

Global Research Trends in Digital Technology and Financial Inclusion: A Bibliometric Approach

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ABSTRACT

This study examines how research on digital technology and financial inclusion has evolved between 2005 and 2022 through a bibliometric analysis of 291 Scopus-indexed publications. Using Microsoft Excel and VOSviewer, it evaluates publication trends, influential authors and institutions, and the intellectual structure of the field. The findings show that contributions were modest in the early years but expanded rapidly after 2017, supported by fintech adoption, global development agendas, and the acceleration of digital financial services during the COVID-19 pandemic. Three main streams of research are identified: financial technology and innovation, including mobile banking and blockchain; technology adoption and institutional factors; and social inclusion and financial literacy, emphasising trust, equity, and cultural acceptance. These streams demonstrate that digital financial inclusion is shaped not only by technological and economic factors but also by social and cultural dimensions. Despite substantial progress, challenges such as digital divides, limited skills, and regulatory gaps constrain equitable access, while emerging frontiers link digital finance with sustainability and green innovation. By mapping these developments, the study contributes a roadmap for future research. It offers practical insights for policymakers, financial institutions, and development agencies working to harness digital technologies for inclusive and sustainable growth.

KEYWORDS: Digital technology, Financial inclusion, Bibliometric analysis, VOSviewer, Scopus.

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1. INTRODUCTION

Digital technologies have transformed how individuals and businesses interact, particularly in purchasing goods, accessing services, and conducting transactions. Online platforms enhance productivity, security, and speed while simplifying processes for consumers and organisations (Aziz & Naima, 2021). This transformation has accelerated the growth of enterprises that rely on digital tools to facilitate commercial transactions, reshaping business strategies and competitiveness in the global economy. Scholars have emphasised that the digital revolution, particularly in the era of Industrial Revolution 4.0, serves as a key driver of socio-economic advancement, business innovation, and entrepreneurial opportunities (Fareed et al., 2022; Nasreen et al., 2024; Sergi et al., 2025).

Small and medium-sized enterprises are primarily reliant on digital solutions. Employees in these organisations tend to be more directly involved in adopting technologies that influence overall performance than those in larger corporations (Pahlevi et al., 2023; Widjajanti & Jumbri, 2025). Beyond organisational performance, the spread of digital technologies is strongly connected to broader equity and access issues, particularly in financial inclusion. Digital banking and financial technology are increasingly recognised as critical tools for expanding financial access to underserved populations (Lee et al., 2022; Syahid et al., 2025). By lowering barriers to credit, savings, and payment systems, digital tools support poverty reduction, business resilience, and inclusive economic growth (Wellalage et al., 2021).

Financial inclusion ensures that individuals and enterprises, particularly marginalised communities, can

access affordable and practical financial services. For small businesses, reliable access to finance is essential to overcome capital and market expansion challenges. Improved inclusion supports innovation, investment, and competitiveness, while exclusion often constrains growth and financial performance (Emara & Said, 2021; Resmi et al., 2021). With rapid digital adoption, technology-driven financial services such as mobile banking, peer-to-peer lending, and digital literacy programs have emerged as powerful enablers of financial inclusion worldwide.

Although the importance of this intersection is increasingly recognised, existing studies often examine digital adoption and financial access in isolation, which limits understanding of their combined development as a research field. A bibliometric approach allows for identifying patterns, themes, and knowledge structures across time and regions. In other fields, such as sustainability reporting, bibliometric analysis has been successfully used to reveal publication trends, thematic clusters, and collaboration networks. Applying this approach to digital technology and financial inclusion allows for uncovering research trajectories, evaluating influential contributions, and highlighting emerging directions.

Considering this gap, the present study conducts a bibliometric analysis of publications on digital technology and financial inclusion indexed in Scopus between 2005 and 2022. This research provides a comprehensive overview of how the field has developed by analysing publication trends, keyword co-occurrence, and thematic clusters using VOSviewer and Microsoft Excel. The study addresses three main questions:

RQ1: How has research on digital technology and financial inclusion evolved in terms of publication trends, sources, and geographical distribution?

RQ2: Which journals, authors, and institutions are the most influential in shaping this domain?

RQ3: What thematic clusters and emerging research frontiers can keyword-based literature mapping identify?

This study contributes to the literature by clarifying the intellectual structure of digital technology and financial inclusion research, linking its development directly to the three research questions, and offering theoretical insights and practical implications for policymakers, financial institutions, and development agencies.

2. LITERATURE REVIEW

2.1 Financial Inclusion

Financial inclusion is broadly defined as the ability of individuals and enterprises to access affordable, practical, and sustainable financial services such as

payments, credit, savings, and insurance (Fareed et al., 2022; Tay et al., 2022). Its primary aim is to bring the unbanked into the formal financial system, thereby enhancing their participation in economic activities and reducing inequality. Scholars agree that financial inclusion contributes to social welfare and economic growth by removing barriers that prevent communities from engaging with financial institutions (Emara & Said, 2021). In this sense, financial inclusion is not only an economic necessity but also a social imperative.

One of the persistent barriers to financial inclusion is inadequate infrastructure, especially in rural areas where technological solutions are increasingly relied upon to close development gaps (Agwu, 2020). Digital technologies are increasingly regarded as critical instruments for overcoming these barriers, enabling financial services at lower costs and greater convenience (Wu & Huang, 2022). The emergence of financial technology, or fintech, has accelerated this transformation, offering mobile-based platforms, electronic payments, and peer-to-peer financial solutions that reach underserved populations (Charfeddine & Zaouali, 2022). Financial institutions that fail to adopt such technologies face the risk of exclusion, as digitalised competitors increasingly dominate the market (Anagnostopoulos et al., 2025; Fayad et al., 2025).

The role of financial inclusion is crucial for small and medium-sized enterprises. SMEs often encounter limited access to capital, weak collateral, and insufficient credit histories, which hinder their ability to innovate and compete. Through expanded access to digital financial services, these enterprises can reduce operational constraints, improve access to working capital, and expand their market presence (Resmi et al., 2021). By improving financing accessibility, financial inclusion contributes directly to entrepreneurial growth, technological adoption, and productivity.

Finally, the broader implications of financial inclusion extend beyond business performance. Improved access to finance supports poverty alleviation, strengthens social equity, and enables individuals to invest in health, education, and long-term well-being. Studies have demonstrated that inclusive financial systems can stimulate broader economic participation, increase household resilience, and enhance competitiveness at the national level (Senyo & Osabutey, 2020; Hu & Tsai, 2024; Becha et al., 2025). Thus, financial inclusion is both a developmental tool and a foundation for sustainable growth, underscoring its relevance for policymakers, practitioners, and scholars.

2.2 Digital Technology

Digital technology refers to the application of electronic systems and computer-based processes that enable

automation, enhance productivity, and improve decision-making (Geng & He, 2021; Ali et al., 2025; Kannan et al., 2025). It is grounded in converting data into information that supports automated tasks, allowing organisations to operate more efficiently and accurately (Ghosh, 2021). Digital transformation has brought profound changes across sectors, influencing firm-level competitiveness and broader issues of governance, regulation, and social interaction (Kouladoum et al., 2022). The rapid adoption of digital systems has become a hallmark of modern economies.

In the financial sector, digital technology has enabled the rise of digital finance, which enhances intermediation, reduces costs, and fosters economic stability. Innovations such as mobile payments, blockchain, and artificial intelligence have improved access to financial services and facilitated the emergence of new business models. For SMEs, digital finance provides opportunities to lower operational expenses, expand customer outreach, and modernise strategies for growth (Resmi et al., 2021; Jun & Ran, 2024). At the macroeconomic level, these developments contribute to greater efficiency and resilience in financial markets.

Adopting digital technology also provides a wide range of strategic benefits for organisations. Firms achieve cost efficiency, enhance marketing flexibility, reduce error rates, and improve customer relationships by integrating digital tools (Ghosh, 2021; Mavlutova et al., 2022). Digital platforms like social media and e-commerce marketplaces allow businesses to interact directly with customers, track preferences, and develop customised services (Geng & He, 2021). Digital marketing enables firms to communicate and transact with consumers in real time across geographic boundaries, fundamentally altering the nature of competition and value creation (Kim et al., 2021).

Beyond firm-level outcomes, digital technology is redefining global economic structures. Digital markets alter competitive dynamics, create new opportunities for entrepreneurship, and reshape employment patterns (Leong et al., 2022). However, the effectiveness of digital adoption is closely tied to human capital. Individual digital competencies determine organisational success, especially in small businesses where employees contribute directly to performance outcomes (Marshall et al., 2020). Hence, digital literacy and training become as critical as technological infrastructure, emphasising digital transformation's socio-technical nature.

2.3 Conceptual Linkage

The literature on financial inclusion and digital technology reveals strong complementarities between these two domains. Financial inclusion provides the normative framework by focusing on equitable access to financial services, while digital technology offers

the practical tools that make such access possible at scale. Together, they represent an evolving ecosystem in which innovations such as mobile banking, digital wallets, and fintech platforms reduce barriers to financial participation and expand opportunities for marginalised populations.

Several studies underscore that digital technology is not merely an enabler of financial inclusion but also a catalyst for its transformation. By lowering transaction costs and enhancing convenience, digital tools expand the reach of financial services to rural and low-income communities that were historically excluded (Lee et al., 2022). This synergy suggests that the impact of financial inclusion is magnified when supported by robust technological infrastructures, as observed in countries that have embraced mobile money and digital credit platforms.

At the same time, challenges remain in aligning digital technology with inclusive outcomes. Issues such as digital divides, cybersecurity, regulatory frameworks, and financial literacy continue to shape the extent to which digital technology can deliver on the promise of inclusion (Xu, 2020; Xu et al., 2024). Without adequate institutional support and user capability, the benefits of digital finance risk being concentrated among already advantaged groups, reinforcing inequality rather than reducing it.

In conclusion, integrating financial inclusion and digital technology highlights the need for holistic strategies that combine technological innovation with inclusive policy frameworks. This interconnection is particularly significant for developing economies, where digital solutions can bridge structural barriers in financial systems. A bibliometric analysis of scholarship in this area provides valuable insights into how these themes have evolved, the significant knowledge clusters that have emerged, and the gaps that remain for future research.

3. METHODOLOGY

This study adopts a bibliometric approach to systematically analyse and map the evolution of research on digital technology and financial inclusion. Bibliometric methods are widely applied in management, economics, and information sciences to evaluate scientific output, track knowledge development, and reveal the intellectual structure of a research domain (Rousseau & Rousseau, 2021; Gan et al., 2022; Ding et al., 2023). This study comprehensively explains the trends, themes, and collaboration patterns shaping this field by combining quantitative techniques with visualisation tools.

3.1 Data Source and Search Strategy

The Scopus database (www.scopus.com) was chosen

as the primary data source because of its extensive coverage of peer-reviewed journals and international publications and recognition as one of the most reliable sources for bibliometric analysis (Parlina et al., 2020; Singh et al., 2021; Ding et al., 2023). A systematic search was conducted for documents published between 2005 and June 2022. The search query was designed to identify studies explicitly addressing the intersection of digital technology and financial inclusion by using the terms "financial inclusion" AND "digital technology" in titles, abstracts, and keywords. Only English-language publications were included to ensure consistency and replicability, as recommended by previous bibliometric studies (Liu, 2022). In addition, to ensure quality, journals were screened against the Scimago Journal Rankings (SJR) and Beall's list to exclude predatory outlets. Following this process, the initial dataset was refined to a final sample of 291 documents. This dataset forms the basis for descriptive and network analyses.

3.2 Justification for the Time Frame (2005-2022)

2005 to 2022 was deliberately selected to ensure historical depth and contemporary relevance in capturing the evolution of digital technology and financial inclusion research. 2005 marks a critical turning point when scholarly attention to financial inclusion intersected meaningfully with digital technologies. This period coincides with the global diffusion of mobile banking, the early adoption of digital financial services, and international policy initiatives led by organisations such as the World Bank and the United Nations that actively promoted financial inclusion through digital means (Shaikh & Karjaluoto, 2015; World Bank, 2016; Ozili, 2018). Prior to 2005, studies addressing the joint theme of financial inclusion and digital technology were minimal and fragmented, which would have weakened the analytical value of bibliometric mapping.

Extending the timeframe to June 2022 ensures the inclusion of the most recent scholarly contributions, particularly those reflecting the rapid expansion of fintech applications and digital financial services during the COVID-19 pandemic (Chen et al., 2022; Tut, 2023). This endpoint offers a dataset that is both comprehensive and manageable, covering nearly two decades of academic contributions. The chosen period thus captures the formative years, subsequent consolidation, and contemporary advancements in digital finance scholarship. Moreover, it aligns with established practices in bibliometric research, which recommend adopting a sufficiently long horizon to trace the conceptual evolution of a field while maintaining analytical focus and contemporary significance (Hakkaraki, 2024; Amiruddin et al., 2025).

3.3 Data Screening and Selection Criteria

The inclusion criteria required that selected publications explicitly discuss digital technology in relation to

financial inclusion, either theoretically or empirically. Document types such as articles, reviews, and full-text conference papers were included. In contrast, editorials, notes, and incomplete conference abstracts were excluded, which aligns with practices used in prior bibliometric studies. Each article was systematically screened for relevance, and bibliographic metadata such as title, authors, affiliation, year of publication, keywords, source title, and country of origin were extracted. This process ensured the accuracy of the dataset and avoided duplication. The resulting dataset was thus both representative and reliable for subsequent bibliometric analysis.

3.4 Data Analysis Tools and Procedures

Two software tools were employed to conduct the analysis. First, Microsoft Excel was used to manage and tabulate the dataset, allowing for the computation of descriptive statistics such as the annual growth of publications, distribution of journals, productivity of authors, and geographical trends. Descriptive analyses are widely recommended as the foundation for bibliometric research, as they provide baseline insights into the structure of scientific production (Hassan & Duarte, 2024). Second, VOSviewer software (version 1.6.20) was employed to perform bibliometric mapping. VOSviewer is a widely used open-source tool for constructing and visualising bibliometric networks, including co-authorship, co-citation, bibliographic coupling, and keyword co-occurrence (Liu et al., 2025). Its text-mining functions also allow extracting key terms from titles and abstracts to identify thematic clusters. This dual-tool approach enabled both descriptive and relational insights into the literature.

3.5 Bibliometric Mapping and Visualisation

The analytical process was carried out in three stages. First, descriptive statistics were compiled to illustrate the temporal evolution of publications, the most productive journals, and the geographical distribution of research output. Second, network visualisations were generated with VOSviewer to identify clusters of co-occurring keywords, co-authorship networks, and co-citation structures. These visualisations made it possible to detect intellectual linkages and collaboration patterns within the field. Third, thematic clusters were interpreted to uncover dominant research themes and emerging frontiers, including fintech applications, digital adoption, and financial literacy.

This structured approach ensured both breadth and depth of analysis by combining quantitative bibliometric indicators with qualitative interpretation. As shown in **Figure 1**, the process began with data collection from Scopus, followed by screening and selection based on inclusion criteria, descriptive analysis using Excel, and network mapping with VOSviewer. The final stage involved visualisation and interpretation, which

provided a comprehensive overview of the intellectual and thematic development of digital technology and financial inclusion scholarship.

4. RESULTS AND DISCUSSION

An analysis of 291 publications provides a comprehensive view of research's intellectual and thematic development on digital technology and financial inclusion. The findings are presented in two parts: first, a descriptive overview of the literature, and second, a bibliometric mapping that highlights keyword clusters, author networks, and thematic streams. These results are then interpreted in relation to prior studies to identify the key drivers, barriers, and broader implications of digital financial inclusion.

4.1 Descriptive Overview of the Literature

The temporal distribution of publications on digital technology and financial inclusion demonstrates a significant transformation in scholarly attention over the past two decades. As shown in **Figure 2**, research output remained relatively modest between 2005 and 2016, with only a handful of studies published each year. This early phase reflects the nascent stage of digital financial technologies and the limited global policy emphasis on financial inclusion during that period (Ozili, 2018).

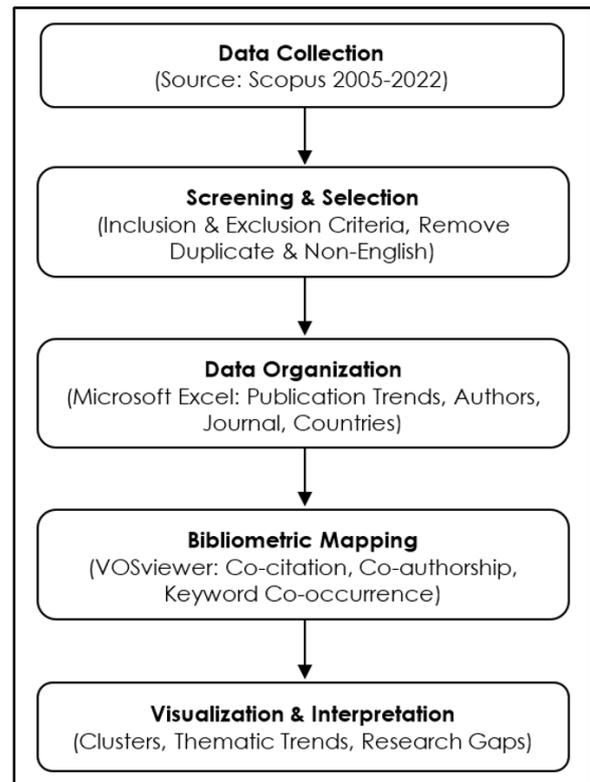


Figure 1: Methodology flow diagram

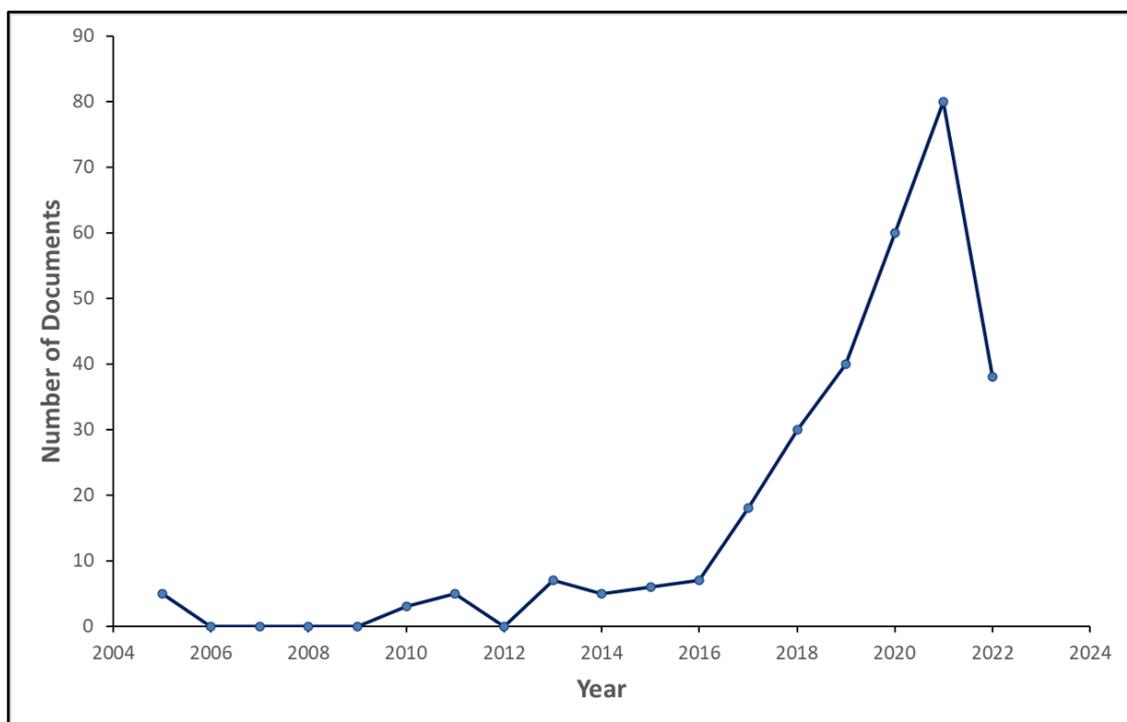


Figure 2: Trends in Scopus publications on digital technology and financial inclusion

From 2017 onwards, however, research output expanded rapidly, mirroring the accelerated diffusion of fintech solutions, mobile banking platforms, and digital payment systems. The period between 2019 and 2021 witnessed a sharp increase, culminating in a peak of over 80 publications in 2021. This surge can be attributed to several factors. First, the rapid expansion of financial technologies, such as blockchain and mobile-based financial services, significantly broadened the scope of inclusion research (Senyo & Osabutey, 2020; Gupta & Kanungo, 2022).

Second, the COVID-19 pandemic intensified reliance on digital services, further stimulating scholarly interest in digital finance as a critical enabler of resilience and economic participation during crises (Fareed et al., 2022). Third, financial inclusion became a central component of global development agendas, particularly through its link to the United Nations Sustainable Development Goals, which emphasise equitable access to financial services as a driver of poverty reduction and inclusive growth (Sharma & Changkakati, 2022; Chitimira & Warikandwa, 2023).

The apparent decline in 2022 should be interpreted cautiously. Since bibliometric data only captured documents indexed until mid-year, the drop is likely a result of database time-lags rather than an absolute reduction in research activity. This pattern is consistent with other bibliometric studies that observe indexing delays in recent years.

Overall, the trend presented in **Figure 2** confirms

that digital technology and financial inclusion have transitioned from a marginal area of inquiry into a mainstream research domain. The steep upward trajectory after 2017 highlights how technological innovation and global socio-economic challenges have driven academic engagement with digital finance as a vital tool for enhancing equity, fostering resilience, and transforming financial ecosystems worldwide (Luo et al., 2021; Chen et al., 2022).

The distribution of publications by country or territory, as shown in **Figure 3**, highlights the global significance of research on digital technology and financial inclusion. India and the United States lead with the highest number of contributions, indicating both the practical urgency of financial inclusion in emerging economies and the strong research capacity of advanced economies. The United Kingdom, China, and the Russian Federation also demonstrate substantial output, reflecting the widespread recognition of digital financial inclusion as a driver of economic development and financial stability.

Countries such as Australia, South Africa, Germany, Indonesia, and Malaysia also appear among the top contributors. Their presence illustrates that the discourse on digital technology and financial inclusion extends across diverse regional and economic contexts. Contributions from South Africa and Indonesia underscore the importance of digital solutions in addressing challenges in developing and middle-income economies. At the same time, Germany and Australia's involvement reflects advanced economies' interest in shaping global financial inclusion agendas.

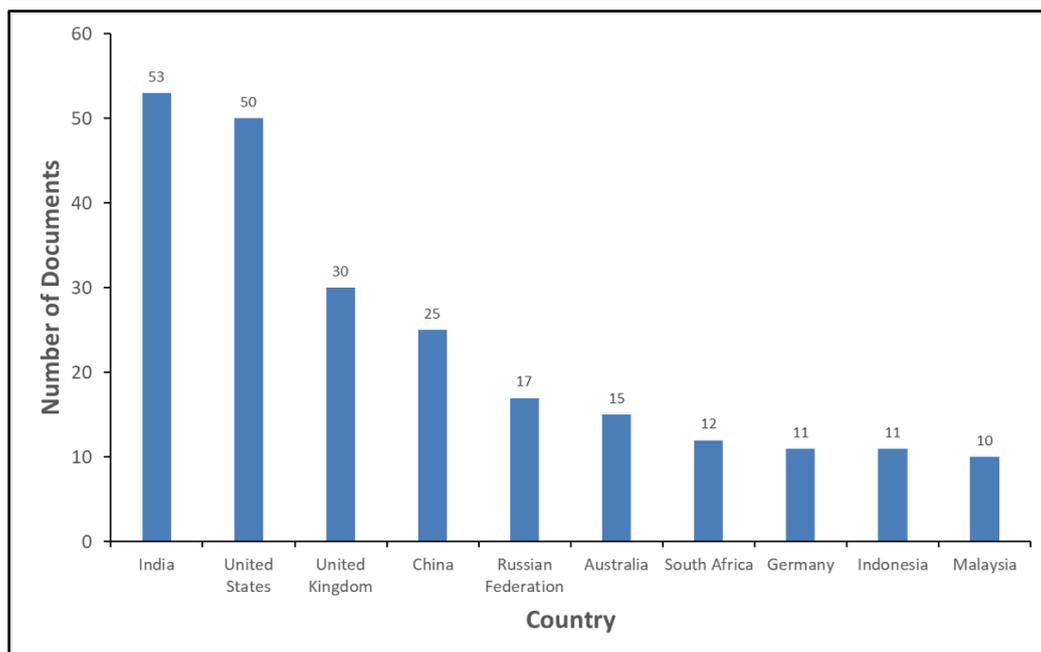


Figure 3: Number of articles by country (Top Ten)

The overall distribution confirms that digital financial inclusion is not confined to a specific region but represents a global research priority. While advanced economies contribute through theoretical frameworks and technological innovation, emerging and developing countries provide valuable empirical insights into the social, cultural, and infrastructural barriers that affect adoption. This balance between developed and developing contexts enriches the literature and underscores the need for cross-regional collaboration in research and policy.

The institutional distribution of publications, presented in **Figure 4**, highlights the diversity of academic and organisational contributions to research on digital technology and financial inclusion. The Singapore University of Social Sciences is the most productive institution, with six publications, reflecting Singapore's strong policy orientation towards digital finance and its position as a regional fintech hub (Wu & Kao, 2022; Kálmán, 2025). Other leading contributors include UNSW Sydney, Saint Petersburg State University, the Indian Institute of Management Bangalore, and Amity University, each with four publications. This spread indicates that research in this domain is being driven by institutions in advanced economies and those in emerging markets.

International organisations and financial institutions also play an important role. The World Bank, for example, has been an influential contributor with four publications. This is consistent with its long-standing commitment to advancing financial inclusion for poverty reduction and sustainable development. Similarly, the Central Bank of Nigeria and the University of Lagos underscore Africa's increasing scholarly and policy interest. In this region, digital finance is widely seen as a mechanism to leapfrog traditional banking infrastructure (Xue et al.,

2023; Jun & Ran, 2024).

The presence of institutions across Asia, Europe, North America, and Africa reflects the global character of this research field. Universities such as the University of Texas at San Antonio and Saint Petersburg State University demonstrate the involvement of Western institutions. In contrast, Asian and African universities provide empirical insights into contexts with significant unbanked populations. This balance between theoretical contributions from developed economies and applied research from emerging economies enhances the richness and global relevance of the literature.

Overall, the institutional distribution suggests that a single region or type of institution does not dominate digital financial inclusion. Instead, it is a shared research agenda pursued by universities, policy institutes, and international organisations. This diversity of contributors reinforces the field's interdisciplinary nature and highlights the need for cross-institutional collaboration to address complex challenges such as trust, regulation, and digital disparities.

Figure 5 highlights the most prolific authors contributing to digital technology and financial inclusion, based on the total number of publications indexed in Scopus. Among these, Lee Kuo Chuen, D., and Ozili, P. K. stand out as the most productive, each with four publications. Their scholarship has influenced academic debate on financial technology, financial inclusion, and the broader socio-economic implications of digital finance. For example, Ozili (2018) has examined the role of digital finance in promoting financial inclusion and financial stability. Meanwhile, Lee has been widely recognised for contributing to research for fintech ecosystems and blockchain applications.

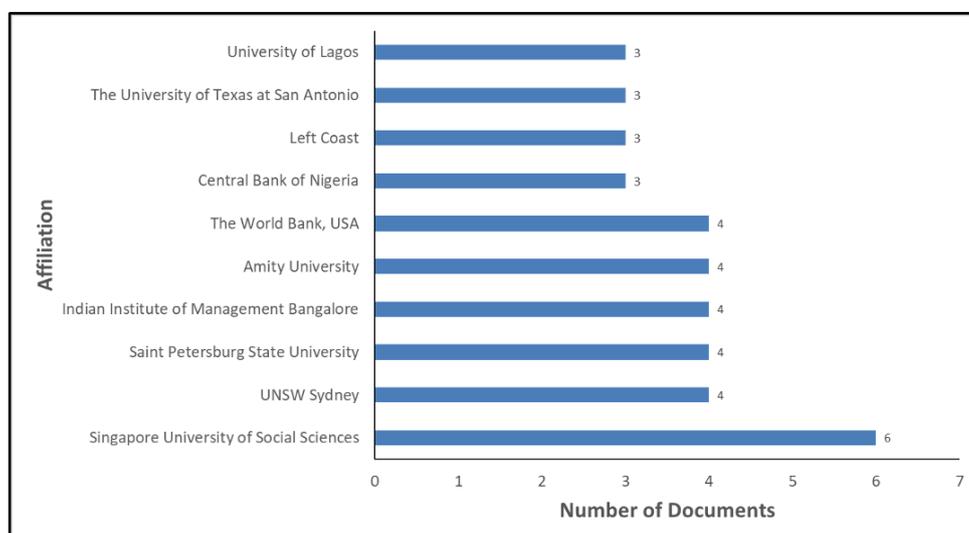


Figure 4: Institutional distribution of publications

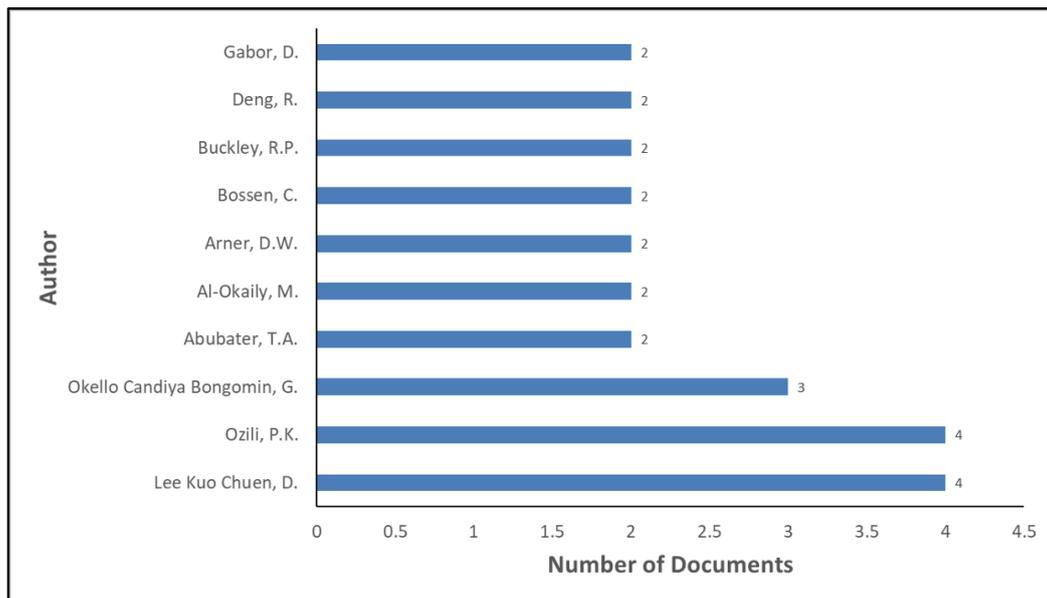


Figure 5: Number of articles by author (Top Ten)

Another notable contributor is Okello Candiya Bongomin, G., who has three publications investigating the intersection of financial literacy, trust, and digital adoption in developing economies. Scholars such as Abubater, T. A., Al-Okaily, M., and Arner, D. W. are also represented with two publications each, reflecting the growing diversity of contributors working on this topic. Collectively, these authors represent research that ranges from conceptual frameworks to applied investigations, covering areas such as financial literacy, digital adoption, fintech regulation, and policy development (Senyo & Osabutey, 2020; Chen et al., 2022).

It is important to emphasise that **Figure 5** reflects productivity regarding publication count rather than influence measured by citations. While these authors are among the most active contributors in terms of output, their impact on the intellectual development of the field depends on how frequently other scholars have cited, used, and extended their work. Citation analysis, co-authorship mapping, and bibliographic coupling, which are presented in subsequent sections, provide a more complete assessment of scholarly influence.

In summary, the results indicate that research on digital financial inclusion is being shaped by a relatively small number of active scholars. Their contributions have provided the foundations for ongoing debates on the role of digital technologies in advancing financial inclusion and continue to guide the direction of research and policy discussions.

4.2 Bibliometric Mapping and Thematic Clusters

Bibliometric mapping using VOSviewer produced three

primary analytical outputs: keyword clusters, author network, and bibliographic coupling.

4.2.1 Keyword Clusters

The keyword co-occurrence analysis identified three main thematic clusters (**Figure 6**). Cluster 1 (Green) focuses on financial inclusion and economic outcomes, bringing together keywords related to banking, human development, and socio-economic impacts. This cluster reflects the foundational research on how access to financial services supports poverty reduction, promotes social equity, and enhances economic stability (Demirgüç-Kunt et al., 2021). Cluster 2 (Blue) represents technological and institutional perspectives, centering on digital banking, financial regulation, cybersecurity, education, and institutional frameworks, particularly within developed countries. It underscores the importance of regulatory support and institutional capacity in advancing effective digital financial ecosystems (Iheanachor et al., 2023). Meanwhile, Cluster 3 (Yellow) highlights emerging societal issues, covering financial literacy, consumer perceptions of digital finance, the shift towards a cashless society, and the influence of global crises such as COVID-19. This cluster illustrates how digital finance intersects with public behaviour, trust, and resilience during societal disruptions (Le, 2021; Setiawan et al., 2025).

The clusters collectively demonstrate the intellectual evolution of the field. Early studies concentrated on the conceptual foundations of financial inclusion and its economic effects. At the same time, more recent research has expanded toward applied issues such as technology adoption, digital resilience, and user trust. Like findings by Tay et al. (2022), the analysis shows

These clusters reinforce the three dominant streams identified in the keyword analysis, adding two important insights. First, adoption studies show strong theoretical interconnectedness, suggesting a well-established foundation. Second, the innovation stream increasingly incorporates themes of sustainability and resilience. The convergence of both methods strengthens confidence in the stability of the field's intellectual structure and highlights opportunities for closer integration of technological, behavioural, and social perspectives.

4.3 Interpretation and Broader Implications

Three interconnected research streams structure the field as shown in the keyword and bibliographic-coupling analyses (Sections 4.2.1 and 4.2.3; Figures 6 and 8). Building on these results, three broader implications emerge.

First, adoption determinants remain under-specified across contexts. Rather than repeating descriptive findings, it is important to note that connectivity gaps, uneven digital skills, and low trust continue to constrain inclusion, especially in developing economies (Danladi et al., 2023; Ediagbonya & Tioluwani, 2023). Addressing these barriers requires a policy shift from supply-driven expansion to approaches integrating social, behavioural, and cultural dynamics.

Second, sustainability is a cross-cutting theme. Prior mapping highlighted how digital finance links to environmental goals (see Section 4.2.3; Figure 8). The broader implication is that fintech can mobilise resources for renewable energy and green technologies, positioning digital inclusion within long-term sustainability agendas (Feng et al., 2022; Yang & Masron, 2022).

Third, the effects of market structure deserve closer attention. Digitalisation expands outreach through affordable platforms while pressuring traditional financial institutions. This innovation stream, identified in earlier analyses (Figure 8), underscores why policymakers increasingly regard inclusive finance as a foundation for stability and resilience (Ozili, 2018; Arner et al., 2020).

Across all three implications, trust remains the decisive factor. Evidence consistently shows that trust influences the adoption and sustained use of digital services (Zhao et al., 2024). Building trust requires transparent governance, data protection, and credible oversight, without which digital financial inclusion's equity and developmental promise cannot be realised (Aldboush & Ferdous, 2023).

4.4 Summary of Results and Discussion

In summary, digital technology and financial inclusion research have grown rapidly and span three interconnected streams: fintech innovation, technology adoption, and social inclusion. While progress has

been made in documenting the benefits of digital technologies, substantial challenges remain in ensuring equitable access, building trust, and linking financial inclusion to sustainability outcomes. Therefore, future research should adopt cross-disciplinary perspectives integrating technology, economics, and social science. At the same time, policymakers should design holistic strategies that combine infrastructure development with education, regulation, and social empowerment.

5. CONCLUSIONS

This study enriches the literature on digital technology and financial inclusion by presenting a bibliometric analysis of 291 Scopus-indexed publications published between 2005 and 2022. The analysis reveals three dominant and interconnected research streams that combine technological innovation, adoption dynamics, and social inclusion. Together, these perspectives highlight that digital financial inclusion is not only a matter of technological advancement but also a social and institutional process shaped by infrastructure, regulation, and cultural acceptance.

The findings offer several theoretical contributions. They deepen the understanding of digital financial inclusion as a multidimensional concept that integrates economic, technological, and social dimensions. By mapping intellectual linkages and identifying influential authors, institutions, and regions, this study provides a structured overview of the field's evolution and a clear roadmap for future research. Furthermore, the analysis highlights an emerging research frontier that connects digital finance with sustainability and green innovation, underscoring the growing potential of digital platforms to support renewable energy development and environmentally responsible investment.

Despite notable progress, the study also underscores ongoing challenges. Digital divides limit digital literacy, and low levels of trust continue to constrain inclusive outcomes, raising the risk that digital transformation may widen rather than narrow financial exclusion. Policymakers therefore need to address both infrastructural barriers and the behavioural and cultural factors that shape adoption and usage patterns.

Future research should build on these insights by extending bibliometric analysis to new technologies such as blockchain, artificial intelligence, and digital identity systems. Comparative studies across regions can further clarify how institutional and cultural contexts influence the adoption of digital financial inclusion. At the same time, longitudinal designs can help assess the resilience of digital financial inclusion during periods of disruption and transformation.

5.1 Practical Implication

Beyond its academic contributions, this study offers several practical insights for policymakers, financial institutions, small and medium enterprises, and international development agencies.

For policymakers, the findings underscore the importance of regulatory frameworks that foster confidence in digital finance through robust consumer protection, robust data privacy, and transparent practices. Continued investment in digital infrastructure and financial literacy initiatives, especially in rural and underserved areas, remains essential to narrowing the digital divide.

For financial institutions, digital platforms create opportunities to extend outreach, reduce costs, and enhance competitiveness. However, success depends on more than technological advancement. Institutions must strengthen user trust and engagement, while collaboration between banks and fintech firms is crucial for designing inclusive financial products that meet the needs of low-income households and small businesses, which often face barriers to traditional finance.

For small and medium enterprises, digital financial inclusion enhances access to capital, supports market expansion, and encourages innovation. Firms that adopt digital tools can improve efficiency, strengthen decision-making, and boost competitiveness, but they require targeted support to develop digital capabilities and overcome adoption barriers.

For international development agencies, digital financial inclusion plays a crucial role in contributing to poverty reduction, social equity, and sustainable development. Promoting green financial technologies and digital infrastructure can simultaneously advance economic growth and environmental responsibility.

Overall, coordinated strategies among governments, financial institutions, enterprises, and development partners are vital to ensure that digital financial inclusion supports equitable growth and long-term sustainability.

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