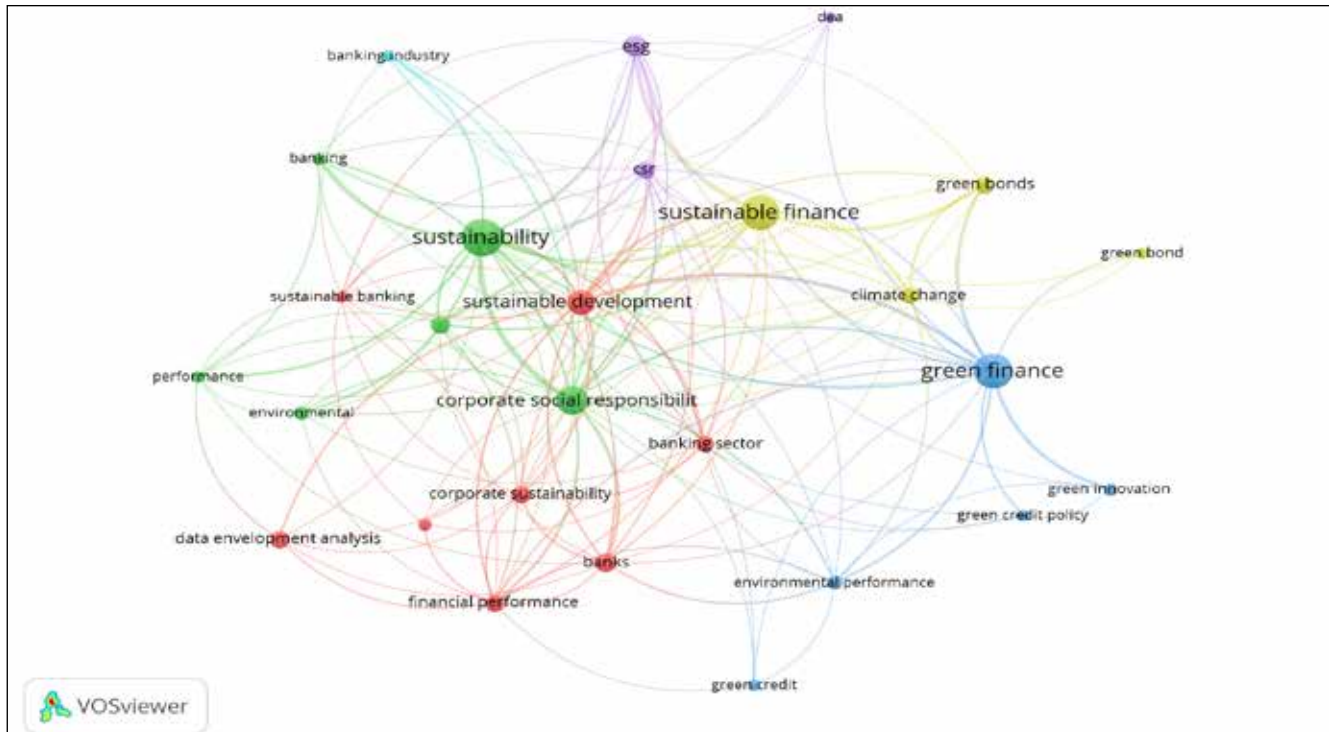
Figure 5: Collaboration Network among the Countries



### Co-Occurance of KeyWords

Cooccurance of keywords shows which two keywords appear together. The keywords on a cluster show a similar theme (Ellegaard & Wallin, 2015).

Figure 6 shows the co-occurrence of keywords. For this analysis, we selected criteria of at least ten times the occurrence of keywords. Thirty keywords meet these criteria. These keywords fall into five clusters. In cluster one, words such as banks, corporate social responsibility, data envelopment analysis financial performance, performance, sustainability reporting, sustainable banking and sustainable development lie. This cluster is named sustainability and performance. Similarly, in cluster second, words such as banking sector, environmental performance, green credit, green credit policy, green finance and green innovation lie. This cluster is named green finance and environmental performance.

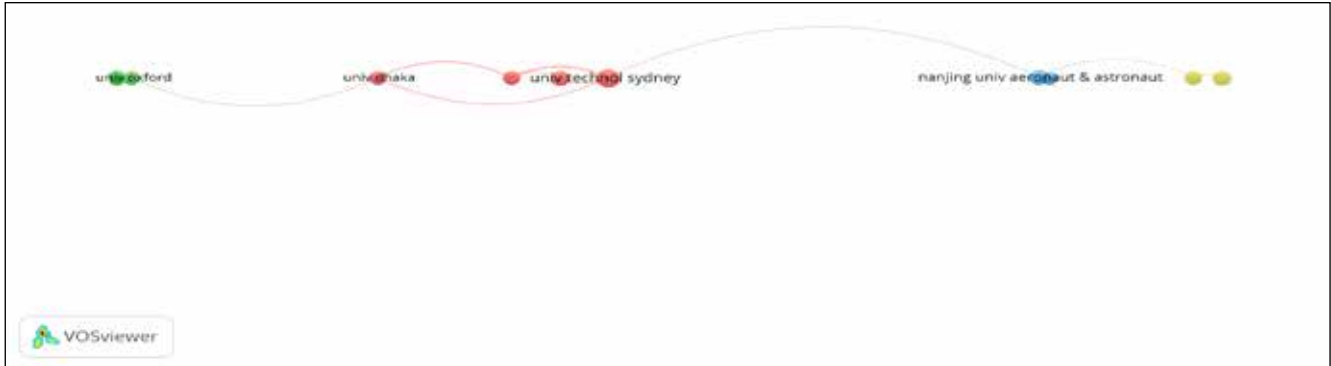


**Figure 6: Co-occurrence of Keywords**

In cluster three, words such as banking, banking industry, CSR and sustainability lie. This cluster can be named CSR and sustainability in the banking industry. Further, in cluster four, words such as climate change, ESG, green bonds, and sustainable finance lie. This cluster can be named ESG and environmental sustainability. Finally, the word corporate governance and environment fall in the fifth cluster. This cluster can be named CSR and environmental performance. From the network analysis, the most used words for the research are green finance, climate change, and sustainable finance. The results show that the items of each cluster are further connected with the items in other clusters. Overall, items of each cluster are further linked with other clusters, which evidences that the banking industry's performance depends upon sustainable financing, CSR activities, green innovation, and ESG practices (Xu et al., 2021). Further, sustainable financing in the banking sector increases the performance of banking sectors and helps achieve sustainable development (Sachs et al., 2019). Ultimately, sustainable financing activities are the drivers for sustainability.

### Institution Wise Collaboration

This analysis shows which are the most collaborating institute in the field. The collaboration network is shown in Figure 7.



**Figure 7: Institution-wise collaboration**

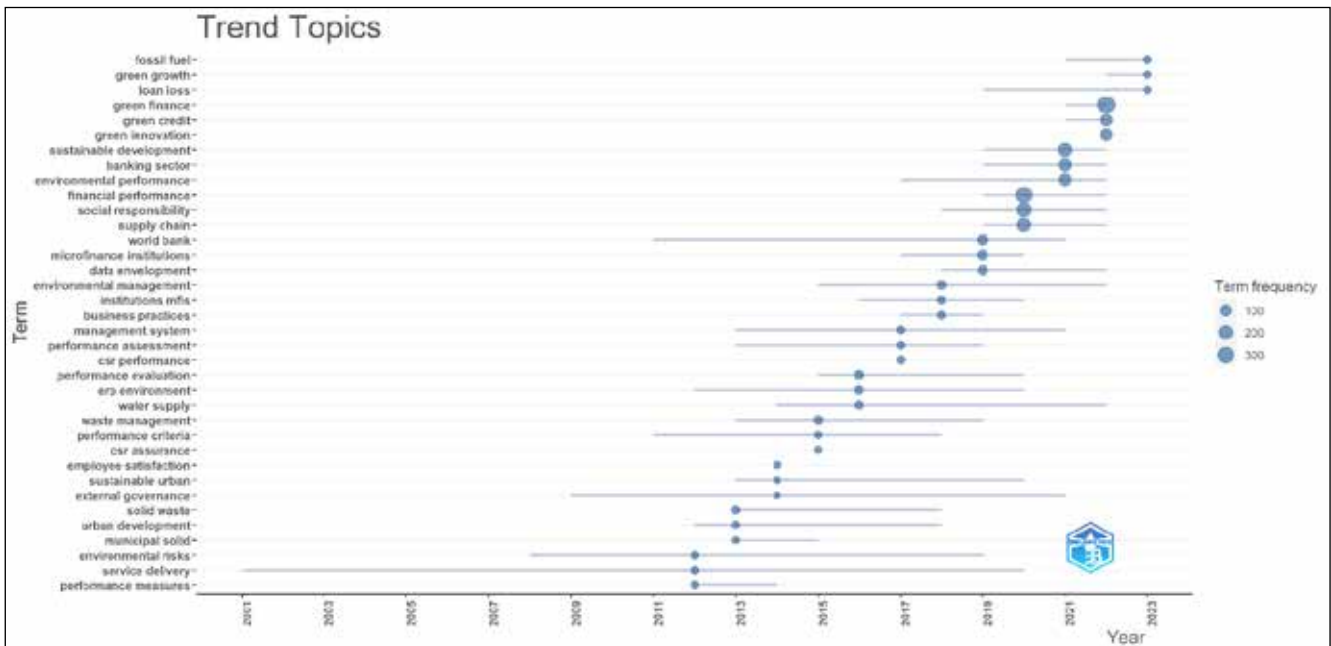
We used collaboration with countries. Out of 598 organizations contributing to sustainable finance, only 29 institutions produce at least five documents. Among them, 11 universities have strong collaboration. These institutions are grouped into four clusters. Bangladesh University of Engineering and Technology, RMIT University, the University of Dhaka, University of Technology Sydney fall into cluster one.

Similarly, the Central University of Finance and Economics, the University of Coll Dublin, and the University of Oxford fall into the second cluster. Further, Jiangsu University and Nanjing University of Aeronautics and Astronautics fall in the third cluster. Moreover, the Central University of Economics and Business and the University of Electrical Science and Technology falls in the fourth cluster.

Overall results show that, except for some universities in developing countries, most are from developed countries. The connection among universities is significantly less, showing the research and collaboration potential among the academic institutions (Secinaro et al., 2021).

**Trending topic**

This analysis helps to identify the trend of research across the period. By doing this analysis, the researcher can identify the emerging topic in his/her research area. The results of the trending topic of sustainable finance and the performance of banks are shown in Figure 8.



**Figure 8: Trending Topic**

Figure 8 shows the trending topic. The figure shows that there was less research before 2011. From 2011 to 2015, risk management and governance were the focus of the research. Reasons may be the cause of the financial crisis in 2008. After the 2008 crisis, there was a lack of trust among the stakeholders. The regulatory authority aims to mitigate risk and improve corporate governance activities among financial institutions (Esteban-Sanchez et al., 2017). From 2015 to 2020, environmental performance, financial performance and corporate responsibility are popular topics because of the impact of the Paris Agreement and the sustainable development goal agenda. Both the Paris Agreement and sustainable development goals focus on reducing carbon emissions taking care of environmental, social and governance aspects and improving financial performance. The chart shows that green finance and sustainability, sustainable development, innovation, and green development are popular topics from 2021. The big circle shows the popularity of the topic. The result implies that sustainability and sustainable finance are emerging topics. Results imply world is diverting from non-green to green aggressively (Naeem et al., 2022).

### Word Cloud Analysis

World cloud is used to identify the famous theme on which research is carried out (J. Z. Zhang et al., 2021). It shows how authors have used words in their keywords, title and abstract. In this analysis, we used the authors' keywords for the analysis. Figure 9 shows the results of Word cloud analysis.



**Figure 9: World Cloud Map**

We performed the word cloud analysis using Biblioshiny software to identify the most emerging words in sustainable finance and bank performance using authors' keywords with 100 main keywords. The result shows that sustainability, corporate social responsibility, sustainable finance, sustainable development, and green finance are the most popular keywords. Further, ESG, environmental, social and governance performance, and renewable energy are other famous words for research. It can be concluded that financial institutions should focus on sustainable business practices. Financial institutions should grant loans to green projects and should concern with corporate social responsibility, ESG disclosure, and green investment to make their performance more effective and efficient (Ng, 2021).

### THEMATIC MAP

A thematic map is used to identify the theme. As shown in Figure 10, the theme can be categorized into four quadrants in terms of the relevance of the theme and development degree. The theme is categorized into niche, emerging, basic, and motor themes. Theme lies on the IV quadrant are more relevant themes, and they are the primary theme for the study. Similarly, the circle size shows the number of works done in that area. The diagram clearly shows that the key theme is sustainable analysis, sustainable development, and environmental impact.

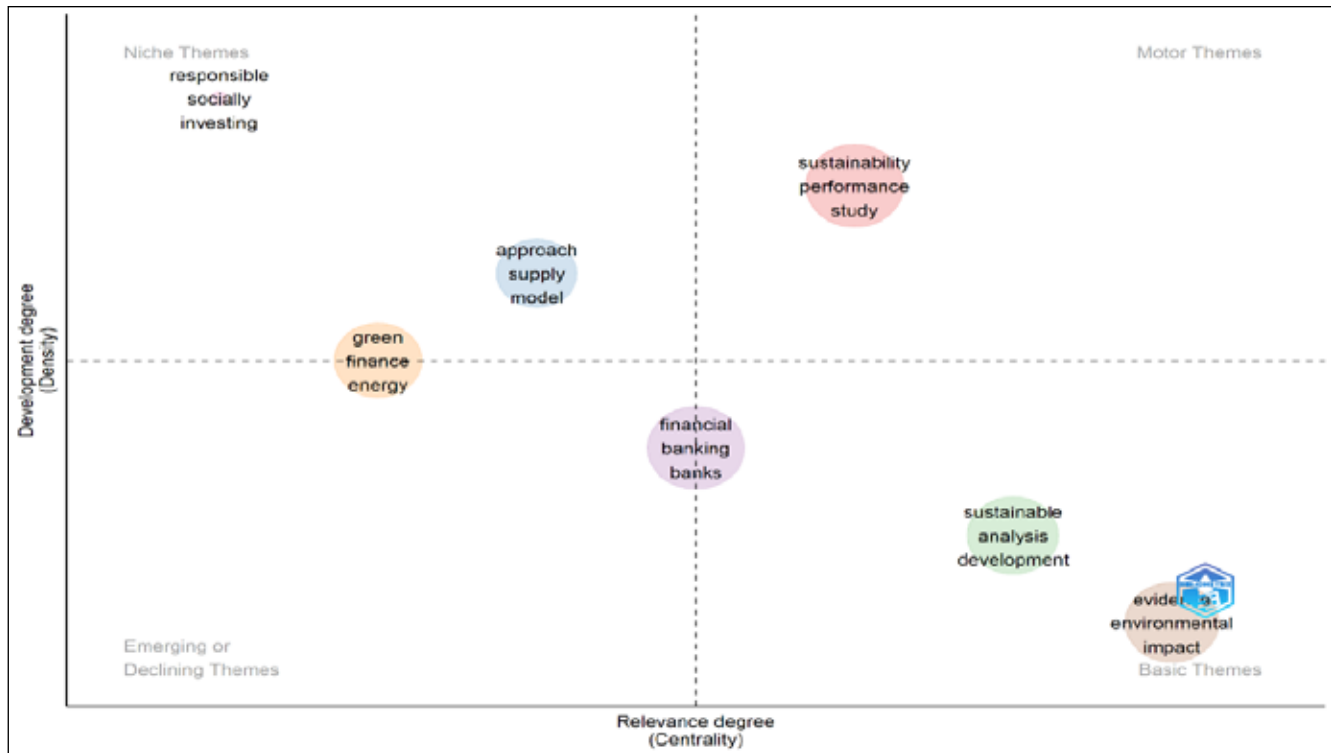


Figure 10: Thematic Map

### Basic theme generated

We have explored three basic themes based on the above network diagram, thematic map and word cloud analysis. They are explained below in brief.

### Corporate social responsibility and performance of bank

There is a debate among researchers about corporate social responsibility and firm performance. Some researchers argue that the objective of an organization is the wealth maximization of shareholders rather than investing in society, which creates costs for the firm. However, there are arguments from scholars that the organization is operated in society, so the objectives should be the maximization of the stakeholder’s welfare. Recent research shows that corporate social responsibility is the investment that will improve the firm’s overall value. Ramzan et al.(2021) argued that CSR creates a positive image for the customer, which attracts them to financial institutions. Belasri et al. (2020) argue that CSR activities help to improve efficiency. Siueia et al. (2019) argue that CSR gives long-term sustainability to financial institutions. This result supports the signalling theory (Bae et al., 2018), as current practices signal future returns.

### Role of green investment on the performance of the bank.

The performance of financial institutions is not only based on financial soundness but also depends on how they follow ESG factors in their operation. Study shows that green investment positively impacts financial institutions’ performance in the long run. Green investment creates a positive image in society and motivates stakeholders to invest in those institutions as investors’ trust increases (Lins et al., 2017). Besides, green investment provides a long-term rate of return in future and reduces risk (Chen et al., 2022). Studies showed that organizations practising green investment strategies are less impacted in crises because of society’s trust. These results support to good governance, sustainability and stakeholders welfare.

### Linkage of banking ESG performance on sustainable development

The ESG performance of financial institutions and sustainable development have a direct linkage. Sustainability depends upon how well financial institutions channel the funds in an economy. Further, if the financial sector fails, it directly impacts other sectors. If financial institutions channel funds focusing

on ESG factors, they will divert funds to sustainable projects, helping to achieve sustainable development. Chiamonte et al. (2022) explore that sustainable investment is the injection into financial institutions during a crisis period, which protects not only banks but also the economy. Kumar et al. (2020) explore that the sustainability practices by financial institutions are essential for sustainable development. Explore good ESG performance helps to reduce waste, minimize environmental hazards, and improve efficiency (Alam et al., 2022), ultimately improving the competitiveness of financial institutions according to stakeholders (de Gooyert et al., 2017) and resource-based theory (H. Zhang et al., 2022). Finally, a solid and sound financial system is essential for sustainable development.

## CONCLUSION

The basic thrust of the paper is to provide detailed bibliometric analysis regarding the different issues related to sustainable financing practices and bank performance. We analyzed the author, document, country, and institution-wise of scientific production found on the Web of Science and Scopus database from 1989 to 2023 March. The results show that the sustainability concept has increased tremendously since 2015, although the publication started in 1989. Besides, the most prominent authors in this field started their publications after 2010. The concepts studied evolve from waste management and environmental regulation to corporate social responsibility, sustainable development, environmental, social and governance performance, green innovation, green credit, and green investment. Furthermore, initially, the concept was popular in developed countries; however, it is now widespread in developing and emerging economies.

The study has some implications. First, financial institutions can change their objectives of shareholders' value maximization to stakeholders' long-term wealth maximization, considering ESG factors. Second, financial institutions should divert their investments

and lend to sustainable sectors such as green energy and environment-friendly infrastructure by creating green securities such as green bonds, green funds, and green stocks to be sustainable for the long term.

Third, observing the thematic map, we infer that sustainable development is possible through sound environmental performance and sustainable performance of financial institutions. The concerned authorities can consider this fact while formulating and implementing policies.

Fourth, although the agenda of sustainable financing for reducing carbon emissions and minimizing climate change impact is the agenda of the globe, only most developed and some developing countries are working on it. Fifth, universities and industries can collaborate on sustainability as such collaborations are very few, and the research in this area is growing quickly.

Sixth, the regulators and government can use this information for their policymaking by considering world trends regarding sustainability and sustainable finance. Besides, executives and financial manager of an organization also can focus their activities towards environmental, social and governance performance, green investment, and green innovation as the organization's objective is changing from wealth maximization of shareholders to long-term sustainable wealth creation by taking the sustainability issues into account.

Seventh, the donor agencies can monitor how the funds donated for sustainable development in least-developed countries are utilized.

This study has some limitations too. It is based on the bibliometric data collected from Scopus and Web of Science. Future research can be conducted using data from more databases covering banks and other financial institutions. Further, a systematic literature review, meta-analysis and empirical analysis of banks and other financial institutions are suggested for future research.

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