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Research Article

Digital Financial Inclusion: A Bibliometric Analysis of Global Research Patterns and Impacts (2005–2022).

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ABSTRACT

In a world increasingly characterized by rapid digital transformation, digital financial inclusion (DFI) has emerged as a critical tool for bridging economic disparities and fostering accessible financial services. This bibliometric analysis investigated 790 DFI-related papers from 2005 to 2022, aiming to elucidate the evolving landscape of DFI and its intersection with environmental sustainability. The study methodically maps the field's growth, identifying key geographic and thematic patterns that reveal the burgeoning role of technology in emerging markets as well as the different foci on developed and developing nations. The findings indicate a concentrated drive towards digitalization in financial services within countries such as China and India, highlighting the potential of digital finance to spur economic development and reduce inequality. However, the analysis also points to a research divide, with advanced economies leading the discourse on financial inclusion's integration into the digital economy. Despite this study's limitations in terms of data representation and emphasis on quantitative metrics, its robust insights serve as a foundation for further exploration into the practical outcomes of DFI. Notably, the study offers a critical lens through which academics and policymakers can navigate the digital financial ecosystem to foster inclusive growth and resilience in the post-pandemic world.

Keywords: Digital Financial Inclusion (DFI); Emerging markets; Research pattern; Impact; Bibliometric Analysis

1 Introduction

The rapid advancement of information technology has heightened the popularity of the "Digital Financial Inclusion" (DFI) concept in the global financial arena of the
21st century. The idea of financial inclusion was introduced by the United Nations in
2005 (Sarma & Pais, 2011) in response to the prevalent issue of financial services' limited availability. As innovations such as big data, blockchain, and artificial intelligence (AI) become increasingly accessible, the development of DFI has brought a transformative shift away from conventional financial structures towards technology-driven systems that enable the secure storage and transmission of financial data.
The implementation of DFI offers inclusion to demographic groups and geographical regions that were previously marginalized or lacked access to comprehensive financial services. Consequently, Koh et al.'s (2018) study, citing Bill Gates, projected that by the year 2030, over two billion individuals without access to traditional banking services would rely on mobile devices as their main means of conducting financial transactions (Qiu et al., 2018). In addition to these marginalized groups, sectors like community banks, savings accounts, loan services, and insurance stand to gain significant benefits from DFI (Bongomin et al., 2019; Mhlanga, 2020). As such, the application of DFI may reach its maximum potential.

Indeed, researchers (Lu et al., 2023; Shen et al., 2022) have shown the significance of this novel financial model in promoting economic development, reducing poverty, and addressing the financial requirements of people and enterprises. According to Leong et al. (2017), the impact of digital technology has facilitated the emergence of Chinese financial technology (fintech) companies, which are able to penetrate underserved areas, establish alternative credit ratings using non-traditional data sources, and enhance the accessibility of financial services for groups who were previously underserved. Bongomin et al. (2019) also reported that the digitization of financial institutions, and the resulting enhancement of financial inclusion, play a vital role in achieving the United Nations' Sustainable Development Goals (SDGs) by 2030, especially for poor nations. Their study offers insight on the role of transaction tax exemptions in moderating the association between mobile money and the expansion of financial inclusion, which carries significant potential for economic expansion.

In a similar vein, Mushtaq and Bruneau (2019) emphasized the reciprocal advantages of using information and communication technology (ICT) with banking to increase accessibility to financial services, which not only addresses the digital financial divide but also mitigates poverty and inequality. Similarly, Ji et al. (2021) revealed the potential of DFI to mitigate the income disparity between urban and rural areas in China by reducing financial exclusion and promoting entrepreneurial inclination.

Notwithstanding its favorable reception, DFI continues to encounter a number of obstacles. Ozili (2018) highlighted inherent complications associated with digital banking and financial access, including data privacy, cybersecurity, and accessibility. Meanwhile, Yue et al. (2022) directed attention to the dual nature of digital banking, wherein on the one hand, it increases the accessibility of financial resources, but on the other hand, elevates the risk of households getting trapped by unsustainable debt.

The preceding discussion on the significant global issue of DFI gives rise to the following three questions: (1) How is the concept of financial inclusion developing in the context of technological advancements? (2) What are the potential divergences in DFI between regions? (3) What strategies may be used to safeguard the integrity of environmental conservation efforts in light of the progress made in the field of DFI? To answer these questions, this study conducted a bibliometric analysis of 790 papers pertaining to DFI published from 2005 to 2022, with the objective of investigating the patterns, geographical variations, and challenges in this domain. This complete and in-depth analysis of the current status of DFI research, as well as DFI's relationship with environmental sustainability, aims to provide academics, policymakers, and practitioners with a novel viewpoint on this field. Notably, the vital insights from this analysis serve as a guidance for the development of future policies and practices that facilitate the expansion of DFI worldwide.

2 Literature review

The increasing significance of DFI worldwide represents a fundamental transition from conventional financial systems to those powered by technology. In light of the revolutionary potential of digital finance in promoting global financial inclusiveness, this section presents a comprehensive literature review of the current research related to DFI, including its advantages and obstacles. By integrating data from various empirical studies, this review aims to shed light on the research directions and key findings on DFI.

2.1 Impact of DFI on economic growth and poverty alleviation

Due to its technological foundations, DFI has the capacity to bring about significant changes to economic systems, particularly in developing nations. The central focus of this discourse is on DFI's simultaneous influence on economic advancement and poverty mitigation.

In terms of economic development, a substantial body of empirical research supports the positive relationship between DFI and macroeconomic advancement. Liu et al. (2021) showed that the expansion of digital financial services has significantly enhanced China's economic strength, while Song et al. (2020) put forth the argument that cautious governmental support and effective control of DFI in developing countries contributes to economic dynamism. Ahmad et al. (2021) discovered a favorable correlation between DFI and human capital in relation to the economic development of Chinese provinces. Similar findings were observed in separate investigations conducted by Koh et al. (2018) in Southeast Asia and Naumenkova et al. (2019) in Ukraine. Moreover, the studies conducted by Adegbite et al. (2020), Yu et al. (2020), Ma et al. (2021), and Liu et al. (2021) collectively established the many advantages of DFI in the agricultural sector, which has historically faced challenges in receiving comprehensive financial services. These advantages span a wide range of contexts, including smallholder agriculture in Nigeria and eco-efficient techniques in China.

Shifting the focus towards the implications of DFI on poverty reduction, academic investigations have emphasized the significant role of DFI in combating this issue. Mushtaq and Bruneau (2019) posited that increased accessibility to ICT potentially enhances financial inclusion, which in turn, plays a crucial role in reducing poverty and addressing inequalities. While Siddik and Kabiraj (2020) highlighted the significant impact of the World Bank's activities on reducing poverty in emerging economies, Kelikume (2021) emphasized the empirical connections among mobile technology, internet accessibility, financial inclusion, informal economic structures, and the reduction of poverty. Shan (2021), on the other hand, collected cross-sectional microdata from families in China to generate valuable insights on DFI's alleviation of several dimensions of poverty.

In conclusion, the existing body of empirical research consistently validates the beneficial impact of DFI on current economic frameworks and contemporary economic narratives. The available evidence suggests that strategically planned, well implemented digital financial interventions stimulate overall economic revitalization and effectively reduce poverty and socio-economic inequality. The aforementioned results have implications not just within the robust economic landscape of China but also across several emerging markets and industries, including agriculture. The findings strongly support the need for continuous innovation, effective governance, and increased investments in DFI, given its significant ability to promote sustainable economic development and create a fairer global financial landscape.

2.2 Challenges with DFI

Although it is widely recognized that DFI has significant advantages in terms of economic development and poverty reduction, numerous emerging research avenues highlight the inherent difficulties involved with DFI that require more careful examination.

First, it is imperative that marginalized and disadvantaged individuals be provided with digital financial services that are readily accessible and designed in consideration of user-friendliness. The digital finance barrier faced by these communities is often attributed to a deficiency in necessary digital skills, crucial technological resources, and even limited accessibility (Olanrewaju et al., 2021). For instance, groups residing in rural or economically disadvantaged areas may have limited Internet connectivity and modern digital equipment. It is imperative to address these discrepancies to promote marginalized groups' full engagement in the digital financial sphere, and thereby, foster financial equality and inclusion. The prioritization of digital literacy and the provision of cost-effective digital resources, whether undertaken by governmental entities or private enterprises, thus have significant importance in this regard.

Second, there are several concerns of risk that impede the dissemination of DFI (Ceyla & Garcia, 2020), including financial consumer protection, the importance of data privacy, and the complex issues associated with cybersecurity. For example, in a hypothetical situation in which the digital framework of a prominent financial institution is breached, the personal and financial information of many clients would be put at risk. These breaches not only harm individual users but also undermine trust in the industry. Therefore, the deployment of stringent security measures and regular evaluations is imperative for DFI. Furthermore, it is the responsibility of regulatory bodies to develop transparent standards and ensure adherence to these standards in order to maintain public confidence.

Third, complex and diverse regulatory frameworks in various national and regional settings might pose obstacles to DFI that need careful navigation (Beck & Maimbo, 2013). For instance, stringent know-your-customer requirements may prevent the achievement of financial inclusion, particularly for those without an official identity (Demirguc-Kunt et al., 2018). Exploring the potential of emerging regulatory technology may provide answers to this dilemma.

On a different note, the fourth barrier is that gender biases may potentially limit women's access to digital financial services (Antonio & Tuffley, 2014). This phenomenon can be seen in several areas, such as disparities in mobile phone ownership as well as the influence of longstanding cultural norms that control financial autonomy (Aker et al., 2016). Socio-cultural structures within certain locales might exacerbate these issues, resulting in a noticeable gender gap in financial access. Therefore, it is vital to implement focused educational efforts, assistance programs, legislation changes, and collaborative initiatives with local communities towards promoting equal access to financial resources for both genders. Such initiatives have the potential to provide interventions that are characterized by a greater level of complexity and cultural sensitivity.

Finally, it should be noted that although emerging technologies like blockchain, AI, and big data hold immense promise (Javaid et al., 2021), their implementation is not without intrinsic difficulties, such as those related to energy use, scalability, and interoperability (Lv, 2023). Furthermore, the energy-intensive nature of blockchain technology may give rise to environmental concerns. To overcome these problems, it is crucial to conduct comprehensive planning, thorough research, and joint efforts, particularly with clear regulatory guidelines.

A comprehensive understanding of the various issues involving DFI is essential for academics, policymakers, and industry practitioners to effectively exploit the possibilities of DFI while recognizing the complex interconnections that define its limitations. Subsequently, these stakeholders can develop informed ways to overcome the challenges facing digital financial services and create a more inclusive global financial structure.

In conclusion, this literature review provides a concise overview of the fundamental research areas that form the basis of DFI. Acknowledging the need for a more comprehensive perspective, it is proposed that a bibliometric study, with a specific focus on quantitative aspects, would advance the understanding of this concept. Therefore, this study consolidates the current DFI literature, highlighting prominent authors, research locations, subject areas, and funding organizations. It further identifies the existing knowledge gaps, present status, and developing patterns and trends within the field, thus offering directions for future research. Apart from enhancing the comprehension of DFI, this study also aims to shed light on innovative approaches that need more investigation as well as to guarantee that research aligns with the changing intricacies and newest discoveries on DFI.

3 Methodology

For bibliometric analysis, this study chose DFI-related studies between 2005 and 2022 from the Scopus database. The selection methods and rationales are as follows. First, the year 2005 was selected as the base year because DFI can trace its roots back to the United Nations' initiative to provide banking service access to the unbanked, which was launched that year. On the other end, due to incomplete information in 2023, the selection time frame was concluded at the year 2022. Next, the Scopus database was chosen because of its extensive index, which contains more than 22,000 articles from over 5,000 publishers throughout the globe. The database provides a wealth of relevant publications, conference proceedings, and patents on topics crucial to DFI, including information technology, software engineering, computer science, and more. Notably, its collection includes resources on the financial and regulatory aspects of DFI, as well as its technological components, such as mobile banking and digital wallets. Thus, Scopus's comprehensive scope offers a multifaceted and international view of DFI.

Additionally, the study's rigorous search process incorporated exclusion and inclusion criteria to ensure the comprehensive and precise acquisition of relevant literature. In particular, constraints were used to limit the publication year to 2005 to 2022, language to English, and publication stage to final. The search string also aligned with the specified criteria, consisting of the following keywords: "digital," "financial," and "inclusion." This structured approach, with specific keyword combinations and filtering parameters, was meticulously designed to capture maximum relevant content from the database while accommodating variations in terminology and phrasing. Through this process, the search yielded 937 publications, of which 884 were already available and 53 were in the process of being published. To preserve validity and applicability in line with the study criteria, papers to be published after 2023 were disregarded, leaving 790 for analysis.

The 790 papers were subjected to a detailed analytical procedure to attain robust bibliometric results. First, the selected studies' abstract, introduction, methodology, and conclusion sections were examined to detect repeating themes on DFI.

Correspondingly, a co-occurrence analysis of the publications was conducted to reveal frequently matched terms and topics in the DFI literature. VOSviewer software was then used to construct graphical representations of key indicators, such as Documents by Year, Subject Area, Funding Sponsor, Affiliation, and Country or Territory. This analysis illustrated the timeline, interdisciplinarity, and global reach of the study area. Finally, the researchers created word clouds, co-authorship maps, and co-occurrence maps as visual aids to draw attention to key collaborations, themes, patterns, trends, and gaps in the literature, thus providing a full picture of where DFI research stands at present.

4. Findings

4.1 Analysis of word cloud for article titles

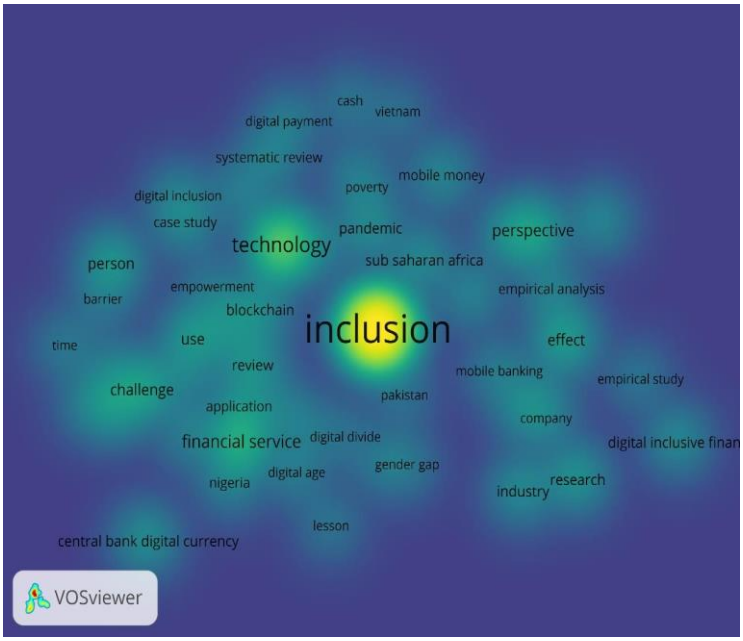

Figure 1: *Word cloud analysis of article titles*

Figure 1 depicts a word cloud representing significant concepts in the study of DFI. The concept of "inclusion," which stresses the need to increase low-income groups' access to resources, appears to be the most prominent in research efforts (Xue & Zhang, 2022). It is surrounded by concepts like "technology," "blockchain," and "mobile banking," all of which point to the importance of technological solutions in the current state of financial inclusion (Barroso & Laborda, 2022). Words like "Vietnam" and "Sub-Saharan Africa" in the cloud

show an interest in developing economies, while the contrast between "empowerment" and "barrier" highlights the two-sided nature of digital finance (Jiang et al., 2023) as it grows amid globalization. The rising usage of the terms "empowerment" and "person" in financial technology also embodies a shift towards a user-centered approach, with an emphasis on empowerment rather than just access. Another trend toward government oversight of financial innovation can be observed in the emergence of "central bank digital currency" (CBDC), as per Qamruzzaman (2023). Notably, the word “pandemic” highlights how the global health crisis has worsened financial inequities (Tay et al., 2022).

Overall, the word cloud illustrates not just the promise of technology-driven financial inclusion, but also the complex difficulties that need to be collaboratively solved by academics, governments, the financial industry, and communities to guarantee that all people enjoy the same level and advantages of financial security. To this end, examining regional variations, the effect of CBDCs, and the ways in which concerns like gender and poverty are handled in digital finance development are all possible areas for further study.

4.2 Analysis of documents by source

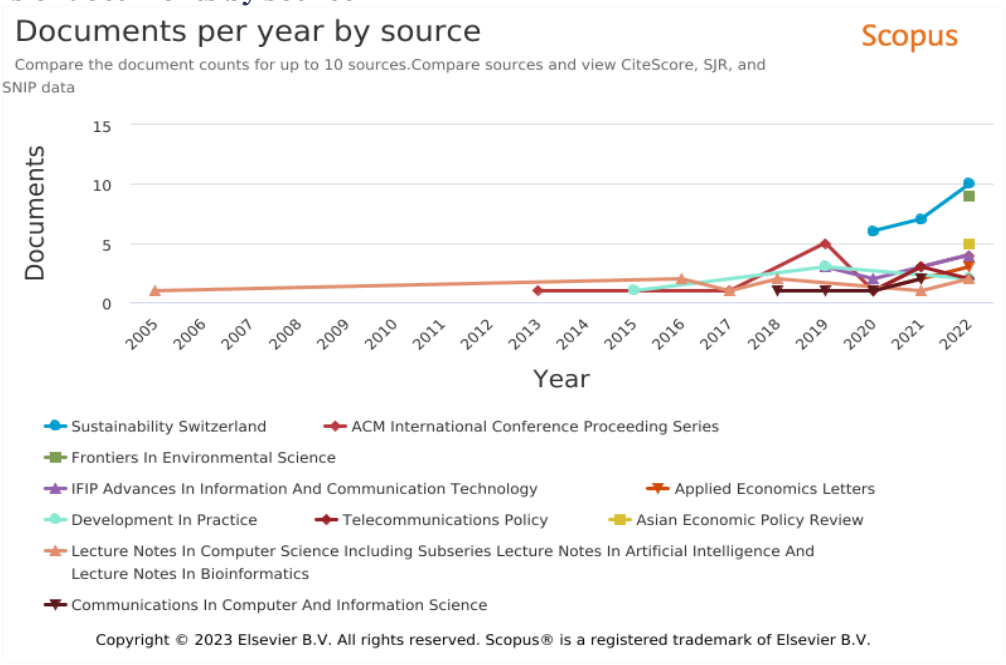

Figure 2 *Documents by Source*

Figure 2 provides insight into the key sources of developments in the study of DFI. With its 23 papers, "Sustainability Switzerland" espouses the scholarly shift toward the nexus of sustainable development and digital finance (Zhuang et al., 2022). This may be indicative of a research trajectory that is sensitive to global sustainability objectives, since it coincides with what seems to be a growing agreement on the importance of integrating financial technology with sustainability goals. Following the year 2020, there was a significant uptick in the number of papers published in the "ACM International Conference Proceeding Series," bringing the series' total to 15. Corresponding with the widespread use of digital technologies in response to the impending pandemic (Tay et al., 2022), this trend reflects the tech community's readiness to respond quickly to new global concerns by researching technology breakthroughs that close the financial inclusion gap during crises. Although the number of publications on the economic analysis of digital finance has decreased, its stability in "Applied Economics Letters" and "Asian Economic Policy Review" suggests that interest in this area has not faded. Rather, the consistent academic production echoes the ongoing conversation about the regulatory implications and economic strategies of digital finance, which is particularly timely for the quickly digitizing markets of Asia (Xue et al., 2023).

Overall, the data shows that DFI research has been conducted in a wide variety of fields, ranging from environmental policy to computer science, with heightened academic attention on sustainable digital finance and its technical improvements. This represents the complex and multidisciplinary nature of DFI, which necessitates a comprehensive strategy, nuanced analysis, and relevant cross-sector input to move the scholarly debate forward and promote inclusive finance.

4.3 Analysis of publications by year

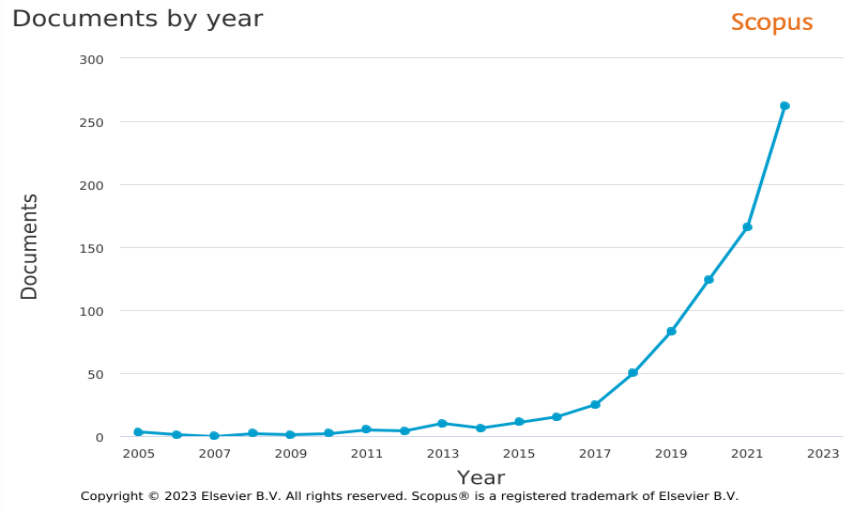

Figure 3: *Documents by year*

Figure 3 shows a general upward trend in the publication of DFI-related papers from 2005 to 2022. Less attention was paid up to 2018, with the number of publications being below 50 per year. From 2018 onwards, however, the number of annual publications rose rapidly, even exceeding 250 in 2022. The increasing attention to DFI in the last five years makes sense, as this timeframe marks significant advancements in both the digital technology and financial sectors. The study of DFI has therefore become more important in the current age of smartphones, internet banking, fintech firms, and new regulatory frameworks.

4.4 Analysis by subject area

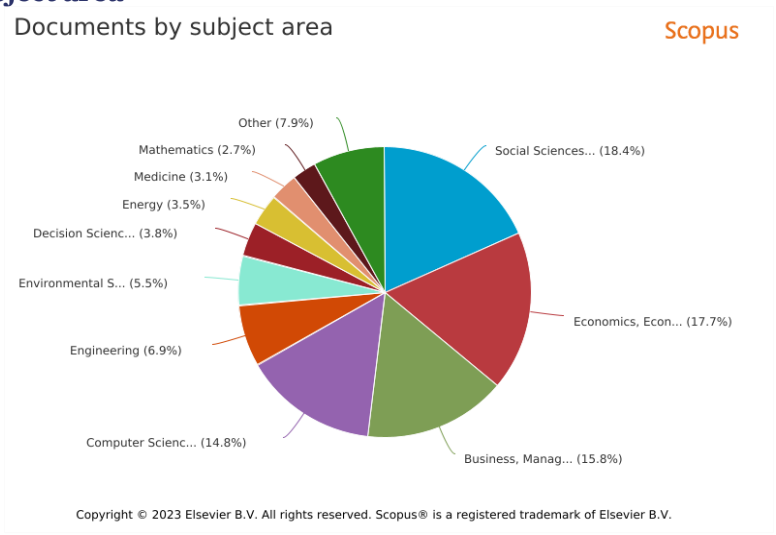

Figure 4: *Documents by subject area*

As can be seen in Figure 4, DFI has been studied across a wide range of academic disciplines, significantly impacting their development. The social sciences tops the list, accounting for 18.4% of the total number of articles on DFI. The economics, econometrics, and finance domain ranks second at 17.7%, followed by the business, management, or accounting field at 15.8%. Another area with substantial published work on DFI is computer science (14.8 percent). Although less prominent, the disciplines of engineering, mathematics, and statistics have also contributed to the literature on DFI.

The fact that DFI studies have been conducted in many different areas has farreaching consequences. For one, it highlights the multiple facets of DFI, from the technological to the socioeconomic and the managerial. While the proliferation of studies in economics, finance, and business domains underlines the significance of economic structures and commercial tactics in DFI research, the prominence of social science implies a focus on the human and societal consequences of DFI. The high level of interest from the field of computer science further indicates a technical motivation, as it reflects the need for new developments in digital tools and platforms. Considering the interdisciplinarity of DFI, it may be necessary to collaborate across multiple research disciplines to properly comprehend and utilize its full potential. However, this dispersion might make it harder to compile a unified body of knowledge, requiring joint efforts to develop interdisciplinary standards and methods.

4.5 Analysis by funding sponsor

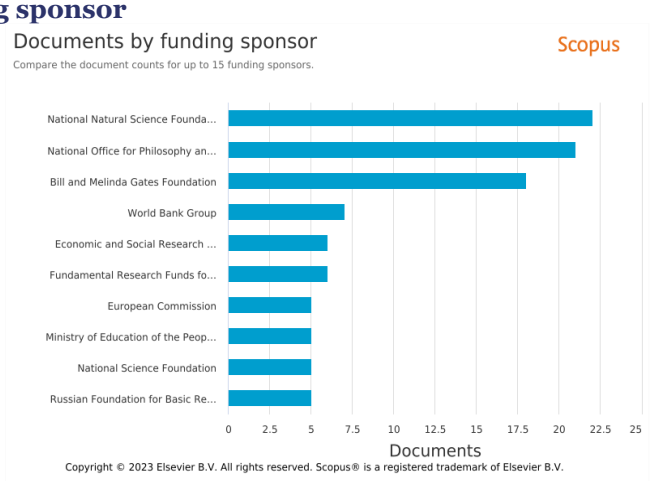

Figure 5: *Documents by funding sponsor*

Figure 5 illustrates that myriad financial sponsors have played a significant role in facilitating DFI-related research, with the National Natural Science Foundation of China being the most prominent. Approximately 22 publications in the field have been funded by this foundation, indicating not only its vast contribution but also the Chinese government's urgency and support for the development of DFI (Wang et al., 2023). China's National Office for Philosophy and Social Sciences has also provided substantial support for DFI research, with 21 sponsored publications, followed by The Bill and Melinda Gates Foundation with 18 funded papers. Other sponsors, including governmental organizations and private foundations, have contributed to DFI research to a lesser extent, with less than seven publications each.

The substantial involvement of both governmental organizations and private foundations in DFI research reflects a broad interest in this concept across various sectors. On the one hand, this attention can foster multidisciplinary collaboration and innovation in the field. On the other hand, the disparity in funding between major sponsors and other entities might also signal potential inequalities in research opportunities and resources. Such imbalances may limit the diversity of research perspectives and hinder the development of a comprehensive understanding of DFI. Therefore, future strategies may need to address these inequalities to ensure the balanced and holistic growth of DFI research.

4.6 Analysis of affiliations

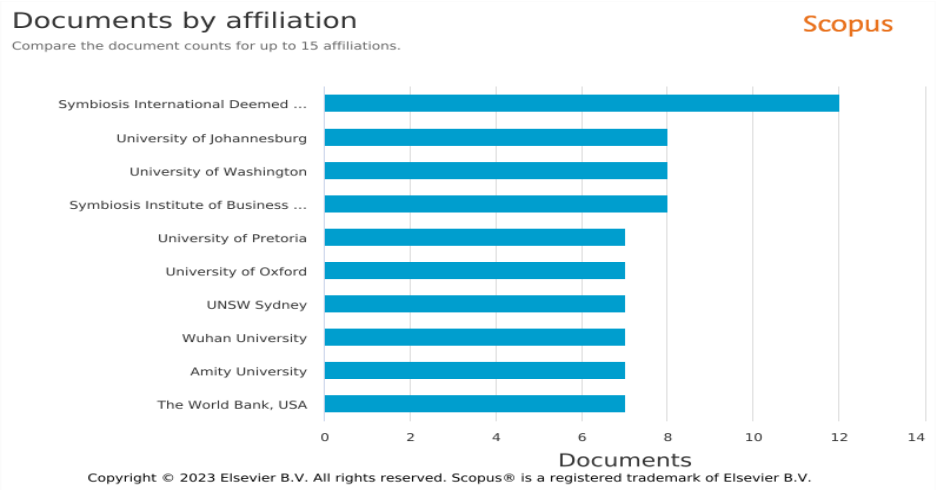

Figure 6: *Documents by affiliation*

Figure 6 highlights the institutions affiliated with the most publications on DFI. Evidently, the Symbiosis International Deemed University in Pune, India has strongly focused on DFI, with 12 publications to their name. The University of Johannesburg, University of Washington, and Symbiosis Institute of Business Management, Pune, with eight publications each, also appear to have robustly engaged with the subject matter. The diverse institutional and geographical distribution of these organizations clearly showcases the global attention drawn by DFI, thereby opening avenues for potential collaboration and competition that shape future research directions, publicprivate partnerships, and the development of educational programs tailored to DFI. Finally, these institutions' concentration on DFI research might attract more scholars, policymakers, and practitioners to the field, further strengthening the discourse and action towards inclusive digital financial services.

4.7 Analysis of countries

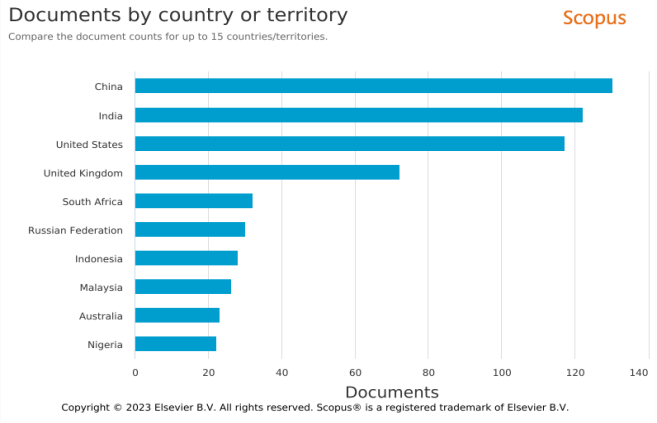

Figure 7: *Documents by country or territory*

When looking at DFI studies as a whole, a significant geographical divide becomes evident. There are 128 and 121 publications on DFI research in China and India, respectively (Arshad et al., 2021; Tay et al., 2022; Dela Cruz et al., 2023), demonstrating these developing nations' dedication to DFI for economic and social development. Countries like Brazil, Nigeria, and Pakistan also make considerable contributions. However, affluent nations like the United States and the United Kingdom have fewer DFI publications, suggesting that the value of DFI is being overlooked there.

Three main inferences can be drawn from this pattern. To begin, DFI is more crucial to developing countries for combating poverty and expanding access to financial services. Second, global DFI policy acceptance and international collaboration might be hampered by the lack of attention to DFI in developed nations. Finally, DFI research in developing nations probably adopts a region-specific approach to address the nations' specific issues, resulting in locally tailored solutions that are less transferable to more economically advanced ones. Therefore, the global trajectory and effect of DFI may be affected by how research resources are divided between developing and developed countries, which has implications for both groups' policy, investment, and technological advancements.

4.8 Co-authorship (Countries)

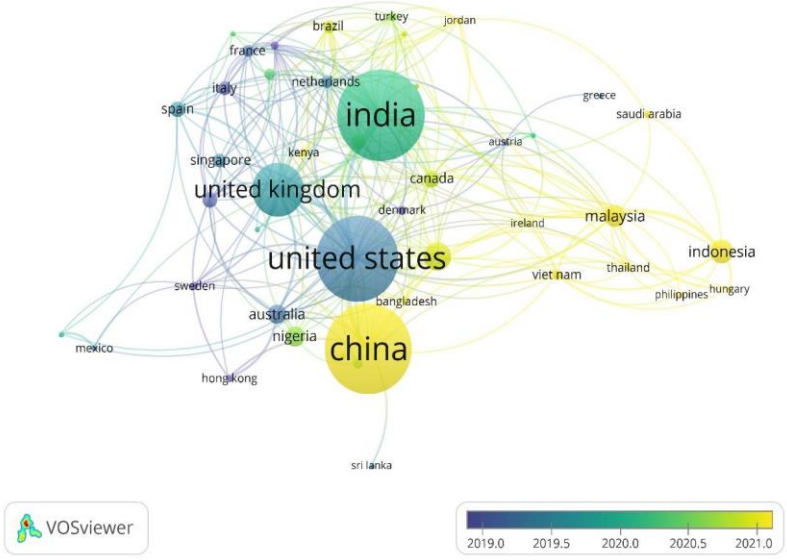

Figure 8: *Co-authorship (Countries)*

The frequency and interconnection of DFI research is shown by the co-authorship network in Figure 8. China, the United States, India, and the United Kingdom stand out as leaders in this field, as seen by the number of linkages between their research institutions and those of others throughout the world. With the largest node, China establishes not only its position as a major contributor to the literature, but also its role as a pioneer in digital payment systems like Alipay and WeChat Pay, which have thrived despite the epidemic (Sleiman et al., 2023; Qiu et al., 2022). Indeed, the emergence of digital payment systems in populous countries like China and India signifies a tilt toward a digital global economy, with major consequences for international commerce,

regulatory frameworks, and economic policy-making (Di et al., 2022). The importance of these countries in both embracing digital finance and creating global financial systems is reflected in their prominence in the network.

Similarly, the United States and the United Kingdom continue to exhibit their longstanding research competence, with their wide linkages indicating that they still guide the research debate. Smaller nodes, such as Malaysia and South Africa, are also participating in the network, suggesting that the knowledge base is expanding and different viewpoints are being shared, both of which contribute to a more welcoming financial climate. Essentially, Figure 8 depicts a strong, dynamic multinational partnership that is advancing the field of DFI via research initiatives that affect the implementation of policy and practice worldwide, aligning with larger sustainable development objectives.

4.9 Co-occurrence (Author Keywords)

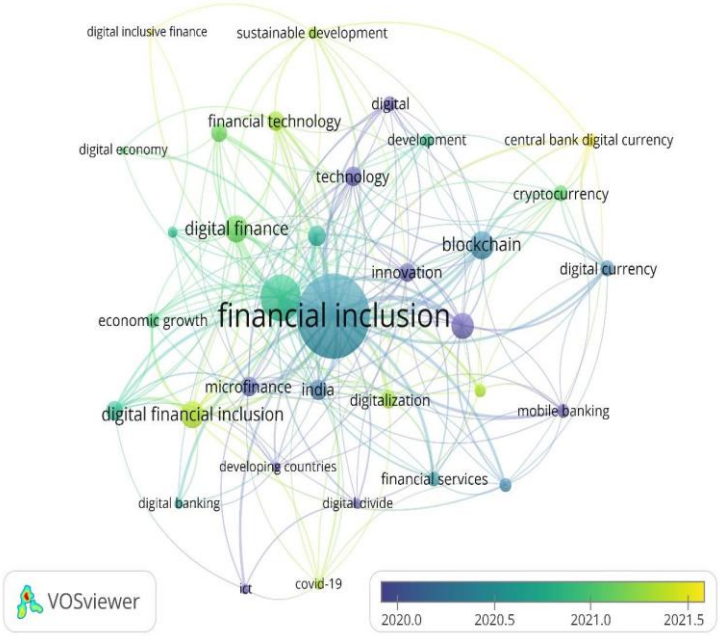

Figure 9: *Co-occurrence (Author Keywords)*

Figure 9 is a bibliometric network map of author keyword co-occurrence in the DFI literature. This visual data illustrates the interrelated nature of distinct study topics within the discipline. As shown in the figure, the term "financial inclusion" is central to the present network of DFI research. It connects several different areas that are crucial to comprehending the multidimensional nature of financial inclusion, such as "digital finance," "economic growth," "microfinance," and "digital banking." The growing importance of the term "financial inclusion" indicates the academic community's interest in investigating accessible digital financial systems for underprivileged communities (Lucero-Prisno et al., 2022).

The strong nodes and extensive links among 'digital economy', 'financial technology', 'digitalization', and 'digital financial services' reveal that these are not separate themes but actually converging areas of academic emphasis. These associations are illustrative of the financial sector's revolutionary shift toward digitalization, mirroring current research trends as well (Vasile et al., 2021). Moreover, the prominence of 'sustainable development' and 'economic development' in this network demonstrates the scholarly predisposition to combine financial services with long-term economic aims and sustainable practices (Tay et al., 2022). This is evidence that the literature is beginning to recognize the importance of finance in fostering long-term economic growth and development (Ramzan et al., 2023).

The blue-to-yellow timeline at the bottom of the figure depicts the scholastic trajectory that relies primarily on digital advances from 2020 to early 2021. More and more references to cryptocurrencies, blockchain, and mobile banking show how the environment is constantly changing to accommodate advancements in financial technology (Haykir & Yagli, 2022; Saeed et al., 2023). In this context, the sudden appearance of 'COVID-19' is indicative of the pandemic's disorienting effect on DFI research, as academics had to refocus their attention on the virus's far-reaching effects on the economy and the financial sector (Tay et al., 2022).

Overall, Figure 9 is a visual representation of both the academic community's reaction to recent events and larger trends in the global economy. Specifically, it reflects the interconnectedness of DFI trends, capturing the dynamic growth of research themes over time as well as a clear shift towards issues at the nexus of digital technology, financial inclusion, and sustainability. This change is consistent with broader financial trends, reflecting a growing awareness of the need for secure, digitally enabled, and accessible financial institutions as the world confronts the difficulties of the COVID19 pandemic.

5. Discussion and Conclusion

DFI is transforming financial services, especially in emerging economies like China and India, by facilitating economic growth, poverty reduction, and social advancement. Its impact is evident in the way it has made payment, credit, and financing services more accessible and affordable. Consequently, this technological integration has been instrumental in bridging the digital divide, linking increased financial participation with reduced inequality and greater social and economic justice. However, a disparity exists in DFI research — emerging nations are awarding more attention to DFI than developed ones, creating a knowledge gap that could hinder balanced global financial advancement. To address this, international collaboration, information sharing, and coordinated policymaking in DFI research are vital to ensure digital banking achieves its potential in expanding financial service access and reducing global inequality.

Co-authorship trends in DFI research indicate the democratization of information and technology and highlight the leading roles played by countries like China, the United States, India, and the United Kingdom. The extensive network of relationships between their research institutes and those throughout the world attests to their superiority in directing DFI discourse and activity, especially in the creation and adoption of cutting-edge digital payment systems. As the main hub in this system, China is a prime example of this kind of leadership for two reasons. First, it is a key contributor to the academic literature on DFI, and second, it is a pioneer in the development and widespread use of digital payment systems like Alipay and WeChat Pay. Notably, the resilience and creativity shown by these systems in the face of the COVID-19 epidemic is indicative of the future of digital commerce.

Indeed, the growth of digital payment systems in highly populated nations like China and India indicates a dramatic change towards a digital global economy, which not only represents the technical progress of these countries, but also signals their capacity to influence the economic patterns and policies of the rest of the world. The widespread acceptance and implementation of their digital payment systems is an important step toward creating a more unified and productive international economy. This shift toward a digital economy is propelled by the joint research and development (R&D) efforts of these top nations, suggesting that digital transactions will come to dominate the global financial landscape in the near future. It also suggests that the technologies and regulations originating from these powerful countries would likely guide the way to attaining complete DFI. Their impact thus extends far beyond their boundaries, defining the future of international finance and, by extension, the economic fortunes of other nations.

The academic landscape is always changing, and the bibliometric network map of author keyword co-occurrence provides insight into the future of the DFI literature. The position of ‘financial inclusion’ at the center of the network map asserts the prevailing academic consensus that the world urgently needs a more diverse and welcoming digital financial ecosystem in the aftermath of the shocking recent global epidemic. The concept’s significance suggests exploring related topics, such as the role of digital financial services in crisis management and recovery. Further research might also look into the resilience of digital banking infrastructures against global disruptions, as well as how these infrastructures can be improved to serve vulnerable areas during such occurrences.

Scholarly works on new technology seem to be on the rise as well, indicating that academic pursuits are swiftly adapting to the latest developments in the financial sector. The shifting paradigm of financial service delivery and its consequences for regulatory frameworks may be better understood with deeper investigations into the systemic revolution brought on by these technologies. Additionally, the recent academic emphasis on ‘'sustainable development' and 'economic development' provides a window of opportunity to investigate the mutually beneficial connection between sustainable practices and the expansion of the financial sector. For example, sustainable finance projects may be studied to see whether they strengthen the economy as a whole and if they meet environmental, social, and governance (ESG) standards.

There is a clear change happening in the field of DFI study towards a more integrated view of financial systems, in which it is recognized that technology developments, economic expansion, and environmental sustainability are not separate but rather interdependent phenomena. This holistic approach promotes interdisciplinary discussion among experts from the fields of finance, economics, technology, and policymaking to tackle the challenges of expanding access to digital financial services. To obtain an even more complete picture of how digital finance can achieve global economic objectives, it may also be useful to include the insights of specialists from fields as varied as behavioral economics, data science, and sustainability in future conversations.

In conclusion, this bibliometric study of DFI evinces a dramatic movement towards digital technology adoption in financial services, especially in developing countries like China and India where these technologies are crucial for economic growth and equality. The COVID-19 pandemic has further highlighted that recovery and resilience in at-risk areas are bolstered by universal access to digital financial services. Despite these benefits, the knowledge gap due to differences in research priorities between developing and developed countries raises concern. Nonetheless, countries with sophisticated research infrastructures, such as China, the United States, India, and the United Kingdom, are taking the lead in shaping the international conversation on the transition to a digital economy.

So, what is the way forward? Based on the current findings, future DFI research should address the imbalance between developing and industrialized countries and explore the regulatory consequences of financial technology innovations to successfully navigate the changing financial service environment.

The global economy also has much to learn from studies on digital finance's resilience and role in crisis management, as well as on the compatibility of sustainable finance projects with ESG norms, which is crucial for long-term economic viability. Additionally, the understanding of DFI's role in achieving international economic objectives can be improved via multidisciplinary research that incorporates behavioral economics, data science, and sustainability. Ultimately, to manage the complexity of emerging digital financial services and ensure that DFI positively contributes to the global quest for economic equality and sustainability, collaboration amongst academics, economists, engineers, and policymakers is imperative.

7. Limitations of the study

This extensive bibliometric study offers useful insights into the research landscape of DFI. Nevertheless, it is important to recognize its limitations, as they may affect the interpretation of the study's findings and the conclusions drawn from them.

First, obtaining the necessary literature from scholarly archives is a precondition for bibliometric analysis. Due to this method's reliance on scholarly publications, however, this study may have overlooked key works from other significant sources, distorting the overall picture of the field. Second, the selection criteria and data sources used may have introduced linguistic bias, geographical coverage limits, or the exclusion of certain types of publications from the analysis. Finally, the study may have neglected to examine the quality and depth of individual publications due to its focus on quantitative characteristics like publication output, keyword occurrence, and co-authorship patterns. While these indicators do reflect a publication's quality, they may not convey the complexity of each publication's relevance. Thus, to fully grasp the significance of the research corpus, further qualitative evaluations beyond bibliometrics may be necessary.

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