Green banking disclosure: A bibliometric analysis
Tran Nguyen Sa*, Ha Thi Thieu Dao
1Ho Chi Minh University of Banking, Ho Chi Minh City, Vietnam
*Corresponding author: satn@hub.edu.vn

ARTICLE INFO

DOI: 10.46223/HCMCOUJS.econ.en.15.3.3158.2025

ABSTRACT

This study uses a bibliometric approach to analyze the influence and productivity of research on green banking disclosure from 1993 to 2023. We utilize the Web of Science Core Collection database to gather the 112 articles, and Biblioshiny software to analyze and visualize bibliometric data to evaluate literature. Through utilizing co-citation, co-authorship, keyword co-occurrence and the science mapping, the results of study show that the amount of papers published in the field of green banking disclosure has increased dramatically over the past seven years, as have the contributions of many authors, institutions from various countries, and collaboration between researchers from different institutions. The analysis results of the others criteria show that institutional theory, asymmetry information theory, and content analysis were used to study green banking disclosure, which is related to corporate social responsibility and sustainability. This thorough synthesis and analysis of green banking disclosure will add to the body of knowledge in this field by enhancing understanding of the subject and pointing out areas of research deficiency that require attention.

1. Introduction

Green disclosure and environmentally responsible business practices have increased globally over the past decade (Wu & Shen, 2013). On December 12, 2015, at the 21st UN Conference of the Parties (COP) in Paris, 195 countries reached a historic agreement to reduce global warming (United Nations, 2023). There had been 26 COPs as of August 2023. During COP conferences, countries work together to mitigate climate change and share responsibility for implementation. These early concepts pertain primarily to non-financial sectors. Planners have realized in recent decades that: (1) the banking and finance sector is increasingly influenced and affected by environmental issues (McKenzie & Wolfe, 2004); and (2) the banking sector is one of the primary sources of financing for numerous industries and businesses, so banks set environmentally relevant approval criteria for industries. The agreement enters into force in 2020 and includes phase-specific objectives.

This historic agreement has put pressure on all industries, including financial services, particularly banks, to go green, as banks indirectly finance numerous industries and businesses, making them environmentally responsible. Due to this pressure, Bangladesh, Brazil, China, India, Indonesia, and Vietnam have shifted from voluntary to regulated banking. All of these nations require environmental disclosure and activity regulations (Bose et al., 2018). These standards encourage banks to actively participate in and disclose publicly their environmentally friendly projects, also known as "green banking disclosure" (Khan et al., 2021). As a result of government and societal interest, scholars are also studying green banking disclosure, particularly, a study by Clarkson et al. (2008) that mentioned the relation between environmental performance and environmental disclosure, Scholtens (2009) and Wu & Shen (2013) both refer to the side of corporate social responsibility in the banking industry, while Weber (2012) studied environmental
credit risk management in banks and financial service institutions; another study by Bose et al. (2018) focused on the influence of many factors on green banking disclosure under the lens of institutional and corporate governance perspectives and Khan et al. (2021) considered the moderating role of non-performing loans on the relationship between green banking disclosure and the firm value of the commercial banks in Bangladesh; Perban (2022) and Wijayanti & Dondoan (2022) considered the relationship between green banking disclosure and firm value in the context of Indonesia’s commercial banks. With the diversity of green banking disclosure research directions today, a study that synthesizes trends, gaps, and related issues may be needed to inform future research. Therefore, bibliometric analysis is required to evaluate green banking disclosure from a scientific and systematic standpoint in order to determine where the literature is evolving. From there, it can assist experts in understanding the disclosure progress of green banking, businesses in identifying research directions for investment, and the government in drafting relevant legislation and regulations.

Bibliographic analysis provides access to study topic particulars and maps the characteristics and evolutionary direction of scientific data in a field (Amirbagheri et al., 2018). Scholars are employing bibliometric methods to investigate disciplinary hotspots and development trends in a variety of disciplines. Donthu et al. (2022) evaluated the Journal of Business Research’s (JBR) 50-year impact and contributions using bibliometrics. Dwekat et al. (2020) examined board features, CSR, and CSRD using bibliometric analysis conducted with VOSviewer. Amirbagheri et al. (2018) utilized bibliometrics, the Web of Science Core Collection database, and VOSviewer to assess the influence and productivity of research on the green supply chain from 1995 to 2017 by identifying trends among authors, countries, and institutions. Bibliometrically, Lin et al. (2016) examined Information Systems and MIS articles in electronic commerce. Arar & Yurdakul (2023) analyzed the evolution of the conceptual, social, and intellectual structure of business management research. The WoS database, VosViewer, and the Bibliometric and Biblioshiny programs supplied the analysis data. Saini et al. (2022) mapped the intellectual structure of employer and internal branding research using VOSviewer and Biblioshiny software to identify influential authors and journals, current and evolving themes, and potential study areas.

We are unaware of a comprehensive bibliometric analysis study on green banking disclosure. To provide a bibliometric overview of green banking disclosure, this study employs a modern bibliometric approach involving the use of multiple bibliometric indicators and the Biblioshiny software to report trends among authors, countries, and institutions from 1993 to 2023 (the first study in the field was published in 1993). This paper employs Biblioshiny to graph data (Aria & Cuccurullo, 2017). This study generates a graphic map using co-citation, co-authorship, and keyword co-occurrence (Merigó et al., 2018).

This study analyzes field performance utilizing bibliometric methodologies, such as publishing metrics (annual production; the most relevant institutions, authors, countries, and journals; trend topics and other indicators), citation metrics, and hybrid metrics. Using citation, co-authorship, co-citation, and keyword co-occurrence analysis, the scientific mapping identifies the intellectual, conceptual, and social structures of green banking disclosure research. This article highlights the most important contributions to the topic and identifies evolutionary tendencies in this field of study to guide future research.

This study contains the following sections: Section 2 discusses the theoretical basis. Section 3 covers research method. Section 4 presents the results of performance analysis and science mapping. In Section 5, we analyze the study’s findings, limitations, and recommendations for future research.

2. Theoretical basis

2.1. Bibliometric method
This study organizes data using bibliometric indicators for easier reading. The literature defines bibliometric in many ways (Amirbagheri et al., 2018). The use of mathematical and statistical methods to analyze books and other media communication was first defined by Pritchard (1969). More broadly, White & McCain (1989) propose a more extensive definition, stating that bibliometrics is the systematic analysis of literature based on bibliographies. Bibliometrics define bibliometrics as the systematic analysis of literature using bibliographies. Broadus (1987), defined bibliometrics as the quantitative analysis of published, bibliographic, or equivalent units. According to Dwekat et al. (2020), bibliometric analysis uses quantitative data to find patterns in literature on a specific topic and time period. The main goal of bibliometric studies is to evaluate scientific publications and their references. Bibliometric methods allow quantitative and qualitative evaluation of scientific works (Lin et al., 2016).

Bibliometrics organizes publication elements and findings. Researchers are increasingly using bibliometrics. It is also promising due to the rise of information technologies (Donthu et al., 2021).

### 2.2. Analytical techniques

The flow of information can be measured by performing performance analysis on a publication or its specific features, such as citations, keywords, and author's name, or by creating a science mapping by identifying object, network, and co-occurrence connections. These indicators are used to show different outcomes for the same variable (Amirbagheri et al., 2018). Multiple analyses will be performed using a variety of methods to meet the study's goals. Performance analysis is acceptable in scientific production. More analyses increase the likelihood of understanding and analysing the relevant field more thoroughly (Dwekat et al., 2020). Every analysis has advantages and disadvantages. Hence, we employ both performance analysis and science mapping to identify the structures that represent the subject in terms of its conceptual, intellectual, and social aspects within bibliometric analysis. We employ a set of commonly used bibliometric analytical methods, as outlined by Donthu et al. (2022) and Mukherjee et al. (2022).

### Table 1

A set of commonly used bibliometric analytical methods

<table>
<thead>
<tr>
<th>Analytical methods</th>
<th>Objective of the analytical methods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Performance analysis</strong></td>
<td></td>
</tr>
<tr>
<td>Publication metrics</td>
<td>• To assess the productivity of various entities such as fields, journals, authors, institutions, countries, and knowledge clusters, by analyzing factors such as average and total publication count and active years of publication.</td>
</tr>
</tbody>
</table>
| Citation metrics | • To assess the influence of various factors (such as field, journal, author, institution, country, and knowledge cluster) on a global scale (measured by citations across different fields) or on a local scale (measured by citations within the same field).  
• To discover social status or secret preconceptions (e.g., inclination towards citing certain sources). |
| Hybrid metrics | • To assess the impact in relation to productivity, metrics such as $h$-index, $g$-index, and $m$-index can be used. |
| Co-authorship analysis | • To reveal the social mapping or social structure. |
| **2. Science mapping** |
Analytical methods | Objective of the analytical methods
---|---
Co-citation analysis | • To identify the intellectual structure by examining the relationships among cited publications, where clusters of cited publications indicate a shared theme.

Bibliographic coupling | • To identify connections between publications that cite each other, whether they are publications or current knowledge.  
• To perform triangulation using co-word analysis, which examines the co-occurrence of keywords to analyze the conceptual structure.

**Note.** Donthu et al. (2022)

3. Research method

3.1. Research Steps

Based on prior research conducted by Lin et al. (2016) and Arar & Yurdakul (2023), our research methodology is structured as follows the five steps process: (1) establishing the goals; (2) gathering data; (3) choosing the appropriate tools; (4) selecting the scientometric analysis method; and (5) explanation and discussing the findings.

**Figure 1**

Research Steps

Establishing the goals → Gathering data → Tool Selection → Analyses → Explanation & Discussing

**Note.** Arar & Yurdakul (2023)

Using bibliometrics, research can have three main goals (Aria & Cuccurullo, 2017; Dwekat et al., 2020): identifying the knowledge base (performance of the literature in the field) and its intellectual structure; examining the research front (or conceptual structure); and creating a scientific community's social network structure. Our research divides 3 general objectives into 4 sub-objectives by dividing the first into 2 tiny objectives for easier observation:

**First,** we analyze journals' performance and discover green banking disclosure's knowledge base using powerful, multipurpose tools. Performance can show the study field's diversity, multidisciplinarity, and current and future directions (Amirbagheri et al., 2018). Bibliometrics results are easily analyzed (Merigó et al., 2015; Amirbagheri et al., 2018).

**Second,** we examine the documents that had the greatest impact on the research domain over the specified timeframe to study intellectual structure. It links key references (Pilkington & Meredith, 2009). It groups significant research contributions to a knowledge domain, maps the intellectual connections and composition of scientific fields, identifies specialty areas, research fronts, and links between scientific disciplines and specialties over time, and tracks intellectual structure changes.

**Third,** we analyze conceptual structure by commonizing keywords to define thematic clusters (Merigó et al., 2015; Amirbagheri et al., 2018). It can highlight field-specific research (Lin et al., 2016).

**Fourth,** we examine green banking disclosure's co-author social structure (Forliano et al., 2021). Showing author-country collaboration ratios reveals it. Co-authorship analysis shows social links better than co-word, co-citation, and bibliographic coupling (Koseoglu, 2016). Green banking disclosure research community co-authorship analysis identifies key researchers and
formal link types and social structures (Koseoglu et al., 2019).

3.2. Data collection

During the second stage of the research process, we collected data. Consistent with prior bibliometric research (Dwekat et al., 2020; Arslan et al., 2023), we conducted a search in the WoS database, which covers various citation indices in its primary collection. We utilized all indexes from 1993 to 2023, as the earliest articles in this investigation emerged in 1993. We utilize WoS as it is the foremost scientific citation search and analytical information platform globally, which has been extensively employed in numerous academic papers throughout the previous decades (Li et al., 2018; Dwekat et al., 2020). Over the past five decades, WoS has comprehensively documented all the publications and their corresponding citations from over 34,000 reputable professional journals worldwide. This vast collection includes 1.89 billion cited references and 171 million records, making it a crucial resource for various scientific disciplines (Clarivate, 2023). Therefore, the journals that are part of the WoS database are acknowledged as "leading journals" (Dwekat et al., 2020). In order to consist of all relevant articles in the area of green banking disclosure, we built a comprehensive keyword containing the context such as green disclosure*, sustainable disclosure and environment* disclosure*. This approach ensures that all potential variations are included in our sample, thereby covering all aspects and appearances of the green banking disclosure field. By excluding all outcomes except for articles written in English, we have selected specific fields that align with our interests. These fields include Business Economics, Environmental Sciences Ecology, Science Technology Other Topics, and Development Studies. Subsequently, we examined the abstract and title of the articles to exclude any that were not directly related to the topic of green banking disclosure. As a result, we were left with a sample size of 112 articles. Subsequently, we employed Bibloshiny software to conduct a bibliometric analysis, examine social networks, and utilize the visualization tool for our research.

3.3. Tool selection

During the third stage of the research process, the selection of bibliometric analysis tools takes place. In addition to the main analysis, this study also includes a visual representation of the bibliographic material using the Bibloshiny software. Bibloshiny was created by Aria & Cuccurullo (2017) at the University of Naples and Campania in Italy. The key characteristic that sets this software apart is its 'non-coding bibliometric' nature (Arar & Yurdakul, 2023). Furthermore, this software application written in the R programming language is highly structured for conducting bibliometric analysis and creating data matrices. Its menu is divided based on the workflow of scientific mapping analysis (Aria & Cuccurullo, 2017; Arar & Yurdakul, 2023). This software gathers data and produces maps using collaboration networks, co-citation networks, and co-occurrence networks of keywords (Amirbagheri et al., 2018). It satisfies the requirements outlined in the toolbox of widely-used bibliometric analytical methods (see Table 1).

4. Analyses and Results

The studies related to green banking disclosure based on the WoS platform span a time span from 1993 to 2023, with 112 articles coming from 72 different institutions. The average annual growth rate of articles in this field is 11.02%, with an average of 15.09 times cited. The total number of authors is 277, including 18 independent authors (no joint research with anyone), and 26.79% of authors have international co-authorship, for an average of 2.77 authors per article. We create a performance analysis and science mapping (shown in Table 1) to look at the literature's output and impact, as well as to find knowledge clusters in a field by mapping out its publications, citations, hybrids, co-authorship, co-citation, and bibliographic coupling.
This section involved conducting a detailed analysis of the publication status, including information on institutions, authors, countries, journal affiliations, and trending topics. The objective was twofold: first, to determine the proportion of researchers belonging to the 'Mobility Class', and second, to evaluate the level of scientific connections between the most famous research group (researcher class) and their country of origin. The term 'scientific connection' refers to the distribution of scientific knowledge exchange that aligns with the particular scientific professional development of individual researchers.

### 4.1. Scientific Production

We conducted a comprehensive analysis of the publication trend spanning from 1993 to 2023. Figure 2 displays a timeline of publications from 1993 to 2023. Figure 3 can be divided into two separate eras: the first period spans from 1993 to 2016, while the second period represents the growth phase from 2017 to 2023. Only 9.82% (11 out of 112) articles were published within the time frame of 1993 to 2016. Throughout this time frame, the quantity of papers published on green banking disclosure was below five. The most significant research period can be seen to have started after 2016. Particularly, there has been a significant increase in the amount of research published during this seven-year timeframe, representing nearly 90.18% of all publications in this particular field. There is a significant increase in researchers' attention with the disclosure of green banking. The increase in the number of publications could be linked to a major global agreement at the United Nations, marking the first time in more than two decades that an agreement has been reached on reducing climate change. The objective of this negotiation was to be addressed in 2015 at the Conference of Parties 21 (COP 21). The development of a strong institutional framework designed to promote research activity demonstrates the acknowledgment by scholars of the significance of the field. The trend further indicates that publications will persistently expand.

### Figure 2

**Annual Scientific Production**

![Annual Scientific Production Chart]

Note. Created by the authors based on the WoS database using Biblioshiny software
4.1.2. Institutions

Table 3 displays the leading 5 institutions that have published six or more articles. This data illustrates the global distribution and variety of institutions engaged in research related to the disclosure of green banking practices, with the participation of institutions from many different countries such as Inha University (Korea), Guangdong University of Foreign Studies (China), Newcastle University (United Kingdom), the University of Canberra, and the University of South Australia (Australia). In particular, Inha University of Korea ranked first with 8 articles, being the organization that produced the most in this field on this list. The organizations ranked 2nd to 5th have a relatively equal number of articles, each with 6 articles. This shows the diversity of leading research institutions in the field of green banking disclosure.

Table 3

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of articles</th>
<th>Institutions</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>Inha University</td>
<td>Korea</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>Guangdong University of Foreign Studies</td>
<td>China</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>Newcastle University</td>
<td>UK</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>University of Canberra</td>
<td>Australia</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>University of South Australia</td>
<td>Australia</td>
</tr>
</tbody>
</table>

Note. Created by the authors based on the WoS database

4.1.3. Authors

There are 277 different authors participating in 112 articles. Table 4 shows national diversity in the list of top authors. Authors come from many different countries, including Australia, Korea, Oman, the US, and China. This reflects the global nature of the green banking disclosure field. The top 7 leading authors (see Table 3) all have three publications from the University of Canberra, Inha University, Nizwa University, Temple University, the University of South Australia, and Nantong University. Top author data shows no association between "most productive institutions" and "top authors". Despite three authors from major universities, including the University of Canberra (Australia) and Inha University (Korea), the four remaining authors are unrelated to the organization's article count. Authors may write for multiple organizations and not always write about their organization. This international author list suggests worldwide green banking disclosure collaboration. Global experts are involved in the study of green banking disclosure.

Table 4

<table>
<thead>
<tr>
<th>Rank</th>
<th>No. of articles</th>
<th>Author</th>
<th>University’s Scientific Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>Bose, S</td>
<td>University of Canberra, Australia</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>Khan, HZ</td>
<td>University of Canberra, Australia</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Masud, Mak</td>
<td>Inha University, Korea</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>Miah, MD</td>
<td>Nizwa University, Oman</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>Wang, W</td>
<td>Temple University, US</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>Xu, L</td>
<td>University of South Australia, Australia</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>Zhang, K</td>
<td>Nantong University, China</td>
</tr>
</tbody>
</table>

Note. Created by the authors based on the WoS database

Both of these tables provide important information about the growth and diversity of research in this field. The green banking disclosure sector is growing globally, with contributions
from many authors and institutions from different countries. This may reflect interest in environmental issues internationally.

4.1.4. Countries

The majority of green banking disclosure publications are from developing countries. The top four countries studied are China, Bangladesh, the EU, and Indonesia (Table 5). Chinese scholars prioritize environmental issues, as shown by their 37 green banking disclosure research articles. Bangladesh and Indonesia, two developing nations, have 10 and 5 study articles on green banking disclosure. The EU and other developed nations are studying green banking disclosure (8 articles). This illustrates that sustainable development through green banking disclosure studies is an issue that receives attention in both developing countries and high-income countries like the EU.

Table 5

<table>
<thead>
<tr>
<th>Rank</th>
<th>Region</th>
<th>Developed/Developing</th>
<th>No. of articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
<td>Developing</td>
<td>37</td>
</tr>
<tr>
<td>2</td>
<td>Bangladesh</td>
<td>Developing</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>EU</td>
<td>Developed &amp; Developing</td>
<td>08</td>
</tr>
<tr>
<td>4</td>
<td>Indonesia</td>
<td>Developing</td>
<td>05</td>
</tr>
</tbody>
</table>

Note. Created by the authors based on the WoS database

4.1.5. Trend topics

Figure 3 shows that trend topics tend to growth in depth in the period 2019–2023. In 2019–2020, studies were simply about understanding environmental disclosure and CSR; by 2021, studies had developed further into understanding the determinants influencing disclosure and the role of governance. After 2021, the research topic has evolved to explore the relationship between disclosure and the performance of enterprises.

Figure 3

Trend topics

Note. Created by the authors based on the WoS database using Biblioshiny software

4.2. Citation metrics

In addition, we have devised a more comprehensive evaluation method to examine the
utilization of literature in the field, employing citation analysis. Therefore, it can be inferred that the most frequently referenced papers are the most valuable. Furthermore, citations establish the connection between the research topic and the research contributions of another author. Citation analysis examines the connections between citations to assess the productivity and impact of the artifacts (Blanco-Mesa et al., 2017).

Table 6 presents a ranking of the articles with the highest number of citations. The article titled "Corporate sustainability and financial performance of Chinese banks" by Weber (2017) in the journal Sustainability Accounting, Management and Policy received the highest number of citations, with a total of 114 citations and an average of 14.25 citations per year. A total of 83.03% (93 out of 112) articles received citations, while approximately 38.4% (43 out of 112) articles were cited more than 10 times.

Table 6

<table>
<thead>
<tr>
<th>Rank</th>
<th>Title</th>
<th>Authors</th>
<th>Journals</th>
<th>Total Citations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Green credit policy and corporate access to bank loans in China: The role of environmental disclosure and green innovation</td>
<td>Xing et al. (2021)</td>
<td>International Review of Financial Analysis</td>
<td>107</td>
</tr>
<tr>
<td>4</td>
<td>Does the green credit policy affect the scale of corporate debt financing? Evidence from listed companies in heavy pollution industries in China</td>
<td>Peng et al. (2022)</td>
<td>Environmental Science and Solution Research Volume</td>
<td>79</td>
</tr>
</tbody>
</table>

Note. Created by the authors based on the WoS database

The top 4 studies may have obtained a significant number of citations due to their publication in the early years of period 2 (2017–2022), which matched with the United Nations' historic global agreement on climate change reduction after more than 20 years. However, it is crucial for them to take into account the basic features of the subjects they handle and the overall importance of collaborative research.

4.3. Hybrid metrics

The h-index, m-index, and g-index of the top 9 journals are presented in Table 7. The h-index is a bibliometric measure that was discovered by Hirsch (2005). It is defined as follows: a scientist has an h-index of $h$ if $h$ out of their $N$ papers have at least $h$ citations each, while the remaining ($N-h$) papers have no more than $h$ citations each (Hirsch, 2005, p. 16569). The h-index is considered advantageous because it quantifies both productivity (number of articles) and impact level (citations to articles) (Walters, 2007). The g-index is a refined version of the h-index that is used to assess the overall citation impact of a collection of articles (Moussa & Touzani, 2010). The g-index, as defined by Egghe (2006, p. 131) is the highest number for which the sum of citations received by the top g articles is at least $g^2$ when the articles are ranked in decreasing order of their
citation count. Thus, it is defined as the inverse of the $h$-index \cite{Bontis2009} as it considers both the highly cited outliers that the $h$-index overlooks and the overall citation consistency. The $m$-index, as defined by Bornmann et al. \cite{Bornmann2008}, represents the median number of citations received by articles within the $h$-core. Given the uneven distribution of citation numbers, it is suggested to utilize the median instead of the arithmetic mean of the $m$-index \cite{Bornmann2008}.

**Table 7**

**Sources' Local Impact**

<table>
<thead>
<tr>
<th>Journals</th>
<th>NP</th>
<th>$g$-index</th>
<th>$h$-index</th>
<th>$m$-index</th>
<th>TC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Science and Pollution Research</td>
<td>11</td>
<td>10</td>
<td>4</td>
<td>2</td>
<td>112</td>
</tr>
<tr>
<td>Sustainability</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>0.857</td>
<td>139</td>
</tr>
<tr>
<td>Climate Policy</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>1.333</td>
<td>82</td>
</tr>
<tr>
<td>Business Strategy and the Environment</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>0.385</td>
<td>78</td>
</tr>
<tr>
<td>Journal of Cleaner Production</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>0.75</td>
<td>37</td>
</tr>
</tbody>
</table>

*NP = number of publications; TC = total citations

Created by the authors based on the WoS database

*Environmental science and pollution research* is the journal with the highest $g$-index (10); this means 10/11 articles in the journal have total citations of at least $10^2$, which shows the highest popularity and global citation performance of articles on the topic of green banking disclosure published in this journal. However, its $h$-index (4) is lower than *Sustainability* (6), which means that *Environmental science and pollution research* have 4 articles in their list that each have at least 4 citations; this number for *Sustainability* is 6. That is, *Sustainability* is the journal with the highest number of articles that itself has a high level of impact on other articles; in other words, *Sustainability* is the journal with the highest productivity.

**4.4. Co-authorship analysis**

Figure 4 shows the collaboration network of the authors. The collaboration network measures the degree of co-authorship among the most productive authors. Greater node size corresponds to a higher degree of co-authorship. Table 4 displays the top 4 authors who have the highest level of co-authorship. These authors are also the leading authors. Miah, MD collaborates with Hasan, R; Bose, S, and Khan, HZ have collaborations collectively; Masud, Mak has collaborations with Bae, SM and Kim, JD Most of the collaboration between researchers is from different institutions; only the collaborations between Bose, S and Khan, HZ originate from the University of Canberra, which is the second most prolific institution in this particular field.

**Figure 4**

*Collaboration Network*

*Note.* Created by the authors based on the WoS database using Biblioshiny software
The top 4 authors with the highest level of co-authorship, namely Miah, MD; Bose, S; Khan, HZ; and Masud, Mak, also hold the top 4 positions in terms of impact, with an $h$-index of 3. That is, the author has 3 papers with at least 3 citations each, which means that the author has been included in at least 9 publications (Fig. 5).

**Figure 5**

*Authors' Impact*

Note. Created by the authors based on the WoS database using Biblioshiny software

**4.5. Co-citation analysis**

Co-citation analysis is a scientific mapping technique that identifies publications that are frequently cited together, indicating a shared thematic focus (Donthu et al., 2022). This phenomenon arises when a third scholarly article references and acknowledges the existence of two preceding papers (Amirbagheri et al., 2018). Conversely, according to Diodato (1994), co-citation refers to the act of a document citing multiple works, authors, or journals simultaneously. The co-citation strength is determined by the frequency with which two previous documents are cited together in a new article, and the papers that are co-cited the most are the ones that are most closely related.

**Figure 6**

*Co-citation Network*

Note. Created by the authors based on the WoS database using Biblioshiny software

As seen in Figure 6, there are four main clusters. The blue cluster is led by a study by Clarkson et al. (2008) published in Accounting, Organizations and Society, which mentioned the
relation between environmental performance and environmental disclosure. The red cluster is led by the studies of Scholtens (2009), published in the Journal of Business Ethics, and Wu & Shen (2013), published in the Journal of Banking & Finance, which both refer to corporate social responsibility in the banking industry. A study by Weber (2012) about environmental credit risk management in banks and financial service institutions, published in Business Strategy and the Environment, is the focal point of the purple cluster. The green cluster is led by a study by Bose et al. (2018) published in the Asia Pacific Journal of Management, which focuses on the influence of many factors on green banking disclosure under the lens of institutional and corporate governance perspectives.

The four main clusters’ contents demonstrate that there is a strong connection between corporate social responsibility and green banking disclosure because studies on corporate social responsibility are both cited and in the lead.

4.6. Bibliographic coupling

Bibliographic coupling and co-word (or keyword co-occurrence) analysis help understand idea structure by finding connections between cited publications (Donthu et al., 2022). Due to the small number of articles, Bibilioshiny could not create a graph showing citing publications. Thus, the study will simply perform a keyword co-occurrence analysis to reveal the most commonly used keywords across papers. Keyword co-occurrence analysis clarifies research patterns and knowledge architectures. Primary and secondary sources are clearer (Altinay Ozdemir & Goktas, 2021).

Figure 7 shows a keyword co-occurrence network. As recommended by previous studies (Saini et al., 2022; Zhang et al., 2022; Arar & Yurdakul, 2023), we intentionally set the sample size at 5. We found 38 words that met the criteria using this threshold. These words fall into four themes. Keywords are represented by balls in each cluster, with ball size corresponding to keyword co-occurrence. The green cluster covers sustainability, including sustainable development, ESG, green finance, and climate risk, mostly in China and Latin America. Green banking can be used to explain how human resources, marketing, and internal resource management work together to achieve sustainability in the bank’s services, according to Suborna (2020). Thus, green banking studies focus on sustainability. The orange cluster examines disclosure through institutional theory and content analysis, the main annual report analysis method (Beattie et al., 2004). The blue cluster covers green banking topics like governance, green credit, and greenwashing. The red one uses asymmetry information theory to examine environmental disclosure and financial performance and annual report disclosure.

Figure 7

Co-occurrence network

*Note.* Created by the authors based on the WoS database using Biblioshiny software
Figure 7 illustrates that the majority of studies concentrate on the broad and specific ideas of disclosure, green banking, and sustainability. It is worth noting that the term ‘China’ is present in the green cluster, while the term ‘Bangladesh’ can be found in both the blue and red clusters. China is extensively researched in the field of sustainable development, while Bangladesh is the most researched country in the areas of green banking and environmental disclosure. This aligns with the fact that the Central Bank of Bangladesh has implemented early and comprehensive regulations on green banking and disclosure (Suborna, 2020).

5. Conclusions

Green banking disclosure research has grown, especially since 2016. Hybrid measures show that most of the most productive field publications are high-quality and scientifically influential. Research on the topic is becoming more important. We found that 83.03% of papers are mentioned at least once and 38.4% more than 10 times, demonstrating the literature's huge impact. Weber (2017), Bose et al. (2018), Xing et al. (2021) are the most cited works in the field (82+). Green banking disclosure research is scarce (112 papers); fill this gap.

Literature trends deepen from 2019 to 2023. Researchers are now studying how green banking disclosure affects bank company value and financial performance, not just its degree. This suggests that research is emphasizing green banking disclosure's benefits and encouraging institutions to disclose environmental information.

According to co-citation analysis and co-occurrence keywords, green banking disclosure, corporate social responsibility, and sustainability are linked, which is relevant to Suborna (2020). Researchers could have a greater impact by focusing on green banking disclosure, which should emphasize corporate social responsibility and sustainability. Institutional theory and content analysis, the main method for analyzing annual report information (Beattie et al., 2004), examine green banking disclosure, and asymmetry information theory examines environmental disclosure and financial performance. This explains the main theory, helping green banking disclosure researchers.

However, co-occurrence keyword analysis may help researchers find literature gaps and issues. All four analyses indicate field-defining studies in their clusters. Environmental disclosure research should use studies in Figure 7's red cluster. This will reveal the current state of the topic, the theoretical framework and analytical methods used to analyze annual reports, and the specific areas studied.

Finally, the bibliometric method may limit this study's search. Missing key articles in a large database is a major limitation unrelated to the approach. Secondary limits include data collection criteria like downloading only English publications and skipping others, but they are minimal. Thus, future studies can be more thorough by focusing on these points.

Acknowledgements

We would like to extend our appreciation to the editor and the anonymous referee for their valuable feedback and suggestions, which have significantly enhanced the paper's quality. Naturally, any remaining are solely attributable to us.

References


