The role of financial inclusion and ICTs in shaping inclusive growth: A bibliometric analysis of past, present, and future trends

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DOI:	Received:	Revised:	Accepted:	Published:
10.22437/ppd.v14i1.44019	13.05.2025	14.04.2026	25.04.2026	30.04.2026

Abstract

This study conducts a comprehensive bibliometric analysis to map and review the scientific literature on the role of financial inclusion (FI) and information and communication technologies (ICTs) in fostering inclusive growth, using the Scopus database. Although previous studies have examined FI, ICTs, and inclusive growth separately, few have systematically integrated their intellectual structures into a unified framework. The bibliometric analysis includes co-citation, bibliographic coupling, and co-word analyses, supported by VOSviewer software. The findings indicate that digital finance plays a significant role in driving financial inclusion and inclusive growth. Current research shows that financial inclusion reduces poverty and income inequality, while ICTs promote economic growth and innovation in fintech and digital financial systems. Emerging themes, including digital financial inclusion, fintech, microfinance, innovation, and sustainability, represent important research trends and future directions. Overall, the integrated findings demonstrate the growing role of digitally enabled financial systems in supporting inclusive economic development.

Keywords: *Bibliometric analysis; Digital finance; Financial inclusion; ICTs; Inclusive growth*

JEL Classification: O15, O33, G21, I32

INTRODUCTION

Financial inclusion (FI) has emerged as a central pillar of global economic development policy, particularly in the developing world, driven by the imperative to address socio-economic challenges in the aftermath of the 2008 financial crisis (Demirgüç-Kunt et al., 2022). Empirical evidence demonstrates that financial inclusion is a key driver of inclusive growth, as the spillover effects of economic development are distributed across society through poverty reduction, decreased income inequality, and employment generation. Despite this, significant challenges continue to undermine the effectiveness of FI programs. These include constraints such as limited mobile network coverage, low internet penetration, and restricted access to banking facilities, particularly in rural and remote areas (Demirgüç-Kunt et al., 2022; Ozili, 2021; Gutiérrez-Romero and Ahamed, 2021).

Another obstacle concerns literacy and education, as individuals may struggle to use financial products and services effectively due to limited comprehension (Pradhan, 2023). The development of Information and Communication Technologies (ICTs), supported by adequate digital infrastructure and complemented by digital literacy, helps to overcome these barriers and facilitates effective financial inclusion through the use of digital financial services (Suri & Jack, 2016; Guerra-Leal et al., 2023).

Although bibliometric analysis in the field of financial inclusion and ICTs has expanded considerably in recent years, existing studies remain fragmented across different research domains. Several bibliometric studies have examined the evolution of financial inclusion literature (Sang, 2023; Priyan et al., 2023; Parra et al., 2022; Chhatoi et al., 2021; Ozili, 2021), while others have focused on specific dimensions, such as financial system aspects (Gálvez-Sánchez et al., 2021), women's financial inclusion (Mushtaq et al., 2023), and investment-related financial inclusion (Pranajaya et al., 2024). In the context of ICT-related financial inclusion, prior research has explored microfinance and ICTs (Liu et al., 2023), digital financial inclusion (Gallego-Losada et al., 2023), and fintech-based financial services (Poonam & Chhikara, 2022). However, these studies primarily address isolated components of the financial inclusion–ICT nexus and do not provide an integrated bibliometric mapping that links financial inclusion, ICTs, and inclusive growth within a unified analytical framework.

Accordingly, this study addresses this conceptual fragmentation by developing an integrated bibliometric approach that simultaneously examines financial inclusion, ICTs, and inclusive growth. By combining co-citation, bibliographic coupling, and co-word analyses, the study offers a comprehensive mapping of foundational knowledge, current thematic developments, and emerging research directions within this interconnected research domain.

It is important to acknowledge that the relationships among financial inclusion, ICTs, fintech development, and economic growth have been widely examined in prior studies. Therefore, the contribution of this study lies not in establishing these individual relationships but in integrating these domains into a unified bibliometric framework that reveals their interconnected knowledge structure and thematic evolution.

Furthermore, existing studies rarely provide a systematic methodological integration that explains how foundational knowledge structures evolve into current research themes and future research directions, indicating an unresolved structural gap within this research domain.

The main objective of this study is to conduct a comprehensive bibliometric analysis that provides an extensive overview and mapping of scientific publications on these topics. The specific objectives of the study are addressed through the following research questions (RQs):

RQ1: What are the foundational intellectual structures underlying research that links financial inclusion, ICTs, and inclusive growth?

RQ2: How have the thematic structures of research evolved within the financial inclusion–ICT–inclusive growth nexus?

RQ3: What emerging research themes and future directions are likely to shape the development of this research domain?

Taken together, these research questions aim to provide a more integrated understanding of how financial inclusion, ICTs, and inclusive growth are interconnected within an evolving research landscape. Addressing this issue requires not only mapping the existing literature but also grounding the analysis in a clear conceptual framework that explains the underlying relationships among these key constructs. To this end, this

study draws on several complementary theoretical perspectives to explain the relationship between financial inclusion, ICT adoption, and inclusive growth.

Specifically, financial development theory emphasizes the role of financial systems in improving capital allocation, reducing poverty, and enhancing economic productivity, highlighting how expanded access to finance supports inclusive economic participation. Digital economy theory further explains the transformative role of information and communication technologies (ICTs) in enabling efficient financial services, fostering innovation, and supporting digital financial ecosystems. The inclusive growth framework provides a basis for understanding how financial accessibility and technological infrastructure contribute to equitable socio-economic development.

Additionally, diffusion of technology theory helps explain how technological innovations, such as fintech and digital financial platforms, spread across populations and institutions, thereby influencing financial accessibility and economic inclusion. Collectively, these theoretical perspectives provide a conceptual foundation for interpreting the evolving relationship between financial inclusion, ICT adoption, and inclusive growth outcomes. Building on these perspectives, a growing body of empirical research has examined the relationships among financial inclusion, ICT adoption, and inclusive growth across diverse socio-economic contexts.

Financial inclusion has been widely recognized as a fundamental driver of inclusive economic development. Access to formal financial services enables households and small businesses to save, invest, and manage risks more effectively, thereby improving economic resilience and reducing income inequality. Numerous studies have shown that increased access to financial services contributes to poverty reduction and enhances socio-economic participation across different population groups.

Furthermore, financial inclusion supports inclusive growth by expanding opportunities for marginalized communities and facilitating access to credit, insurance, and digital financial services. The integration of financial services into broader economic systems enables a more equitable distribution of resources and supports long-term development outcomes. These findings underscore the critical role of financial inclusion as a mechanism linking financial access to broader inclusive growth objectives.

The rapid advancement of information and communication technologies (ICTs) has significantly transformed traditional financial systems into digital financial ecosystems. ICT adoption enables broader access to financial services by reducing geographical and institutional barriers, particularly for underserved populations and remote communities. Digital technologies, such as mobile banking, online payment systems, and fintech platforms, have enhanced financial accessibility, efficiency, and transparency in financial transactions.

Moreover, ICT-driven financial systems support financial inclusion by facilitating low-cost financial services and enabling real-time financial interactions. The integration of ICTs into financial services fosters innovation and strengthens financial infrastructure, thereby improving economic productivity and expanding access to financial resources. These developments highlight the essential role of ICTs as an enabling mechanism that connects financial inclusion initiatives with broader inclusive growth outcomes.

METHODS

Bibliometric analysis

Bibliometric analysis is a quantitative methodology that provides an overview and a map of the academic literature by examining bibliographic data. This approach applies

statistical and computational techniques to evaluate the structure and interconnections of scholarly work within a specific field. It also enables the visualization of relationships, such as maps or networks, depicting connections among research topics based on authors, journals, or institutions (Donthu et al., 2021). In this study, VOSviewer software (version 1.6.20) was employed to construct and visualize bibliometric networks. Co-citation analysis was used to identify foundational research, underlying themes, and influential studies (RQ1). Bibliographic coupling analysis was applied to determine dominant research themes and current developments (RQ2). In contrast, co-word analysis (i.e., keyword co-occurrence) was utilized to identify emerging research directions, trends, and key issues within the nexus of financial inclusion (FI), ICTs, and inclusive growth (RQ3).

Within bibliometric methods, co-citation analysis is used to examine influential earlier research and the development of underlying themes (Donthu et al., 2021). This method refers to instances where two documents are cited together in at least one subsequent publication. When a later document cites two earlier documents simultaneously, those documents are considered co-cited. The frequency with which two documents are cited together is called co-citation frequency or strength. A higher co-citation frequency indicates a stronger intellectual linkage, suggesting that the documents share conceptual or thematic relevance.

Second, bibliographic coupling is employed to analyze current research themes and track their development (Donthu et al., 2021). Bibliographic coupling occurs when two documents cite one or more references in common. In practice, this is identified through overlaps in the reference lists of the documents. If at least one shared reference exists, the documents are considered bibliographically coupled. The number of shared references represents the coupling strength, with a higher number indicating a stronger relationship. This method is particularly useful for assessing contemporary research trends and the ongoing evolution of thematic areas.

Third, co-word analysis is used to identify research directions, uncover emerging trends, and trace the development of scientific knowledge within a field. This method analyzes the co-occurrence of words or terms within documents to reveal the thematic structure of the literature. Frequently co-occurring terms are grouped into clusters representing specific research themes. In the resulting network, nodes represent keywords or terms, while edges indicate the frequency of their co-occurrence (Lim and Kumar, 2024; Donthu et al., 2021).

Threshold selection is a critical step in constructing bibliometric networks across co-citation, bibliographic coupling, and co-word analyses. If thresholds are set too low, the resulting networks may become overly dense, with redundant themes and limited interpretability. Conversely, excessively high thresholds may exclude relevant documents, leading to fragmented and incomplete thematic structures. Prior studies suggest that no universally fixed criteria exist for determining threshold values; instead, thresholds are typically selected through an iterative process that balances citation or occurrence levels to produce meaningful and interpretable clusters (Nawanir and Fauzi, 2024; Geng et al., 2020; Lim and Kumar, 2024).

In this study, threshold values for co-citation, bibliographic coupling, and co-word analyses were determined through multiple iterative trials, with dataset size and visualization clarity taken into account. The final thresholds were selected to retain meaningful thematic structures while minimizing redundancy and noise, thereby enhancing the reliability of bibliometric visualization and interpretation (Lim and Kumar, 2024; Donthu et al., 2021; Xu et al., 2024).

Data and procedure

This study followed a structured bibliometric procedure adapted from established guidelines (Donthu et al., 2021; Zupic & Čater, 2015; Mukherjee et al., 2022). The procedure began by defining the research objectives and questions to clarify the study's focus on financial inclusion, ICTs, and inclusive growth, and to identify thematic developments and potential research gaps. Scopus was selected as the primary bibliometric database for its extensive journal coverage and strong representation in economics, finance, and development studies. The database also provides high-quality indexing standards and reliable metadata suitable for bibliometric analysis.

The next stage involved constructing the search query using combinations of search strings, as presented in Table 1. The query was developed using Boolean operators, relevant keywords, and keyword synonyms to ensure comprehensive literature coverage while minimizing the exclusion of relevant studies. The search was conducted in the Scopus database using predefined queries, and all retrieved records were exported to CSV to facilitate data cleaning and bibliometric analysis in VOSviewer.

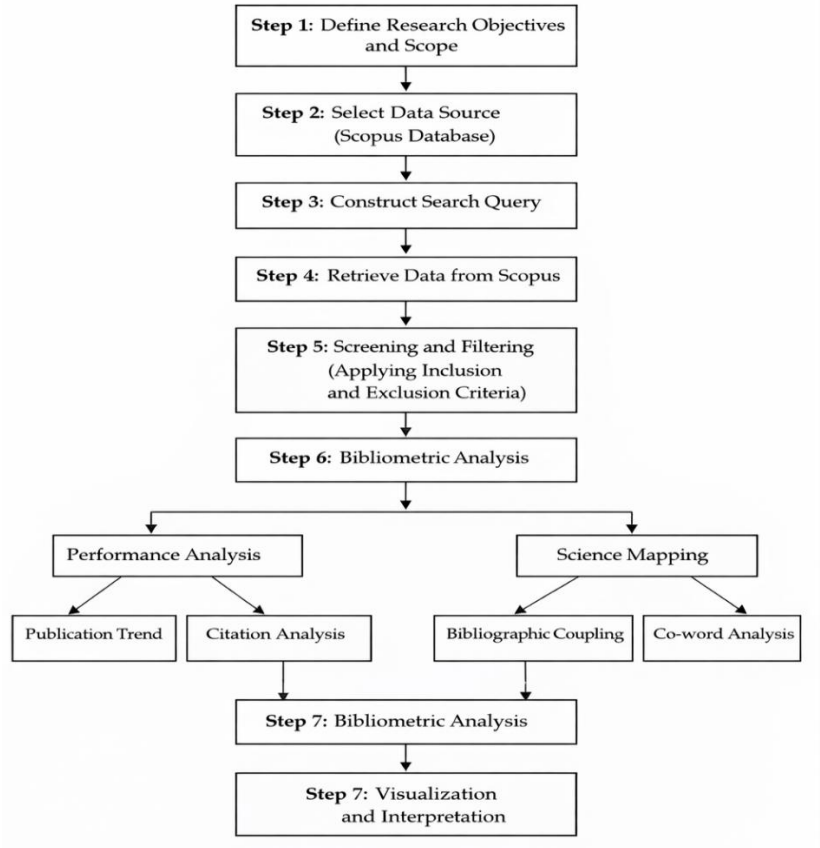

Figure 1. Stages of the bibliometric analysis workflow

Source: Adapted from Mukherjee et al. (2022); Donthu et al. (2021); Zupic and Čater (2015), and developed by the authors.

Following data retrieval, a systematic screening and filtering process was undertaken to ensure data relevance and quality. The inclusion criteria comprised peer-reviewed journal articles on financial inclusion, ICTs, and inclusive growth published between 2010 and 2024. The exclusion criteria included conference papers, book chapters, editorial notes, non-English publications, and records not directly related to the research domain. Duplicate records were identified and removed during the data cleaning

stage. Subsequently, all records were screened based on titles, abstracts, and keywords to confirm their relevance to the research objectives.

Finally, bibliometric techniques were applied using VOSviewer to conduct co-citation, bibliographic coupling, and co-word analyses. These methods were employed to map the intellectual structure, thematic relationships, and emerging research trends within the financial inclusion–ICT–inclusive growth domain.

The Scopus database was selected as the primary source of bibliometric data because of its extensive journal coverage and strong representation in economics, finance, and development studies. Compared with other academic databases, Scopus provides broad indexing coverage and reliable bibliometric metadata, making it suitable for large-scale bibliometric analysis. Its metadata are also compatible with bibliometric visualization tools such as VOSviewer, thereby supporting consistency and reliability in network mapping and cluster analysis (Singh et al., 2021).

Table 1. The search string of the Scopus database

No	Keywords	Justification
1	TITLE-ABS-KEY (("financial inclusion" OR "inclusive finance" OR "access to finance" OR "Financial access*" OR "microfinance" OR "microcredit" OR "microloans"	To identify literature related to Financial Inclusion (FI).
2	AND ("ICT" OR "ICTs" OR "Information communication technology" OR "digital*" OR "computer" OR "telephone" OR "mobile phone" OR "smartphone" OR "internet" OR "online" OR "website" OR "mobile banking" OR "mobile payment" OR "mobile money" OR "Fintech" OR "peer-to-peer" OR "P2P" OR "crowdfunding" OR "blockchain" OR "cashless payment" OR "E-banking" OR "PayPal" OR "Alipay" OR "point of sale")	To identify literature related to ICTs.
3	AND ("inclusive growth" OR "shared growth" OR "balanced growth" OR "pro-poor growth" OR "economic growth" OR "poverty" OR "income inequality" OR "disparity" OR "income distribution" OR "employment" OR "unemployment"))	To identify literature related to inclusive growth.

In the Scopus database search, filters were applied to include only English-language articles published between 2010 and 2024. English-language publications were selected to ensure consistency in terminology and comparability across studies, as English remains the dominant language in international academic publishing. This selection also enhances the reliability of keyword standardization and thematic mapping in bibliometric analysis.

The data search was conducted on January 15, 2025. The retrieval period began in 2010, which represents a turning point in this field of interest. During the 2010 Seoul G-20 Summit, financial inclusion (FI) emerged as a global phenomenon and was identified as one of the nine pillars of essential development (Demirgüç-Kunt et al., 2018; Suri & Jack, 2016). Scopus employed a combination of search terms (1–3), as explained in Table 1, to retrieve the data.

RESULTS AND DISCUSSION

Descriptive analysis and publication trend

The search process using the keyword string in the Scopus database returned 630 publications. The search was limited to journal articles and excluded book chapters and conference papers to ensure the quality of the analyzed documents. The total number of

citations recorded was 11,547, with an average of 18.3 citations per publication. After excluding self-citations, the total number of citations decreased to 10,895. In addition, 57 documents were cited at least 57 times, as indicated by an h-index of 57 in the search results.

The relatively high average number of citations per publication suggests a significant scholarly impact and broad referencing within the research field. Over time, both the number of publications and citations fluctuated, with the highest values observed in 2024, reaching 224 publications and 5,436 citations. Figure 2 illustrates the trends in publication and citation numbers. The Scopus database search employed the search string presented in Table 1.

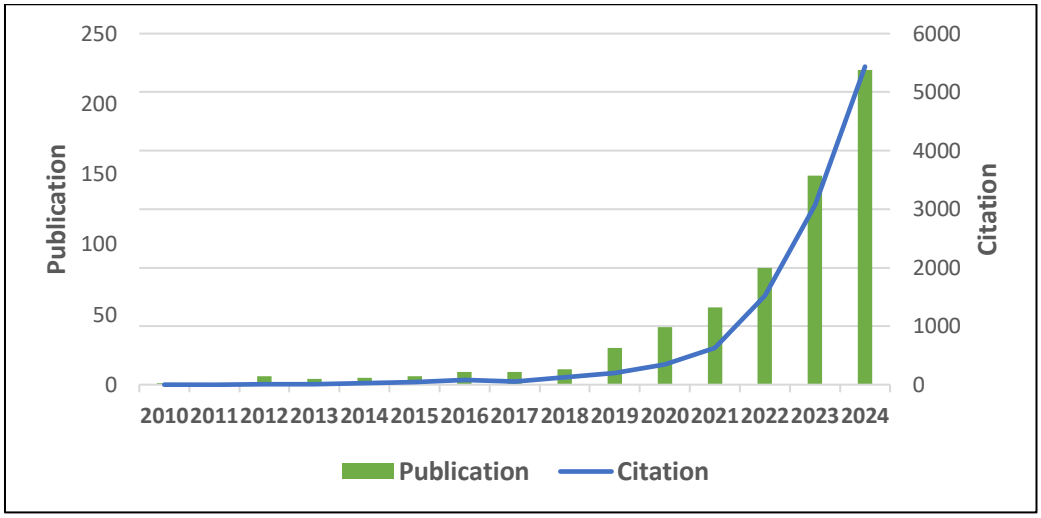

Figure 2. Number of publications and citations in the Scopus database
***Source**: Scopus database retrieved on January 15 2025*

Co-citation analysis

In a dataset comprising 32,999 cited references, 49 references met the established threshold of being cited at least nine times by other sources. The citation counts for these documents ranged from 9 to 44, while their total link strength ranged from 3 to 135. Among these references, the most frequently cited documents were Ozili (2018), Demirgüç-Kunt et al. (2018), and Suri and Jack (2016), with 44, 36, and 36 citations, respectively. The five most highly cited publications are presented in Table 2, while the network visualization of the co-citation analysis is shown in Figure 3.

Table 2. The top five most highly cited documents based on co-citation analysis

Rank	Publication	No. of citations	Total link strength
1	Ozili (2018). The impact of digital finance on financial inclusion and stability.	44	135
2	Demirguc-Kunt *et al* (2018). The global Findex database 2017.	36	92
3	Suri and Jack (2016). The long-run poverty and gender impacts of mobile money.	36	89
4	Sarma and Pais (2011). Financial inclusion and development.	28	94
5	Zins and Weill (2016). The determinants of financial inclusion.	27	100

Source: Created by authors using VOSviewer and bibliometric metadata

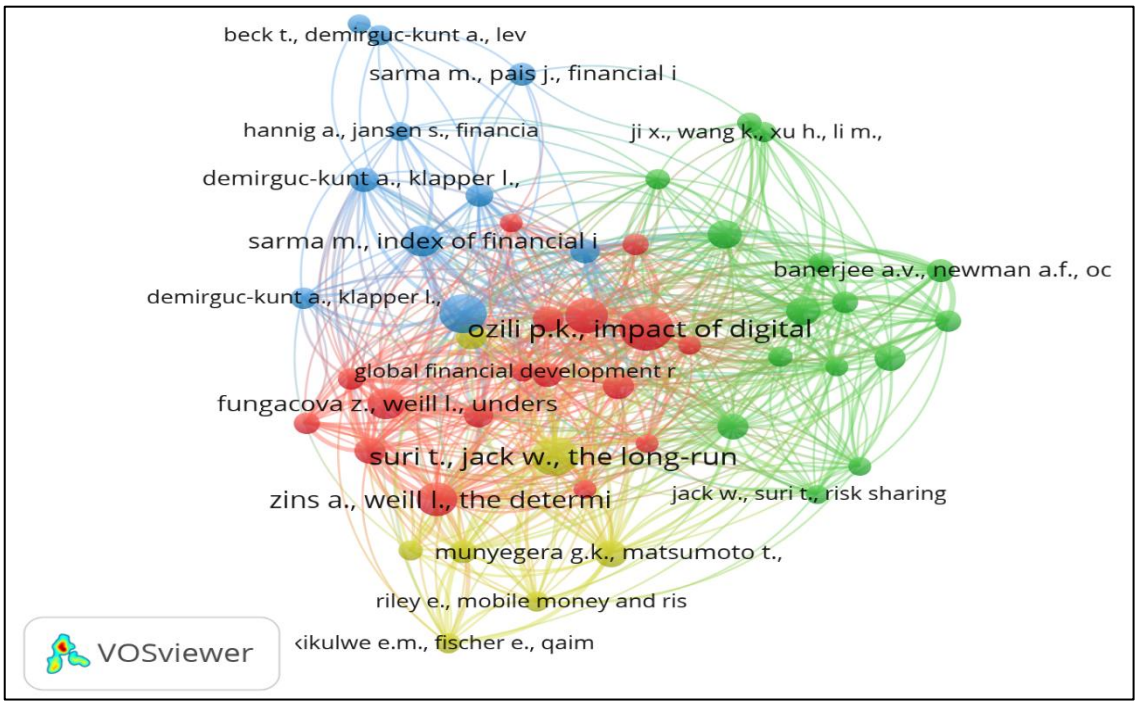

Figure 3. Network visualization of co-citation analysis
Source: Created by authors using VOSviewer and bibliometric metadata

The co-citation analysis yielded four clusters. Cluster 1 (red) comprises 17 articles and is categorized as "Mobile Money and Financial Inclusion Determinants." This cluster highlights the significance of digital finance and its benefits for individuals, businesses, and the financial sector. The key publications in this cluster include Suri and Jack (2016), Kikulwe et al. (2014), Riley (2018), Zins and Weill (2016), and Ghosh and Vinod (2017). Mobile money can facilitate access to banking services, enable rapid transactions, and reduce risks and liquidity constraints (Kikulwe et al., 2014). These effects can directly enhance financial inclusion and improve community income and well-being. With the expansion of mobile money, users can access financial services such as bill payments, cash transfers, and the purchase of goods and services without a traditional bank account (Riley, 2018).

Cluster 2 (green) comprises 15 articles and is categorized as "Financial Inclusion and Economic Growth." The representative articles in this cluster include Sethi and Acharya (2018), Erlando et al. (2020), Sharma (2016), and Ozili (2018). Most studies in this cluster emphasize the essential role of financial inclusion in driving economic growth and supporting economic development. Achieving inclusive growth and sustainable development requires sustained economic expansion. Sethi and Acharya (2018) explained that financial inclusion has significantly increased economic growth. Financial inclusion, therefore, functions as both a long-term determinant and a catalyst for economic growth.

Cluster 3 (blue) comprises 12 articles and is labeled "Financial Inclusion, Poverty, and Income Inequality." Most articles in this cluster emphasize the central role of financial inclusion in reducing poverty and income inequality. Financial sector development makes a vital contribution to poverty alleviation and income equality, particularly in the developing world. Building an integrated financial sector can help

ensure universal access to improved financial services. This enables individuals to use finance and savings for business investment and educational needs, particularly among economically marginalized populations in rural communities with limited incomes (Aziz and Naima, 2021).

Cluster 4 (yellow) comprises seven articles and is labeled "ICT, Fintech, and Microfinance." The most recent studies in this cluster highlight the relationships among ICT, fintech, and microfinance. Information and communication technology (ICT) provides significant benefits for microfinance development, which is a crucial factor in reducing poverty and promoting local development in developing countries. Innovative financial technology offers solutions to improve access to credit, and fintech solutions are increasingly integrated into microfinance operations to enhance efficiency and effectiveness (Bateman et al., 2019).

Beyond identifying thematic clusters, the co-citation structure reveals the foundational intellectual relationships underlying research on financial inclusion, ICTs, and inclusive growth. The clustering patterns indicate that early studies primarily emphasized financial inclusion and poverty reduction, which later evolved to incorporate ICT-based financial services as enabling mechanisms. This transition reflects a shift from traditional financial access models toward digitally driven inclusive growth frameworks.

These findings highlight the importance of foundational research in shaping the development of financial inclusion and inclusive growth frameworks. The evolution identified through co-citation analysis suggests that early theoretical models remain highly relevant and continue to influence contemporary research directions. This reinforces the importance of maintaining a strong theoretical foundation when designing digital financial inclusion strategies.

Bibliographic coupling

A total of 630 documents retrieved from the Scopus database were used to conduct the bibliographic coupling analysis. Of these, 35 documents met the threshold, each with at least 62 citations. Citation counts ranged from a maximum of 370 to a minimum of 62, while total link strength ranged from 66 to 0. This analysis produced four main clusters. The documents with the highest citation counts were Tchamyou et al. (2019), Omar and Inaba (2020), and Demir et al. (2022). The five most highly cited articles based on bibliographic coupling are presented in Table 3, while the network visualization is shown in Figure 4.

Table 3. The top five most highly cited documents based on Bibliographic coupling analysis

Rank	Publication	No. of citations	Total link strength
1	Tchamyou et al. (2019). Inequality, ICT, and financial access.	370	28
2	Omar and Inaba (2020). Does financial inclusion reduce poverty and income inequality?	215	35
3	Demir et al. (2022). Fintech, financial inclusion, and income inequality	193	47
4	Ozturk and Ullah (2022). Does digital financial inclusion matter for economic growth?	190	42
5	Mushtaq and Bruneau (2019). Microfinance, financial inclusion, and ICT.	166	35

Source: Created by authors using VOSviewer and bibliometric metadata

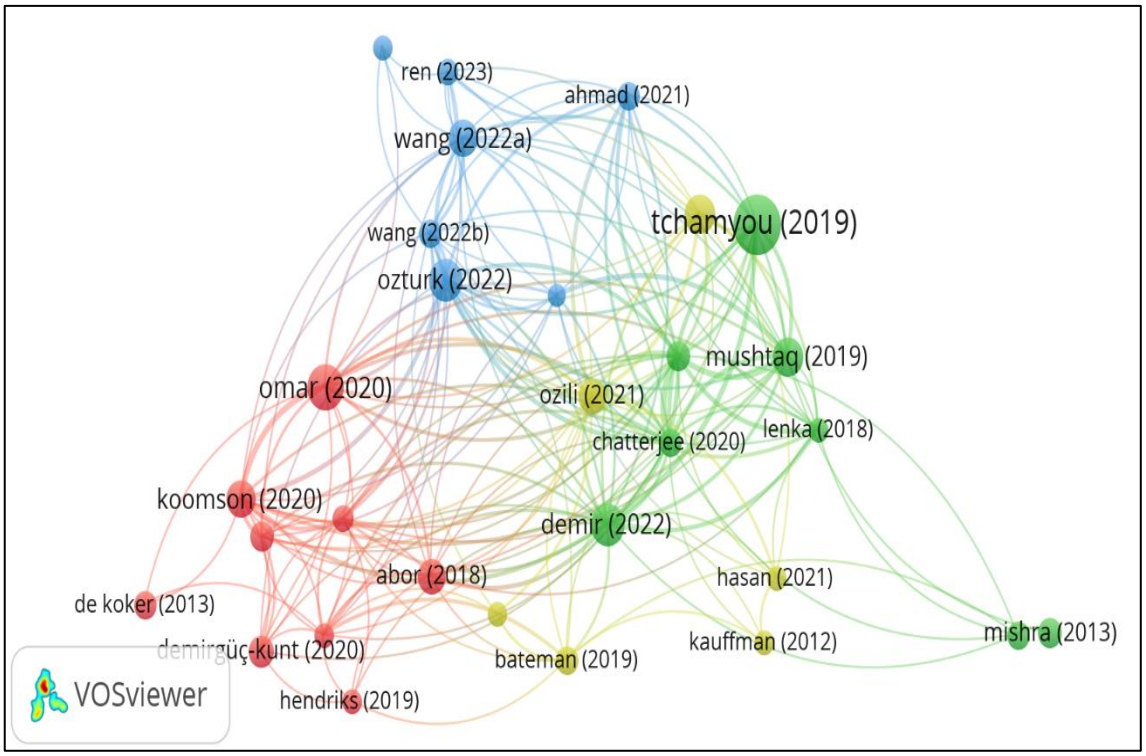

Figure 4. Network visualization of Bibliographic coupling
Source: Created by authors using VOSviewer and bibliometric metadata

The bibliographic coupling method identified four clusters. Cluster 1 (red) comprises nine articles and is labeled "Financial Inclusion, Poverty, and Income Inequality." A considerable body of research in this area examines how financial inclusion can help alleviate poverty and reduce the gap between rich and poor populations. The representative articles in this cluster include Koomson et al. (2020), Omar and Inaba (2020), Wang and He (2020), and Hendriks (2019). Recent work by Koomson et al. (2020) indicates that expanding access to financial services helps reduce current levels of deprivation in these communities while also protecting against deterioration into destitution over time, particularly for those living in remote regions. Similarly, Omar and Inaba (2020) demonstrated that financial inclusion is a key dimension of social inclusion and can help address poverty and income inequality by creating opportunities for advancement among disadvantaged groups.

Cluster 3 (blue) comprises seven articles and is labeled "Digital Financial Inclusion, Economic Growth, and Poverty." Recent studies in this cluster emphasize the impact of digital financial inclusion on economic growth and poverty reduction. Ahmad et al. (2021) argued that digital financial inclusion plays a crucial role as a growth engine for enhancing economic activity. Ozturk and Ullah (2022) asserted that although improvements in digital financial inclusion accelerate economic growth, they may also exacerbate environmental degradation. In the context of poverty alleviation, Lee et al. (2023) demonstrated that digital financial inclusion makes a significant contribution to poverty reduction. Finally, Yu and Wang (2021) showed that digital finance increases disposable income in rural areas and reduces the income gap between rural and urban areas, thereby supporting income equality and poverty reduction.

Cluster 4 (yellow) comprises seven articles and is labeled "ICT, Fintech, and Microfinance." Recent studies in this cluster highlight the relationships among ICT, fintech, and microfinance. Information and communication technology (ICT) provides significant benefits for microfinance development, which is a crucial factor in reducing poverty and promoting local development in developing countries. Innovative financial technology offers solutions to improve access to credit, and fintech solutions are increasingly integrated into microfinance operations to enhance efficiency and effectiveness (Kauffman & Riggins, 2012; Bateman et al., 2019).

The bibliographic coupling structure reflects current research developments within the financial inclusion–ICT–inclusive growth domain. The close connections among clusters indicate that contemporary research increasingly integrates digital financial technologies with inclusive economic policies. This suggests that current studies are moving toward more technology-driven models of financial inclusion that support broader socio-economic development outcomes.

The current research structure identified through bibliographic coupling reflects a growing emphasis on digital financial systems and policy-driven financial inclusion initiatives. This trend indicates that modern research increasingly recognizes the importance of integrating technological innovation with socio-economic development policies to achieve sustainable, inclusive growth.

Co-word analysis (co-occurrence of keywords)

Co-occurrence keyword analysis, or co-word analysis, was performed using data retrieved from the Scopus database. The minimum number of keyword occurrences was set at 15. Of the 2,477 keywords identified, 48 met the threshold. Keyword occurrences ranged from a maximum of 221 to a minimum of 15, while total link strength ranged from 527 to 31. This analysis produced four main clusters. The most frequently occurring keywords were "financial inclusion" (221), "finance" (120), and "financial inclusions" (71). The top 10 keywords from the co-word analysis are presented in Table 4, and the network visualization is shown in Figure 5.

Table 4. The top ten keywords based on co-occurrence analysis

Rank	Keywords	Occurrences	Total link strength
1.	Financial inclusion	221	527
2.	Finance	120	511
3.	Financial inclusions	71	304
4.	Poverty	70	230
5.	Economic growth	64	224
6.	Fintech	62	140
7.	Digital financial inclusion	58	148
8.	Mobile money	42	101
9.	Poverty alleviation	38	135
10.	Digital finance	35	99

Source: Created by authors using VOSviewer and bibliometric metadata

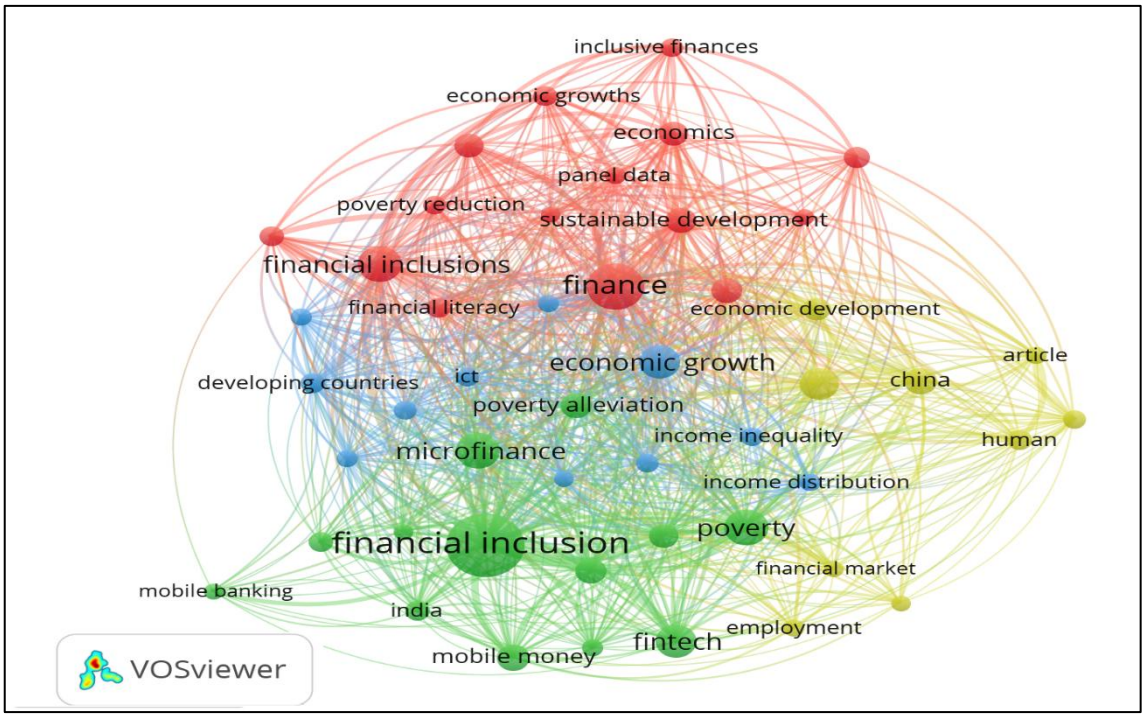

Figure 5. Network visualization of co-word analysis
Source: Created by authors using VOSviewer and bibliometric metadata

Cluster 1 (red) comprises 15 items and is titled "Digital Financial Inclusion for Inclusive Growth." Representative keywords include digital inclusive finance, digital finance, financial inclusion, poverty, and economic growth. Digital financial inclusion provides individuals and businesses with access to digital technologies, such as mobile money, mobile banking, and internet banking. The use of digital financial technology enables citizens and businesses without direct access to formal finance—due to barriers such as inaccessible financial facilities, inadequate infrastructure, and high costs—to conduct money transfers, savings, and loan activities online (Aziz & Naima, 2021). Access to digital finance can expand opportunities for households and businesses by enabling more efficient economic transactions. This improves productivity and efficiency, ultimately contributing to economic development and poverty reduction, particularly among individuals engaged in agricultural activities (Sethi and Acharya, 2018; Aziz & Naima, 2021).

Cluster 2 (green) comprises 13 items and is titled "Microfinance, Fintech, Digital Financial Services, and Inclusive Growth." It is characterized by terms such as microfinance, fintech, financial services, digital financial services, mobile money, mobile banking, poverty, and poverty reduction. Microfinance provides small loans, savings accounts, and other financial services to individuals who lack access to mainstream banking services. These resources enable low-income families to invest in income-generating activities, such as small businesses or agriculture, thereby improving their living standards. Access to credit and other financial services enables individuals to move out of the poverty cycle and achieve sustainable growth (Flaming et al., 2023).

Cluster 3 (blue) comprises 11 items and is labeled "ICTs and Inclusive Growth." Representative terms include ICTs (information and communication technology), economic growth, income inequality, and income distribution. Information and communication technologies (ICTs) contribute to inclusive growth by expanding access

to information, education, economic opportunities, health services, financial services, social connectivity, government services, and infrastructure. In this way, ICTs empower individuals and communities to engage with the digital economy and integrated digital banking systems, facilitating access to affordable financial services across all segments of society (Guerra-Leal et al., 2023). ICT applications also influence the quality of financial inclusion, banking and financial services, as well as the development of microfinance and financial technology, thereby playing a crucial role in promoting economic growth (R. P. Pradhan et al., 2021) and reducing income inequality and poverty (Tchamyou et al., 2019).

Cluster 4 (yellow) comprises nine terms and is titled "Economic Development and Digital Finance." Representative keywords include economic development, employment, digital finance, and entrepreneurship. The integration of employment and digital finance has the potential to expand job opportunities, enhance financial inclusion, support informal-sector workers, facilitate skills development, and inform evidence-based employment policies, thereby contributing to inclusive growth.

The co-word analysis highlights emerging research themes that are likely to shape future studies in this domain. The prominence of keywords related to fintech innovation, digital inclusion, and policy frameworks indicates a growing focus on technology-enabled financial ecosystems. These themes point to potential directions for future interdisciplinary research that integrates financial systems, digital infrastructure, and inclusive development strategies.

The emerging themes further underscore the increasing role of fintech innovation, digital governance, and regulatory frameworks in shaping future research trajectories. These findings suggest that interdisciplinary collaboration among financial systems, technological development, and public policy will become increasingly important in advancing inclusive economic systems.

Overall, the combined findings from co-citation, bibliographic coupling, and co-word analyses illustrate the dynamic evolution of research on financial inclusion, ICTs, and inclusive growth. The knowledge base has progressed from foundational theories of financial access identified through co-citation analysis, to digitally enabled financial systems revealed through bibliographic coupling, and toward innovation-driven financial ecosystems highlighted by co-word analysis. This integrated progression demonstrates the growing importance of financial technologies in supporting inclusive economic development pathways.

The findings of this study provide important insights into the evolving research landscape of financial inclusion, ICTs, and inclusive growth. The integration of bibliometric methods shows that technological transformation has become a central driver of financial inclusion strategies worldwide. This transformation reflects broader global shifts toward digital economies and highlights the increasing need for inclusive digital infrastructure and supportive policy frameworks. Furthermore, the observed evolution underscores the importance of aligning technological innovation with institutional readiness and social inclusion frameworks.

Theoretical implications

The findings of this study contribute to the theoretical development of research on financial inclusion, ICTs, and inclusive growth by demonstrating how technological transformation functions as an enabling mechanism within inclusive development frameworks. The integration of bibliometric findings indicates that financial inclusion theories have evolved from traditional access-based models toward digitally enabled

financial ecosystems that emphasize institutional readiness, technological infrastructure, and inclusive policy frameworks.

Furthermore, the observed evolution of research themes highlights the role of ICT-driven financial systems as intermediary mechanisms linking financial accessibility with broader socio-economic development outcomes. These findings suggest that inclusive growth is influenced not only by financial access but also by the integration of digital infrastructure, regulatory readiness, and socio-economic inclusion mechanisms. These insights provide a conceptual foundation for future research exploring the causal relationships among technological innovation, financial inclusion, and inclusive economic development.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study provides a synthesized understanding of the evolving research landscape linking financial inclusion, ICTs, and inclusive growth. By integrating co-citation, bibliographic coupling, and co-word analyses, it reveals a progressive knowledge trajectory—from foundational research emphasizing financial accessibility to contemporary digitally enabled financial ecosystems, and toward emerging innovation-driven themes. This synthesis underscores the central role of digital transformation as a unifying mechanism connecting financial inclusion strategies to broader socio-economic development outcomes.

The findings indicate that digital finance serves as a key driver of financial inclusion and inclusive growth. In contrast, financial inclusion itself functions as an important mechanism for reducing poverty and income inequality. In addition, ICTs contribute significantly to economic growth by fostering innovation in fintech and digital financial systems. Emerging themes identified through co-word analysis—including digital financial inclusion, emerging ICTs, fintech, microfinance, innovation, and sustainability—highlight important research trends and promising directions for future scholarly inquiry.

Future research should further explore the interaction between financial inclusion mechanisms and digital innovation systems across diverse socio-economic contexts, particularly in developing economies. Empirical studies on policy-driven digital transformation initiatives and regional disparities would provide valuable insights to strengthen inclusive economic development strategies.

Nevertheless, several limitations of this study should be acknowledged. This study relies solely on the Scopus database and may not capture all relevant scientific publications in this field. In addition, the literature retrieval process was limited to English-language publications, thereby excluding research published in other languages. While bibliometric techniques provide valuable quantitative insights into research impact and structure, they tend to place less emphasis on qualitative aspects such as depth of analysis, methodological rigor, and practical applicability. These limitations suggest important avenues for future research, including expanding data sources, including multilingual studies, and integrating qualitative analytical approaches.

Recommendations

Based on the discussion and key issues related to financial inclusion, ICTs, and inclusive growth, this study offers several practical and managerial recommendations. Governments and financial institutions—particularly in developing countries—should

expand digital financial services to improve accessibility and ensure their availability in remote and underserved areas, supported by increased investment in ICT infrastructure and technology transfer. In parallel, financial institutions, in collaboration with non-governmental organizations (NGOs), should strengthen digital financial literacy programs to enhance users' understanding and effective utilization of digital financial services, including fintech and microfinance.

Furthermore, financial inclusion programs initiated by stakeholders should be systematically monitored and evaluated to assess their effectiveness and long-term sustainability. Continuous evaluation is essential to ensure that such programs not only expand access but also contribute meaningfully to inclusive economic outcomes. Finally, managers should prioritize ICT-driven innovation in their strategic investments, as the integration of financial services and digital technologies is critical to expanding access for unbanked and underserved populations.

AUTHOR CONTRIBUTIONS

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the research.

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