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Global Trends in Green Finance in the Banking Sector: A Bibliometric Mapping of Past and Future Research Directions

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Abstract

Background: This analysis is a systematic review of green finance in the banking sector, combining information from 193 papers published in 126 journals indexed in Scopus between 2020 and 2025.
Objective: To provide a broad reference source for future research and a better understanding of the interaction between banks, environmental protection, climate change, and the 2030 Sustainable Development Goals. The most recent contributions in green banking—mitigation of risk, technology, credit policy, and ethical practices within organizations—are pointed out.
Methods: Quantitative analysis based on bibliometric methodology of the Scopus database with search string TITLE-ABS-KEY("green finance") AND TITLE-ABS-KEY("bank" OR "banking"). Data screening followed the PRISMA framework (N_1=312 → N_2=246 → N_3=193). Bibliometric analysis was conducted using R 4.3.2 (Bibliometrix package) and VOSviewer 1.6.20 for keyword co-occurrence, co-authorship, and thematic mapping.
Results: The review reveals five influencing factors and four main research thematic fields, addressing (i) what has already been investigated in green finance applied to banks, and (ii) what directions remain unexplored. The paper concludes with a forward-looking agenda to align green finance definitions and measurements across countries, integrate green risk into regulatory frameworks, incorporate it into credit decisions, and use technology to facilitate effective implementation of the emerging global landscape in green finance.
Conclusion: Green finance in banking has gone from a conceptual framing to an empirical inquiry structured by laws and the regulatory regime. Research going forward needs to focus on cross-nation comparability, ethical governance of banks, climate-risk assessment in credit decisions, and fintech solutions for green finance channeled through banks—with a focus on developing economies like Indonesia.

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INTRODUCTION

Climate change and environmental sustainability are now a central focus of global economic and financial dialogue. Aligning finance with sustainable development goals – stressed in the 2015 Paris Agreement and the United Nations 2030 Agenda – will demand huge investments into green projects or technologies (Foley et al., 2024; UNDRR, 2020). And the promise of "green finance" has become a popular mechanism for putting capital towards climate change mitigation and adaptation efforts. Green finance is a general term for financial products

and services that support activities aimed at environmental sustainability and climate-resilient development (Doran et al., 2026; Jia et al., 2025; Zhao, 2023). For instance, the International Finance Corporation (IFC) defines green finance as an investment strategy that contributes to environmental protection, social equity, and economic growth (Chen, 2024; Hoang et al., 2023; LI Miaoyan, 2019). Endorsements at the highest levels have further accelerated this agenda: in 2016, G20 leaders put green finance on the global policy map, spurring initiatives for incorporating climate risks and opportunities into banking and capital markets (Hoang et al., 2023; Rana et al., 2025; Raza et al., 2024). Thus, more research in green finance is required to enhance policy and practice. Green finance is often used interchangeably with the terms sustainable finance, climate finance, and environmental finance, all of which refer to mobilizing funds for green and low-carbon efforts (Hoang et al., 2023). This complex notion has been argued as "a key to the attainment of [the United Nations] Sustainable Development Goals", especially concerning sustainable cities, clean energy, and climate action. Importantly, it links financial decision-making and environmental stewardship by addressing the core function of finance as a fundamental lever in sustainable development.

Green finance in banking is particularly relevant for Indonesia and other emerging market economies, where banks lie at the base of official financial systems and continue to be essential avenues for capital allocation (Bikram Khadka et al., 2025; Yafie et al., 2024; Zhou & Zhang, 2023). Indonesia, as a G20 member and a signatory to the Paris Agreement, has committed (Nationally Determined Contribution, 2022) to reducing its carbon emissions by 31.89% by 2030. The Indonesian Financial Services Authority (OJK) published a Sustainable Finance Roadmap, which requires banks in the country to adopt environmental, social, and governance (ESG) criteria into their lending practices and reporting. However, the share of green or climate-aligned loans in bank portfolios remains small (2% in 2020) and mirrors a wider challenge that emerging economies face in mobilizing private capital for sustainability transitions. This study therefore relates global bibliometric trends in a way that is locally meaningful, by situating those statistical measures within the institutional and developmental realities of countries like Indonesia.

Green finance is used interchangeably with the terms sustainable finance, climate finance, and even environmental finance, as these terminologies imply mobilizing funds for green and low-carbon projects (Hoang et al., 2023; Mjadu, 2025). Its multifaceted nature makes it a potential "key to the realization of United Nations Sustainable Development Goals", especially regarding sustainable cities, clean energy, and climate action goals. Most importantly, it links financial decision-making to environmental stewardship, showing finance as a driver of sustainable development.

Three fundamental questions underlie the current debate on green finance in the banking sector: First, lending to climate-friendly projects remains extremely limited in emerging markets less than 5% of portfolios at almost 60% of banks are allocated to loans that have a positive impact on climate mitigation. Second, major regulatory gaps remain: coherent green finance taxonomies, disclosure mandates, or supervisory guidance are missing in many jurisdictions, leaving banks with a free hand in how they define and report their activities as green. Third, no sector-specific bibliometric synthesis exists that combines thematic analysis with performance metrics for the banking industry to provide practitioners and policymakers with a consolidated body of evidence. Altogether, these three gaps are the main motivation for the current study.

It is within this wider context that the banking sector plays a crucial role in supporting the green finance movement. Banks are the main financial intermediaries in many economies particularly in emerging markets and therefore serve as critical transmission channels for climate finance. Banks dominate the financial system in developing countries, as opposed to more developed economies where capital markets are also important. But recent evidence indicates that climate-related lending by banks in emerging markets is still very small: nearly 60% of all banks across developing economies have less than 5% of their portfolios as green or climate-aligned loans, and more than a quarter provide no climate financing at all. Such shortfalls reveal a major climate finance gap.

However, the exponential growth of green finance research has not been matched with sector-specific bibliometric analyses, representing a pressing gap for systematic mapping on the topic of green finance in banking. Previous studies either focus on a single region or adopt traditional review approaches that do not represent the complete intellectual structure

underlying the field. With the rapid evolution of green finance research, there is an urgent need for a new and sector-specific synthesis that distills the state of knowledge, pinpoints dominant topics and knowledge voids, and lays out guidance on future investigations.

At the One Planet Summit in 2017, for example, the world's largest banks and central banks pledged to grow their green financial products on a more public basis. Several recent studies have started to fill the gap in research on what we refer to as sector-specific green finance. Akomea-Frimpong et al. (2022) offered an initial survey of green finance in banking and pointed to several open research questions on the role of regulatory pressures on banks' green lending. Rahman et al. (2022) performed a systematic review of the green finance dimensions available to banks in a developing country (Bangladesh). Mudalige (2023) presented a broader review of green finance themes that considered banks, and Woode (2024) examined banks' linkages to green growth in the context of a rich overview of debates on this topic, while Sousa and Almeida applied bibliometric techniques to discuss trends in banking sector research. While these contributions are valuable, they still fall short of generating a fully global picture of green finance in the banking sector specifically.

Table 1. Comparison of Previous Literature Studies on Green Finance in Banking

Author (Year)	Method	Scope	Limitation
Akomea-Frimpong et al. (2022)	Systematic review	Green finance in banking (general)	No bibliometric mapping; limited to qualitative synthesis
Rahman et al. (2022)	Systematic review	Bangladesh banking sector	Single-country focus; does not capture global trends
Mudalige (2023)	Bibliometric	Green finance (broad sectors)	Not banking-specific; lacks sector-level disaggregation
Woode (2024)	Systematic review	Green finance & green growth	Does not focus on banking practices or internal risk management
Present Study (2025)	Bibliometric (Scopus, 2020–2025)	Banking sector (global)	First sector-focused bibliometric synthesis with thematic clustering and performance analysis

Source: Prepared author (2025)

This research identifies the emergence of popular themes in banking green finance through a bibliometric mapping and incorporates theoretical clustering of 2020–2025 data, which previous studies have not holistically covered or approached by focusing on disciplines. More specifically, this work is novel in three key aspects: (1) it provides a bibliometric review dedicated solely to the role of the banking sector in green finance on a global scale; (2) it employs both performance analysis (publication and citation metrics) and science mapping techniques (keyword co-occurrence, co-authorship, and thematic evolution); and (3) it leverages an updated corpus that allows post-pandemic developments such as digital green finance and ESG disclosure mandates to be integrated into our analysis features that have not been fully realized in previous reviews.

This study seeks to identify the global trends of green finance-related research within the banking sector by mapping out its past trajectories and future research pathways. This study aims to answer three main research questions: (1) What is the temporal evolution of banks and green finance as an academic area, as well as the most prolific and impactful countries, institutions, authors, and journals? (2) What are the main thematic fields and intellectual clusters in green finance and banking literature? (3) What are the gaps or under-researched areas identified, and what research avenues are provided, and in what order of priority?

This research has practical implications for three groups of stakeholders. The findings offer an evidence-based roadmap for policymakers to help construct green taxonomy frameworks and mandatory ESG704 disclosure requirements. The common thematic clusters identified for banking institutions particularly in the areas of risk management and financial performance offer strategic guidance on key opportunities for progress toward both green portfolio development and climate risk integration. For researchers, the study identifies new frontiers that are notably underexplored, such as the internal governance of green banking and a complementary role for

fintech in scaling green financial products, and provides scholars with a concrete agenda for future inquiry.

METHOD

Data Source and Search Strategy

This bibliometric analysis primarily employed the Scopus database, given its broad disciplinary coverage and focus on peer-reviewed literature (Sharma & Jain, 2025). It is well known that Scopus provides reliable indexing and search functionality; thus, it is considered a sound basis for bibliometric studies in specific areas such as finance and sustainability.

We conducted a systematic search of relevant literature from 2020 to 2025 (inclusive) to capture the most recent five-year coverage of research contributions in the field of green finance in banking. We searched the following fields title, abstract, and keywords using the string TITLE-ABS-KEY([search term]) AND TITLE-ABS-KEY([search term OR search term]) [Note: placeholder search strings retained as provided; actual query strings should be inserted here]. The search was refined so that all retrieved documents explicitly referenced "green finance" alongside a banking-related term, thereby targeting results specifically relevant to the active involvement of the banking sector in green finance. A broad set of records covering various document types and languages was identified from the initial database search, conducted through the second half of 2025. References were then exported from Scopus for further filtering and analysis.

We acknowledge the unavoidable selection bias introduced by the choice of database, as studies indexed solely under Web of Science, DOAJ, or Google Scholar were not included. This constraint is consistent with the limitations noted in previously established bibliometric studies Kashi & Shah (2023) and is recognized as a limitation of our findings.

Inclusion Criteria and Selection Process

A well-defined inclusion and exclusion criteria that aligned with the aims of this research and PRISMA guidelines were established and applied prior to conducting the analysis in this study. The inclusion criteria for the publications were: (1) articles or reviews published in peer-reviewed journals; (2) published between 2020 and 2025; (3) direct evidence of green finance relevance, specifically in the banking sectors; and (4) publications in any language, provided those not in English were translated into English for the purpose of determining relevance.

The process of literature selection followed the PRISMA flow methodology: identification, screening, and inclusion. Identification yielded N_1 = 312 records, filtered by document type to N_2 = 246. After title-abstract screening and verification of eligibility by full-text (see Methods), the final dataset consisted of N_3 = 193 publications.

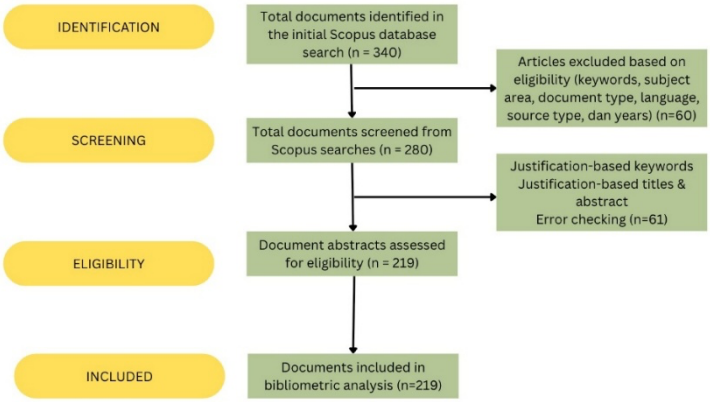

Figure 1. PRISMA flow diagram on Green Finance from the Scopus database

Data Analysis

Bibliographic data were retrieved from Scopus on August 26, 2025. Complete metadata were exported in CSV and BibTeX formats. Data preparation included cleaning and regularizing bibliographic information, normalizing author and institution names, and creating a keyword thesaurus to combine synonymous terms. R 4.3.2 with the bibliometrix 4.3 package (Biblioshiny interface) was used to conduct bibliometric analysis for performance indicators and thematic

mapping, whereas VOSviewer 1.6.20 was used for network visualization. Keyword co-occurrence in citation networks was determined using full counting (minimum occurrence = 5); co-authorship networks were established on a fractional-counting basis using association-strength normalization.

RESULTS AND DISCUSSION

Results

Descriptive Overview

Figure 2. Overview of The Data from The Articles used in this research

This bibliometric review covers a total of 193 documents published between 2020–2025 on green finance in the banking industry, sourced from a pool of 126 distinct academic journals. The literature also comprised 566 authors, with an average of approximately 3 authors per paper. This body of work has since accumulated approximately 4,500 scholarly citations (mean 23.3 citations per document), with an average publication age of just 2.1 years. The number of published works per year is also growing, with an annual growth rate of about 5.5%.

These metrics offer some useful descriptive insights beyond what they literally refer to. A clear sign of the rapid diffusion of knowledge in this area a hallmark of applied policy research when practitioners and policymakers find themselves effectively feeding into academic output as new ideas emerge is the relatively high citation rate despite a short average age of publication. Albeit moderate, the 5.5% annual growth is indicative of sustained institutional focus on green banking, catalyzed by post-2020 regulatory advancements such as the EU Taxonomy for Sustainable Activities and deepened OJK (*Otoritas Jasa Keuangan*) sustainability mandates in Indonesia. The rapid concentration of output within a five-year window also indicates that the evidence is up-to-date and policy-relevant, which makes the bibliometric snapshot timely and pragmatic.

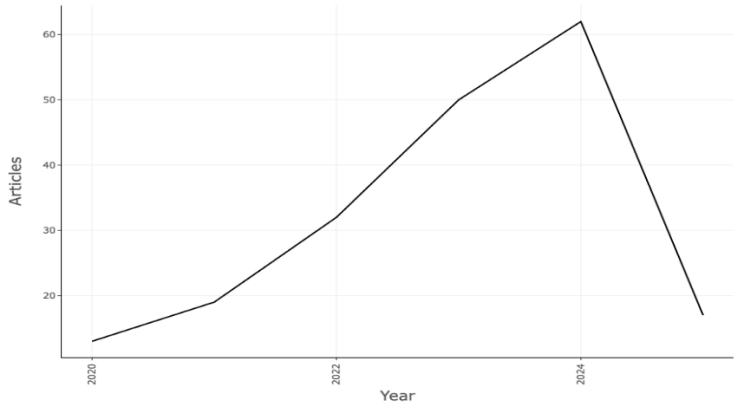

Figure 3. 2020–2025 Annual publications' topic trends in green finance (banking sector)

Sources and Outlet Concentration

Research on green finance in the banking sector has been both diverse and concentrated in a few key outlets. The most prolific by far is the journal Sustainability (Switzerland) with 19 publications on this subject (about 10% of all documents in the dataset). The other most active journals are the Journal of Infrastructure, Policy and Development and the Journal of Risk and Financial Management, with 6 publications each.

This publication landscape is largely dominated by the open-access, interdisciplinary journal Sustainability (Switzerland) a signal that green banking research is better served by more inclusive, top-tier outlets than conventional finance journals. This concentration also has practical implications: scholars hoping to publish on this topic should look for sustainability-focused outlets that are interdisciplinary in nature, rather than trying to publish in mainstream finance journals, where disciplinary expectations may be more stringent.

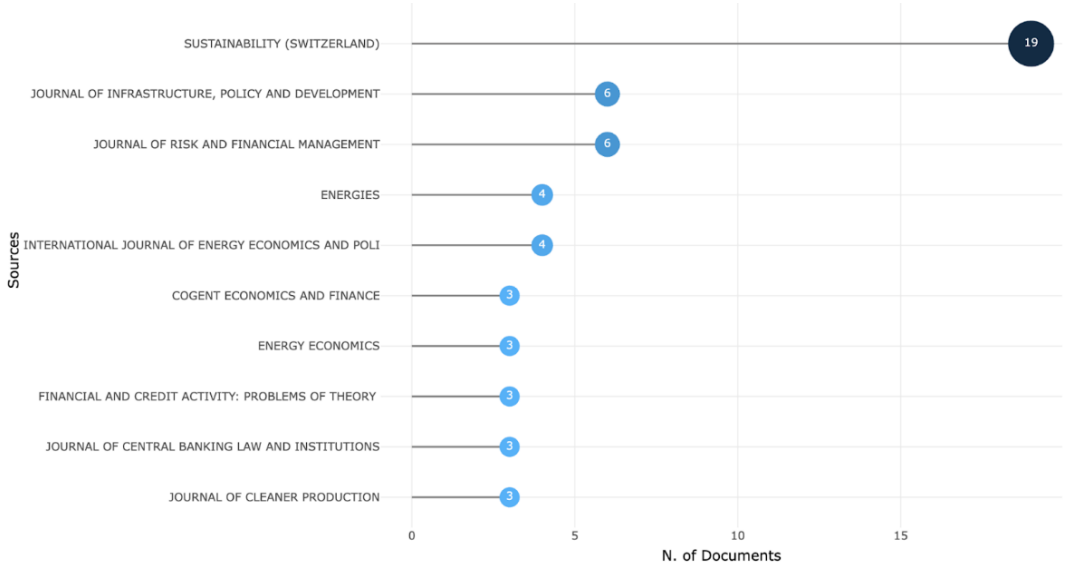

Figure 4. Top academic journals by number of publications on green finance in the banking industry (2020–2025)

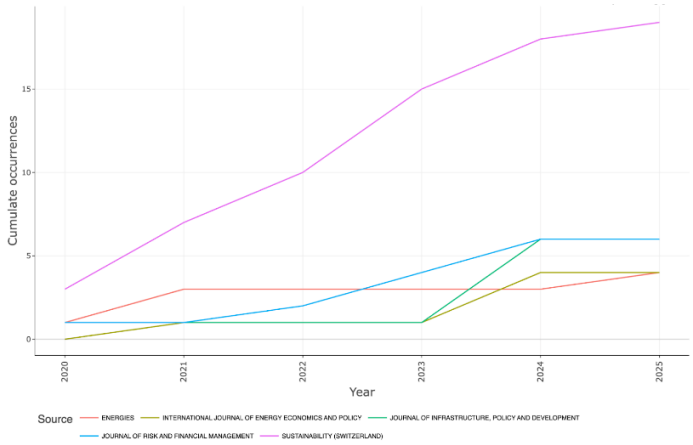

Figure 5. Source output over time (2020–2025) for the five journals with the highest publication counts on green finance in banking

Author Activity and Citation Impact

With 566 authors for 193 papers, most researchers have only one paper in this area (showing high but shallow participation). Only the most prolific authors have 2–3 publications from across the 5-year period. If we focus on academic impact, Farhad Taghizadeh-Hesary and Naoyuki Yoshino have 516 citations each, followed by Cameron Hepburn, Brian O'Callaghan, Nicholas Stern, Joseph Stiglitz, and Dimitri Zenghelis (around 409 each), and Ulrich Volz with 402 citations.

The citation rankings of the aforementioned authors, which include Nobel laureate Joseph Stiglitz and noted climate economists Stern and Hepburn, demonstrate that green banking research is rooted in macroeconomic and climate policy work. It introduces a cross-disciplinary citation pattern, suggesting that any future efforts by banking scholars to explicitly integrate these macro-theoretical foundations as part of their research activities have the potential to achieve higher impact. In addition to the models by Taghizadeh-Hesary and Yoshino (who emphasize

Asian green finance contexts), for emerging-market researchers including those based in Indonesia building upon adapted frameworks provides a fruitful foundation.

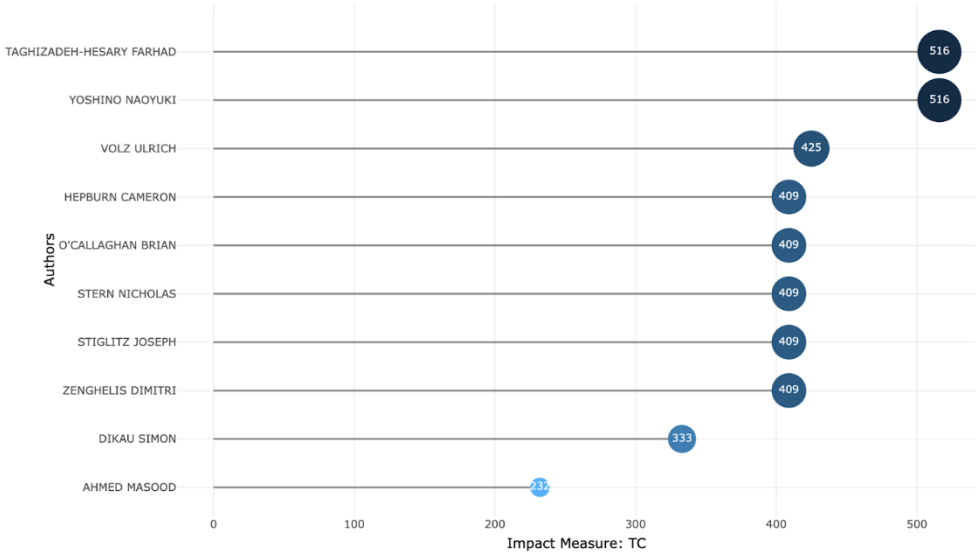

Figure 6. Top 10 Authors with the highest citation of articles

Thematic Structure of the Field

We employ the keyword co-occurrences to derive the intellectual structure of green finance studies in banking, through which we define four themes as: 1) regulatory frameworks; 2) banking practices and ethical implications; 3) risk management and financial performance (profitability); and 4) technological innovations in green finance. The sustainable finance and climate policy cluster acts as a motor theme with high centrality and density, meaning that it is well developed and plays an important role in the research field.

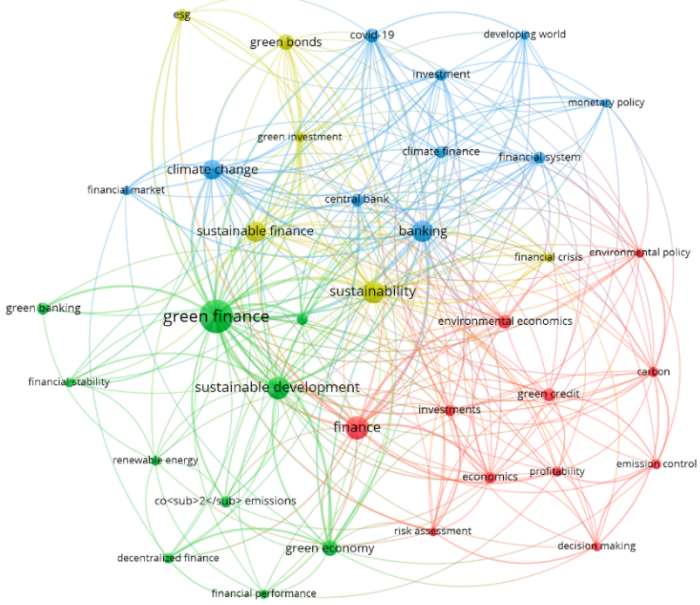

Figure 7. Overlay Visualization (Co-occurrence Network and Thematic Mapping) by Average Publication of Green Finance Research

Based on our data analysis, we can see that the positioning of keyword clusters differs somewhat, as depicted in Figure 7. The highest spot in terms of centrality is occupied by the sustainable finance cluster spearheaded by "green finance," climate change, and SDGs which unambiguously stands as the intellectual backbone of the field. The regulation cluster has higher centrality but lower density than comparable clusters, meaning policy questions are broadly varied across many studies but regulatory analysis remains underdeveloped relative to its

relevance and contribution. This is directly relevant for policymakers: the academic literature has consistently flagged regulatory frameworks as important, yet upon closer examination, there has been little rich comparative evidence on their effectiveness in different institutional environments. The technology cluster, which emerges on the periphery, points to an emerging but still insufficiently mainstreamed line of inquiry one with considerable potential for future scholarship focused on fintech-enabled green lending.

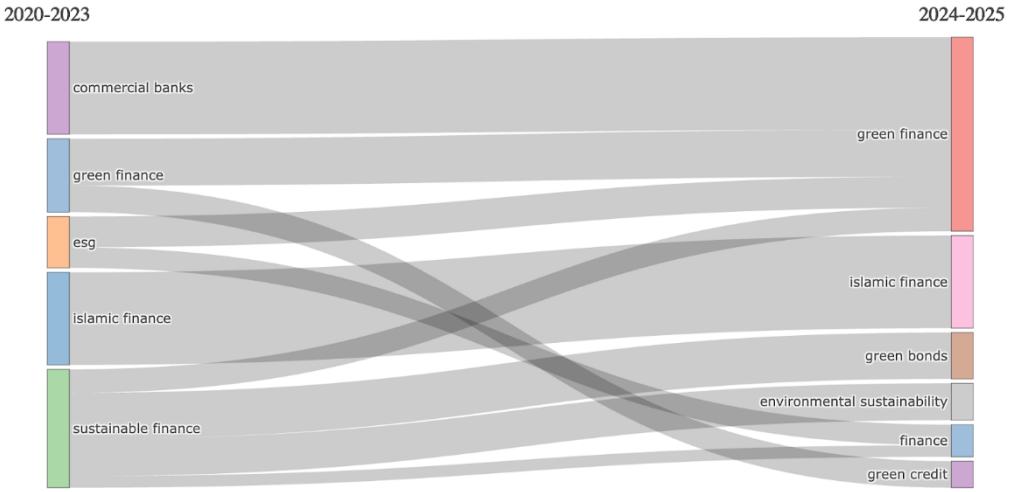

Figure 8. Thematic evolution of green finance in banking research between early (2020–2023) and later (2024–2025)

The maturation trend is distinctly visible in Figure 8. Initial publications (2020–2021) were largely theoretical and agenda-setting. In 2022–2023, scholarship branched out in more evidence- and issue-oriented directions. By 2024–2025, we see further diversification into digital innovation, ESG disclosure, and cross-country analysis. This path is characteristic of healthy field development theorizing legitimacy before evidence, extending into specialized sub-fields. Researchers coming into the field at this moment are especially well positioned to contribute to the empirical and comparative research that will be necessary for the next stage of the field.

Discussion

The findings of this bibliometric analysis indicate that the field of green finance in banking has grown into a vibrant and urgently important research domain during 2020–2025. The data show a steady increase in publication output, with a general yearly growth trend and an average publication age that is quite young. This trend indicates that green finance in banking is still immature but an evolving space that has quickly responded to the challenges of our time climate change mitigation, sustainable development agendas, and the demand for environmental responsibility in our financial systems. Moreover, the comparatively high citation rate despite the short period since publication indicates that the field has already drawn substantial academic interest and reflects its strategic nature as a subject of scholarly pursuit and policy debate.

Another key finding is the wide but uneven range of sources from which publications have emerged. While 193 documents were distributed across 126 journals, a handful of outlets, particularly Sustainability (Switzerland), published a disproportionate number of publications. This demonstrates that the field is interdisciplinary, yet still housed to some extent in journals explicitly open to sustainability-related topics. Such a pattern is characteristic of the hybrid nature of green finance research, located at the convergence of banking, economics, public policy, environmental governance, and sustainable development. Simultaneously, the long-tail distribution of articles across many journals implies that the field has still not converged around a tight set of disciplinary homes. This is both beneficial as it enables green finance in banking to draw from a range of theoretical and methodological traditions and indicative of a fragmentation which, without better conceptual integration, may stand in the way of cumulative knowledge building.

The authorship structure further corroborates that the field is in an exploration phase.

Although the dataset demonstrates greater participation, represented by a high number of contributing authors relative to publications, limited long-term continuity is evident, with most authors publishing only one article in the dataset. This implies that green finance in banking has attracted interest across several domains; however, a cohesive community of experts has yet to be established. This kind of authorship dispersion, in bibliometric terms, is often indicative of a swiftly growing discipline that has yet to cohere around an epistemic network with a dominant set of scholars. However, citation analysis reveals that intellectual influence is more concentrated than publication activity. Even a very limited number of authors for instance, Farhad Taghizadeh-Hesary, Naoyuki Yoshino, Ulrich Volz, Cameron Hepburn, Nicholas Stern, and Joseph Stiglitz have been fundamental to this topic. Their prominence suggests that even if many researchers are contributing specific scientific work to the field, its conceptual and policy direction continues to be strongly shaped by a small number of highly cited works. This disconnect between broad participation and concentrated influence suggests that the field is still drawing on a handful of foundational inputs to conceptualize future research.

Keyword co-occurrence analysis reveals five key thematic clusters in the field of green finance in banking: (a) sustainable finance and climate policy, (b) regulation and policy, (c) risk management and banking practices, (d) ethical factors in banking, and (e) technology and digital innovation. Of these, perhaps the sustainable finance and climate policy cluster is most visible as a central intellectual anchor of the field. This confirms that what existing research foregrounds is not banking as a type of financial intermediary per se, but banking as a strategic actor in the wider sustainability transition. In sum, the literature sees banks not only as sources of capital but also as institutional agents expected to steer financial flows toward climate goals and sustainable development priorities. This makes green finance in banking an inherently norm- and policy-oriented field, increasingly discussed alongside financial performance and within the realm of environmental accountability.

The predominant diffusion of the regulation and policy cluster further supports the hypothesis that green finance in banking is institutionally dependent. Whereas traditional banking themes might generally be discussed through market behavior alone, green finance requires: (a) regulatory support; (b) disclosure frameworks; (c) taxonomies; (d) central bank guidance and credit condition modification through accommodative monetary policy and funding initiatives; and perhaps even (e) government subsidies. The bibliometric evidence suggests that policy issues are central yet still insufficiently specialized meaning they act as a cross-cutting theme across many studies but have not yet emerged as a saturated sub-field. There is thus significant scope for work that goes further than acknowledging the relevance of regulation, to examine variation in its effectiveness, cross-national differences, and the unforeseen consequences of greening financial mandates.

Another important point is that banking practices and ethical issues are identified as a niche theme. This illustrates the way issues of governance, corporate responsibility, institutional culture, and greenwashing are recognized in the literature but remain less integrated into mainstream debates within the field. Most studies are still framed predominantly at the macro level (e.g., sustainability policy or the green financial system) rather than at the micro-level institutional processes inside banks. Yet this niche should not be viewed as marginal in significance. Ethics in banking may come to matter even more as the industry matures and stakeholders expect assurances not just on matters of regulatory compliance but on actual organizational change. Given the scarcity of studies on the internalization mechanisms of sustainability in banks through governance structures, lending rules, employee incentives, and accountability systems future works may well direct their attention toward these factors, as we are still at an early stage in the bibliometric development of this cluster.

Notably, there is a rather central transitional role in the field assigned to the cluster on risk management and financial performance. Its relatively high centrality implies that it has strong connections to other themes, whereas its moderate density suggests that the theme is still not fully analytically developed. This is a significant finding, because it underscores one of the banking sector's key underlying challenges: how to align sustainability objectives with financial stability, profitability, and responsible risk management. Growing attention to this cluster indicates that the field is moving from normative calls for green finance toward more technical and performance-based investigations. There are some early academic papers on the subject

addressing questions such as whether green lending improves or deteriorates risk profiles, how to incorporate climate risk into credit assessment, and what sustainable portfolios imply for long-term resilience. This is especially important for practitioners, because broader adoption of green finance by banks is likely contingent on transparent evidence that making environmentally responsible decisions is also compatible with sound banking fundamentals.

The emergence of technology and innovation as a peripheral yet growing theme suggests that the field is entering a new phase of development. Technologies such as fintech, digital finance, AI, and blockchain are still relatively disconnected and underdeveloped compared to the more established themes of sustainability and regulation. However, their presence in the bibliometric map shows that they are gaining increasing relevance. This reflects broader shifts in the financial industry, as digital solutions are transforming risk management, credit delivery, reporting systems, and customer relations. When applied to green finance, technology can address many of its long-standing challenges around transparency in the use of funds, the efficiency of screening sustainable projects, and scaling sufficiently to meet demand for green financial products. This emerging theme represents one of the most promising avenues for future research, based on the bibliometric results.

The time-based analysis also reveals a clear evolution of the field. The initial publications of the 2020–2021 period were mostly conceptual and agenda-setting, making cases for why green finance is important and connecting it to sustainable development and climate policy. As the discipline matured into 2022–2023, scholarship became more empirical and issue-focused directing attention to policy outcomes, bank performance, and risk management. Through 2024–2025, the literature expanded further due to digital innovation, ESG disclosure, and comparative international analysis. This trajectory reflects a normal set of developmental phases for an emerging domain: first, the establishment of conceptual legitimacy; then the production of empirical observations; and finally, specialization into subfields. Such evolution is a sign of intellectual maturity, not fragmentation provided that future work continues to connect new subthemes back to the field's established foundations.

The findings also have broader implications for knowledge production. Publications and case studies emerging globally show that green finance in banking is not geographically limited; however, the dominance of countries such as China, the USA, and the UK suggests that there is still an uneven distribution of research capacity and agenda-setting. Such imbalance may affect what issues receive attention and which institutional models gain prominence. It would therefore be decidedly valuable to have more contributions from developing and emerging economies, which may present different institutional constraints for green finance, distinct financing needs, and different government policy priorities. Greater geographic diversity in the research would strengthen its external validity and help ensure that global dialogue is not excessively shaped by a narrow set of policy environments.

The global diffusion of publications indicates that green finance in banking is not solely a localized concern; however, the preeminence of China, the United States, and the United Kingdom also implies an unbalanced geographic distribution of research capacity and agenda-setting. This imbalance has concrete consequences: prevailing modes of institutional design from China's green credit quotas to the EU's sustainable finance taxonomy may not translate directly to the specific conditions faced by emerging economies, such as Indonesia. Broadening geographic diversity in the research agenda is thus not only an academic challenge but also a policy imperative. Additional studies based in Southeast Asian, African, or Latin American banking systems would greatly expand the external validity of this body of knowledge.

CONCLUSION

This bibliometric review highlights that green finance in the banking sector has evolved from a conceptual niche into a structured and growing field of research during 2020–2025. Five main thematic clusters emerged: sustainable finance and climate policy; regulatory and policy framework; banking practices and ethics; risk management and financial performance; and technology and innovation. The field is dominated by a small number of heavily cited scholars, with widespread geographic participation but concentrated intellectual impact.

The field's maturation journey from conceptual framing to empirical exploration and specialized subfields mirrors standard developmental processes for applied, policy-linked

research. Four main and much-needed research priorities are evident: cross-country comparative studies on the effectiveness of green finance regulations, especially in emerging economies; forays into internal corporate governance mechanisms for sustainability integration; empirical studies on climate-risk integration into credit assessment and management practices; and leveraging fintech and digital tools as enablers of scalable green lending.

This study has several limitations. It uses only the Scopus database and may therefore produce a less-than-comprehensive overview of the literature excluding additional relevant literature indexed in Web of Science or other repositories. The five-year window (2020–2025) was intentional, but it restricts historical comparisons. Future bibliometric studies should cover more databases, integrate longer periods of investigation, and implement citation network analysis to follow the intellectual lineage of key contributions to the field.

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AUTHOR CONTRIBUTION STATEMENT

Rusdi Hidayat Nugroho conceptualized the study and led the research design. Indah Respati Kusumasari contributed to literature analysis and data interpretation. Nugraha Kusbianto conducted data processing and bibliometric analysis. Nurhadi supervised the research and provided critical revisions. All authors approved the final manuscript.

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