Mapping the Evolution of Digital Financial Literacy Research: A Bibliometric Analysis (2009–2025)

[1]Muslimah Nur Islami, [2]Dharma Tintri Ediraras, [3]Sudaryanto

[1]Fakultas Ekonomi & Bisnis Universitas Mulia, [2,3]Fakultas Ekonomi Universitas Gunadarma

[1]Jl. Letjend. TNI Jl. Letjen Zaini Azhar Maulani No.9, Balikpapan 76114, [2,3]Jl. Margonda Raya No. 100, Depok 16424, Jawa Barat

[1]muslimah0311@gmail.com, [2]dharmate@staff.gunadarma.ac.id, [3]sudaryanto@staff.gunadarma.ac.id

Abstract

Examines the evolution and thematic development of research in digital financial literacy. Background Problems: How has research on digital financial literacy developed from 2009 to 2025 in terms of publication trends, influential contributors, and thematic focus? This study offers a comprehensive bibliometric analysis of DFL using Scopus-indexed literature, revealing research trajectories and emerging themes that have not been mapped in previous reviews, focuses specifically on the transition from traditional financial literacy to DFL and highlights the role of interdisciplinary and regional dynamics. The research employed bibliometric analysis using data extracted from the Scopus database through Publish or Perish software, covering 194 articles published between 2009 and 2025. VOSviewer was used to visualize publication trends, keyword co-occurrences, thematic clusters, and country-level collaboration networks. The findings reveal a significant increase in DFL publications post-2020, with thematic evolution from basic financial education to digital finance, fintech, and digital inclusion. Conclusion: DFL has transitioned into a mature interdisciplinary field addressing economic inclusion and digital competency. This analysis also provides a foundation for future research on digital capability and financial empowerment in emerging markets.

Keywords*: bibliometric analysis, digital financial literacy, finance, fintech, vosviewer*
JEL Codes : M41, M15

INTRODUCTION

Digital financial literacy (DFL) research has grown rapidly and unevenly across multiple disciplines (finance, education, information systems, development studies), producing diverse definitions, measures, and contexts. A bibliometric approach enables a systematic, quantitative, and reproducible assessment of this expanding corpus. Specifically, it (i) maps publication dynamics and influence (top articles, journals, authors, countries), (ii) uncovers the intellectual structure of the field through co-citation and collaboration networks, and (iii) tracks the thematic evolution from traditional financial literacy to contemporary DFL concerns—fintech adoption, digital inclusion, and cyber-risk—via keyword co-occurrence and overlay visualizations. This evidence base is essential for policy makers, educators, and practitioners seeking to design DFL programs and standards, and for scholars aiming to identify conceptual gaps and future research frontiers.

In the rapidly evolving digital economy, digital financial literacy (DFL) has emerged as a critical competency, enabling individuals to effectively navigate digital financial services and make informed financial decisions ("Digital-Financial-Literacy-And-Financial-Well-Being," 2024). DFL encompasses the knowledge and skills required to access, understand, and utilize digital financial platforms, such as online banking, mobile payments, and fintech applications, while also safeguarding against digital financial fraud and risks. As financial technologies become increasingly integrated into daily life, the importance of DFL in promoting financial well-being and inclusion has garnered significant attention from researchers, educators, and policymakers.

Over the past decade, scholarly interest in DFL has grown substantially, reflecting the global shift towards digital financial ecosystems. Bibliometric analyses have been instrumental in mapping this research landscape, identifying key trends, influential publications, and emerging themes within the field. For instance, a study analyzing literature from 2015 to 2022 highlighted the expanding scope of DFL research, emphasizing its relevance in enhancing financial decision-making and resilience in the digital age (Yadav & Banerji, 2023).

Despite the increasing volume of research, there remains a need for a comprehensive bibliometric analysis that captures the evolution of DFL scholarship over an extended period. This study aims to fill this gap by examining the trajectory of DFL research from 2009 to 2025, utilizing bibliometric methodologies to uncover patterns, collaborations, and thematic developments. By providing a systematic overview of the literature, this analysis seeks to inform future research directions and support the development of effective DFL initiatives worldwide.

The purpose of this study is to conduct a comprehensive bibliometric analysis of scholarly publications on DFL from 2009 to 2025. This study aims to map the development of the field by analyzing publication trends, identifying the most influential authors, countries, and journals, and examining the thematic evolution of research over time. Specifically, this research seeks to determine the volume, growth rate, and temporal distribution of publications in DFL; identify the most productive and influential authors and countries contributing to the field; highlight the most frequently cited articles and journals; explore the shifting thematic focus and emerging research trends using co-word and cluster analysis; trace the conceptual progression from traditional financial literacy to digital financial literacy, as reflected in academic literature. Through these objectives, the study aims to provide a structured overview of the intellectual landscape of digital financial literacy research, uncovering gaps and informing future research directions in the field.

LITERATURE REVIEW

Financial literacy

Financial literacy is a foundational concept that encompasses an individual's ability to understand and effectively use various financial skills, including personal financial management, budgeting, and investing. According to the Organisation for Economic Co-operation and Development (OECD) 2024, financial literacy is defined as a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial well-being.

The importance of financial literacy has been emphasized in numerous studies, highlighting its role in promoting financial inclusion, reducing economic disparities, and enhancing individual financial stability. For instance, a systematic review by Aren and Dinç Aydemir (2014) underscores the critical role of financial literacy in enabling individuals to make informed financial choices, thereby contributing to overall economic well-being (The Evolution of the Financial Literacy Concept: A Literature Review,2019).

Digital financial literacy

The advent of digital technologies, the concept of financial literacy has evolved to include digital competencies, giving rise to the term "Digital Financial Literacy" (DFL). Digital financial literacy refers to the ability to understand, use, and manage digital financial services effectively, safely, and responsibly, including digital payments, online banking, and fintech applications (Golden & Cordie, 2022). Golden and Cordie (2022) define DFL as the knowledge and skills required to use digital devices to make informed financial decisions.

The significance of DFL has grown in tandem with the proliferation of financial technology (fintech) services, mobile banking, and online financial platforms. A study published in ScienceDirect highlights the association between digital financial literacy and financial well-being, emphasizing that individuals with higher DFL are better equipped to navigate the complexities of digital financial services (Choung et al., 2023).

Financial literacy to digital financial literacy

The evolution from traditional financial literacy to DFL reflects the profound impact of digitalization on financial behaviors and education. Initially, financial literacy encompassed basic competencies such as budgeting, saving, investing, and understanding credit. However, the advent of digital technologies has transformed the financial landscape, necessitating a broader skill set to navigate digital financial services effectively.

DFL extends beyond traditional financial knowledge, incorporating the ability to use digital platforms securely and efficiently for financial transactions. This includes understanding online banking, mobile payments, digital wallets, and the risks associated with digital financial activities, such as cybersecurity threats and online fraud. As noted by Golden (2022), digital financial literacy involves acquiring the knowledge, skills, confidence, and competencies to safely use digitally delivered financial services (Alliance for Financial Inclusion, 2021).

The transition to digital financial literacy is driven by the increasing integration of technology in financial services. Fintech innovations have made financial services more accessible but also more complex, requiring users to possess digital skills alongside financial knowledge. This shift underscores the importance of digital financial literacy in promoting financial inclusion and empowering individuals to make informed financial decisions in a digital economy.

Despite its growing importance, digital financial literacy remains an emerging concept with varying definitions and measurement approaches (Capital One, 2024). Research indicates a need for standardized frameworks to assess and enhance digital financial literacy effectively. As highlighted in a bibliometric analysis, the global level of digital financial literacy is generally low, emphasizing the need for comprehensive strategies to improve digital financial competencies (Yadav & Banerji, 2023).

A systematic literature review by Jose and Ghosh (2024) emphasizes the need for a standardized definition and measurement of DFL to effectively assess and enhance individuals' capabilities in managing digital financial services (Gulati et al., 2025). This evolution underscores the importance of integrating digital competencies into financial education programs to ensure individuals are equipped to make sound financial decisions in a digital context.

Bibliometric analysis

Bibliometric analysis is a quantitative method used to assess scientific literature by examining publication patterns, citation metrics, and collaborative networks (Mina, 2025). This approach enables researchers to identify trends, measure the impact of scholarly works, and map the intellectual structure of specific research fields (Öztürk et al., 2024). By analyzing data such as authorship, institutional affiliations, and keyword co-occurrences, bibliometric studies provide insights into the evolution and dynamics of academic disciplines. For instance, bibliometric analysis has been instrumental in uncovering research trends and evaluating the influence of publications across various domains (Mina, 2025). The process typically involves data collection from databases like Scopus or Web of Science, followed by data cleaning, analysis using bibliometric tools, and visualization of findings to interpret the development and structure of research areas (Passas, 2024).

In the context of digital financial literacy, bibliometric analysis serves as a valuable tool to trace the evolution of the field, identify key contributors, and highlight emerging themes. By analyzing data such as authorship, institutional affiliations, and keyword co-occurrences, bibliometric studies provide insights into the development and dynamics of DFL research. This methodological approach is instrumental in informing future research directions and policy formulations aimed at enhancing digital financial competencies.

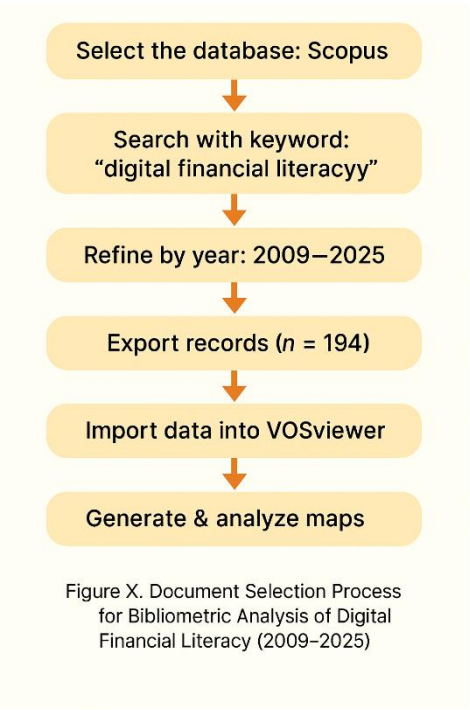

Figure 1. Document Selection Process for Bibliometric Analysis
Source: created by Authors

RESULTS AND DISCUSSION

Distribution of citations and articles

The bibliometric analysis reveals a clear growth trajectory in the field of digital financial literacy (DFL) between 2009 and 2025.

Table 1. Annual Distribution of Citations and Articles

Year	Citations	% of Citation	Articles	% of Article
2009	3	0.1%	1	0.5%
2010	0	0.0%	0	0.0%
2011	0	0.0%	0	0.0%
2012	0	0.0%	0	0.0%
2013	0	0.0%	0	0.0%
2014	0	0.0%	0	0.0%
2015	0	0.0%	0	0.0%
2016	0	0.0%	0	0.0%
2017	0	0.0%	0	0.0%
2018	57	1.5%	4	2.1%
2019	130	3.4%	4	2.1%
2020	700	18.2%	4	2.1%
2021	857	22.3%	12	6.2%
2022	1100	28.6%	41	21.5%
2023	661	17.2%	38	19.5%
2024	293	7.6%	72	36.9%
2025	45	1.2%	18	9.2%
	3846		194	

Source: POP Search Results from Scopus 2025

Table 1 presents the annual distribution of publications and citations related to digital financial literacy research from 2009 to 2025. The total dataset includes 194 articles and 3,846 citations. During the early phase of the analysis period (2009–2017), scholarly attention toward digital financial literacy was minimal, with no publications or citations recorded in most of these years. The only exception was in 2009, which saw one article published and three citations (0.1% of total citations), indicating an embryonic stage of the research field.

A noticeable increase began in 2018, marking the start of an upward trend in both article output and citation impact. Between 2018 and 2020, article counts remained consistent at four per year, while citations grew significantly from 57 in 2018 to 700 in 2020. This reflects the field's growing recognition and relevance in response to global digital financial transformation and increasing fintech adoption.

The most rapid growth occurred between 2021 and 2023, which can be considered the expansion phase of the field. In 2021, the number of articles rose to 12 (6.2%), and citations reached 857 (22.3%). The year 2022 saw the highest impact with 1,100 citations (28.6%) and 41 articles (21.5%), indicating a peak in both quantity and scholarly influence. This was followed closely by 2023, with 38 articles (19.5%) and 661 citations (17.2%).

Interestingly, while 2024 produced the highest number of articles 72 publications accounting for 36.9% of the total, the citation count was relatively lower at 293 (7.6%), likely due to the natural delay in citation accrual following publication. A similar trend appears in 2025, with 18 articles (9.2%) and 45 citations (1.2%), as these papers are still too recent to have accumulated substantial academic attention.

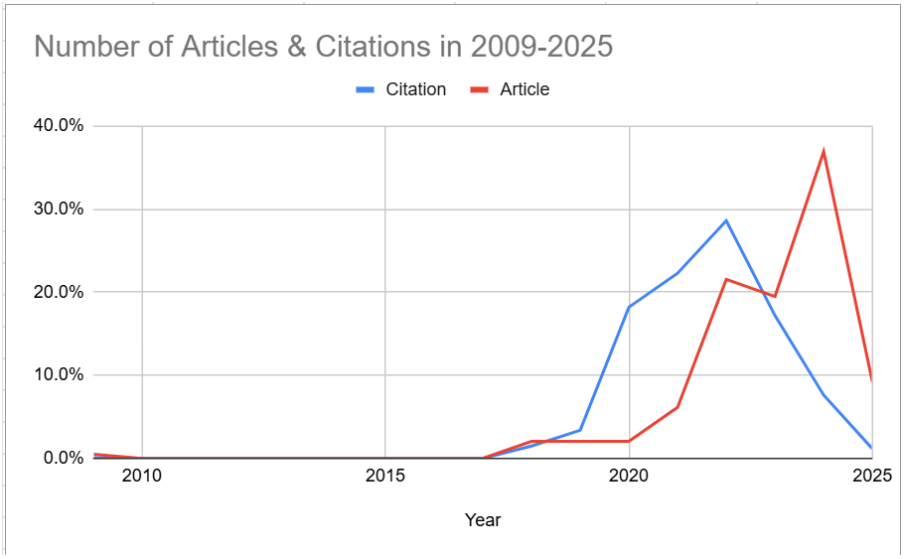

Figure 2. Trends in Articles and Citations
Source: POP Search Results from Scopus 2025

Figure 2 illustrates the percentage distribution of articles and citations related to digital financial literacy published from 2009 to 2025. The graph features two distinct trend lines the red line representing the percentage of articles, and the blue line showing the percentage of citations each year.

In the early years (2009–2017), both publication and citation activities were negligible, reflecting the nascent stage of digital financial literacy as a research domain. This changed starting in 2018, when the blue citation line began to rise modestly, and a steeper upward trajectory followed after 2020.

From 2020 to 2022, there is a clear correlation between increasing research output and rising scholarly impact. Specifically, the citation line peaked in 2022, reaching close to 29% of all citations, suggesting that publications in or before that year had substantial influence. Meanwhile, the article line rose sharply in 2022 and peaked in 2024, with over 36% of total articles published in that single year. This indicates

a strong acceleration in academic interest, though citations for 2024 remain relatively low likely due to citation lag.

The divergence between the article and citation lines in 2024 and 2025 highlights a typical pattern in bibliometric studies: newly published works often require time to accumulate significant citations. Hence, while 2024 was the most prolific in terms of research output, it did not immediately translate to high citation counts. Overall, this figure confirms the rapid expansion and growing scholarly engagement with digital financial literacy since 2020, with major contributions in both volume (articles) and academic influence (citations) between 2021 and 2023.

Distribution of articles and citations per country

Table 2 below presents the distribution of publications and citations by country, based on 194 articles and 3,846 citations on digital financial literacy between 2009 and 2025.

Table 2. Distribution of Articles and Citations per Country (2009-2025)

Country	Articles	% of Article	Citations	% of Citation
Australia	1	0.5%	2	0.1%
Austria	1	0.5%	15	0.4%
Bahrain	1	0.5%	6	0.2%
Bangladesh	3	1.5%	268	7.0%
Bosnia & Herzegovina	2	1.0%	25	0.7%
Brazil	1	0.5%	1	0.0%
Cambodia	1	0.5%	2	0.1%
Cameroon	1	0.5%	110	2.9%
Canada	1	0.5%	20	0.5%
China	57	29.4%	1467	38.1%
Cyprus	1	0.5%	61	1.6%
Ethiopia	2	1.0%	6	0.2%
Finland	2	1.0%	93	2.4%
France	2	1.0%	3	0.1%
Germany	2	1.0%	7	0.2%
Ghana	1	0.5%	30	0.8%
Hungary	2	1.0%	28	0.7%
India	27	13.9%	278	7.2%
Indonesia	16	8.2%	298	7.7%
Israel	1	0.5%	1	0.0%
Italy	6	3.1%	153	4.0%
Japan	3	1.5%	18	0.5%
Jordan	4	2.1%	11	0.3%
Lebanon	1	0.5%	5	0.1%
Malaysia	7	3.6%	15	0.4%
Mexico	2	1.0%	12	0.3%
Morocco	1	0.5%	3	0.1%
New Zealand	1	0.5%	10	0.3%
Nigeria	6	3.1%	304	7.9%
Pakistan	4	2.1%	8	0.2%
Peru	1	0.5%	1	0.0%

Country	Articles	% of Article	Citations	% of Citation
Philippines	3	1.5%	17	0.4%
Qatar	1	0.5%	86	2.2%
Russia	4	2.1%	8	0.2%
Saudi Arabia	1	0.5%	9	0.2%
South Africa	4	2.1%	40	1.0%
South Korea	1	0.5%	38	1.0%
Spain	1	0.5%	2	0.1%
Sri Lanka	1	0.5%	40	1.0%
Sweden	1	0.5%	2	0.1%
Thailand	2	1.0%	18	0.5%
Turkey	2	1.0%	9	0.2%
United Arab Emirates	1	0.5%	1	0.0%
United Kingdom	2	1.0%	142	3.7%
United States	5	2.6%	71	1.8%
Vietnam	4	2.1%	102	2.7%
	194	100.0%	3846	100.0%

Source: POP Search Results from Scopus 2025

The results reveal that China is the dominant contributor, accounting for 29.4% of all articles and 38.1% of total citations, signifying both high output and strong academic influence. Following China, India and Indonesia contributed 13.9% and 8.2% of total publications respectively, with Indonesia accumulating 298 citations (7.7%), suggesting growing academic engagement with digital financial inclusion in emerging economies.

Interestingly, countries such as Nigeria and Vietnam demonstrated significant impact relative to their output. Nigeria, with only six publications, garnered 304 citations (7.9%), while Vietnam produced just two articles but earned 102 citations (2.7%), indicating a high citation-per-paper ratio. Similarly, Cameroon and Germany each contributed a single article, yet received 110 (2.9%) and 93 citations (2.4%) respectively, reflecting substantial influence. These findings suggest that certain countries may have produced seminal or widely cited papers, despite their limited volume of publications.

A broader geographic view shows contributions from various global regions, including Asia, Africa, Europe, the Middle East, and the Americas. While China, India, and Indonesia lead in volume, nations such as Saudi Arabia, Finland, and the United States also exhibit meaningful citation performance. This diverse authorship landscape underscores the growing global interest in digital financial literacy, particularly in regions experiencing rapid fintech adoption and digital transformation.

Visualization Map Analysis

Figure 3 below presents a keyword co-occurrence network generated using VOSviewer, illustrating the thematic landscape of research in digital financial literacy from 2009 to 2025.

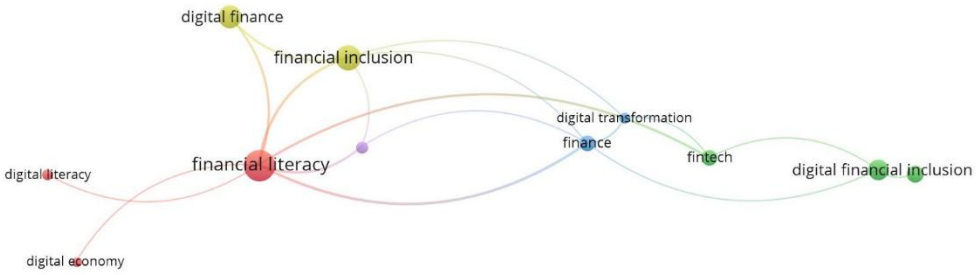

Figure 3. Visualization Map of Terminology (Items) from Articles on Digital Financial Literacy

The visualization maps keywords that frequently co-occur in titles, abstracts, and keywords of the analyzed articles, with each node representing a keyword and each link indicating co-occurrence strength. The size of a node reflects the frequency of the term, while the colors represent thematic clusters.

At the center of the network lies the term "financial literacy", the most prominent and central node, signifying its foundational role in the literature. From this core term, several thematic clusters emerge:

a. Cluster 1 (Red) – Traditional & Digital Literacy Foundation
   (Keywords: financial literacy, digital literacy, digital economy)
   This cluster highlights the traditional concept of financial literacy and its extension into the digital space. The presence of "digital literacy" and "digital economy" suggests early-stage discussions about the shift from analog to digital competence in financial behavior.
b. Cluster 2 (Yellow) – Inclusion and Access
   (Keywords: financial inclusion, digital finance)
   This theme focuses on how digital tools and financial literacy contribute to greater financial inclusion, especially in underserved populations. The connection between digital finance and financial inclusion reflects the goal of expanding access through education and technology.
c. Cluster 3 (Blue) – Transformation & Fintech
   (Keywords: finance, digital transformation, fintech)
   This pathway tracks the evolution of finance under the influence of digital transformation and financial technology (fintech). These keywords indicate a growing emphasis on how financial systems are being restructured and how literacy must adapt to innovations in fintech services.
d. Cluster 4 (Green) – Technological Evolution and Future Directions
   (Keywords: fintech, digital financial inclusion)
   This emerging cluster represents the intersection of fintech and digital inclusion goals. It captures research that investigates how fintech solutions (such as mobile payments, blockchain, and AI-driven finance) are reshaping access to financial tools and influencing digital financial literacy frameworks. The link with digital financial inclusion highlights the shift toward personalized, tech-driven financial services that still depend on user competence and literacy.

The transition from financial literacy to digital financial inclusion, and from digital literacy to fintech adoption, shows a matured and multidimensional research field. The map illustrates how the topic has evolved from foundational education to advanced, tech-integrated financial systems, underscoring the need for new literacy models that combine behavioral and technological.

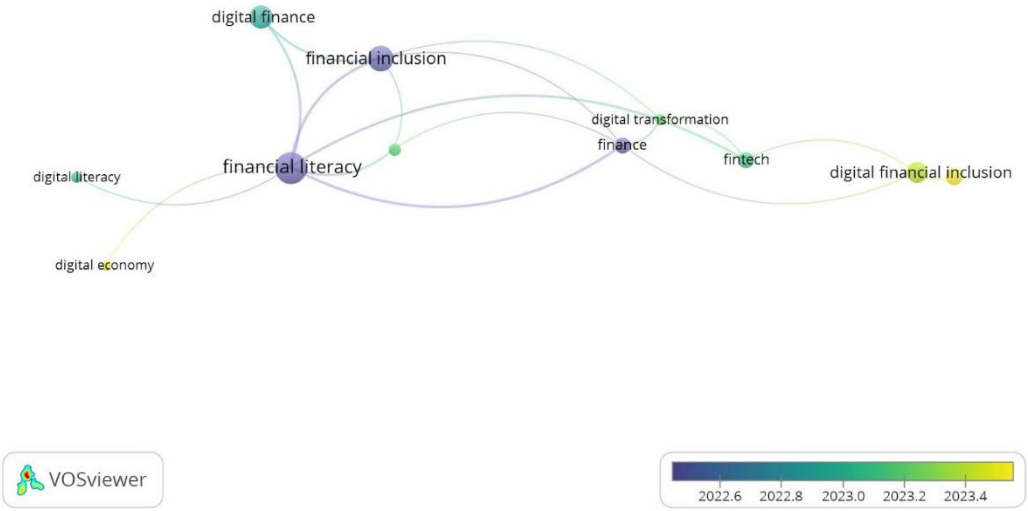

Figure 4. Yearly Publication Map Articles related to DIgital Financial Literacy (2009-2025)

Figure 4 presents an overlay visualization map generated using VOSviewer. This map displays the temporal evolution of keywords in digital financial literacy (DFL) research between 2022 and 2023, with each node representing a keyword and its color indicating the average publication year in which the term appeared. The color gradient ranging from dark blue (earlier) to yellow (more recent) provides a dynamic view of how the focus of the research has shifted over time.

Keywords shaded in dark blue to purple (before 2022) indicate themes that dominated the earlier stages of the analyzed period: financial literacy, financial inclusion and finance. These themes form the foundational base of digital financial literacy research. Financial literacy appears as the most central and frequently occurring keyword, indicating its critical role in shaping the field. The inclusion of financial inclusion and finance in this early cluster highlights the traditional focus on improving access to financial systems and understanding core financial principles before the digital shift.

Keywords shaded in green (2023) indicate themes: digital literacy, digital finance, digital information and fintech. These keywords represent a transitional phase in the research field, focusing on the integration of technology into financial education and access. The rise of terms like fintech and digital finance shows how technological innovation has increasingly influenced the financial literacy discourse, while digital literacy and digital information signal a growing concern with individuals' capacity to navigate digital platforms.

Keywords shaded in yellow (After 2023) indicate themes: digital economy and digital financial inclusion. These are the most recent areas of focus, reflecting the latest scholarly interest in the digital ecosystem's role in promoting inclusive and equitable financial access. Digital financial inclusion indicates a shift toward ensuring that fintech solutions and digital financial tools reach marginalized and underserved populations, while digital economy contextualizes this inclusion within broader economic systems.

The overlay map shows a clear thematic progression in digital financial literacy research from foundational knowledge and access (financial literacy and inclusion) to technology integration (fintech and digital literacy) and finally to systemic and policy-oriented concerns (digital financial inclusion). This trajectory reveals a maturing field that increasingly emphasizes inclusive innovation and the digital infrastructure necessary for financial empowerment.

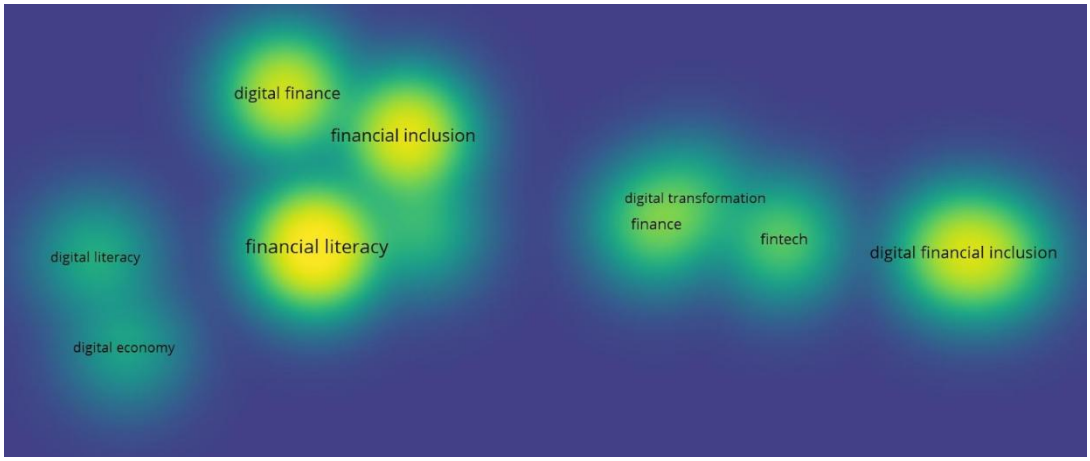

Figure 5. Digital Financial Literacy Articles Density Map

Figure 5 displays a density visualization map produced using VOSviewer, illustrating the frequency and relevance of keywords in digital financial literacy research from 2009 to 2025. Each term shown on the map corresponds to a keyword extracted from the analyzed publications. The color intensity reflects the density of occurrences and co-occurrences of each term.

Yellow indicates high-density (frequently used and central terms). The terms appear in bright yellow, suggesting that they are the most dominant and frequently co-occurring keywords in the field: financial literacy, financial inclusion, digital financial inclusion and digital finance. These keywords reflect the primary focus areas in the field. Financial literacy remains the central pillar of the research, while financial inclusion and digital financial inclusion highlight the field's ongoing emphasis on equity and access in digital contexts. The inclusion of digital finance in this group underscores its growing importance as a bridge between financial services and digital platforms, often serving as the context where digital literacy is applied.

Green indicates moderate density. Keywords such as: fintech, finance and digital transformation. They serve as intermediate themes, connecting foundational literacy topics to newer areas of technological and institutional change. These terms are increasingly relevant in academic discourse but have not yet reached the core density of the primary keywords.

Blue to purple indicates lower density (less frequent or peripheral terms). keywords like digital literacy and digital economy appear less frequently, indicating either emerging areas of interest or topics with lower citation strength in the current literature. Despite their peripheral placement, these keywords are important in shaping the digital competence dimension of financial literacy and may represent opportunities for future research.

This density visualization demonstrates that research in digital financial literacy is most intensely focused on concepts of literacy, access, and finance in digital environments. The presence of digital finance alongside financial literacy and financial inclusion as a high-density keyword affirms its rising prominence in the discourse. Meanwhile, the continuing emergence of terms such as fintech and digital literacy suggests a trend toward more integrated and multidisciplinary approaches in future scholarship.

CONCLUSION AND SUGGESTION

Conclusion

This bibliometric study has comprehensively mapped the evolution of digital financial literacy (DFL) research between 2009 and 2025 using Scopus-indexed publications. The results demonstrate a clear transformation in scholarly interest, beginning with foundational themes such as financial literacy, finance, and financial inclusion, and advancing toward more complex digital domains including digital finance, fintech, and digital financial inclusion.

Empirically, this study reveals a rapid growth in DFL publications, particularly after 2020, with 2022 and 2024 being peak years in terms of citation impact and article volume, respectively. Thematically, the research evolved from traditional financial education to interdisciplinary approaches that incorporate technology, inclusion, and digital transformation. The analysis also identifies China, India, and Indonesia as the most productive contributors, while countries such as Nigeria and Vietnam emerged with high impact despite lower publication volume.

Theoretically, this study contributes to the ongoing refinement of digital financial literacy as a distinct construct, extending beyond financial knowledge to include digital competencies, platform navigation skills, and cybersecurity awareness consistent with definitions by Golden & Cordie (2022) and the OECD (2024). These findings support calls for integrative frameworks that link digital skills, behavioral economics, and inclusive finance strategies.

Economically, the study highlights the role of DFL in reducing digital inequality and promoting financial inclusion, particularly in developing countries. As fintech expands globally, enhancing DFL becomes a critical factor in fostering digital economic participation, reducing risk exposure, and improving individual financial well-being.

Suggestions for Future Research

Despite its contributions, this study has several limitations. First, it relies exclusively on Scopus-indexed documents, which, while comprehensive, may omit relevant literature from other databases such as Web of Science, Google Scholar, or regional repositories. This may have introduced a coverage bias, especially for gray literature or emerging research in non-English-speaking countries.

Second, while bibliometric methods are powerful for mapping trends and influence, they do not provide deep qualitative insights into conceptual content or user perspectives. A future systematic literature review (SLR) or meta-analysis could enrich understanding by exploring how DFL is operationalized in empirical studies.

Third, the keyword-based approach may underrepresented works that discuss DFL under alternative terminology, such as “financial capability,” “digital economic empowerment,” or “e-banking education.” Refining keyword strategies or employing natural language processing (NLP) in future bibliometric studies could improve conceptual capture.

Therefore, future researchers are encouraged to:

a. Incorporate multiple data sources (e.g., Web of Science, Google Scholar) for broader bibliographic coverage.
b. Apply mixed-method designs, combining bibliometric mapping with qualitative synthesis or case studies.
c. Explore comparative regional analyses to understand how DFL evolves differently in emerging vs developed economies.
d. Investigate the role of behavioral, psychological, and policy-related factors in shaping DFL outcomes.
e. Develop and validate standardized instruments to assess DFL across demographics and platforms.

In conclusion, this study provides an essential foundation for understanding the development of digital financial literacy as both a research field and a social necessity in the digital era. The findings can inform educators, policymakers, and financial service providers as they seek to close digital gaps and build inclusive financial ecosystems.

Relevance and Implication to Indonesian Context

The findings of this bibliometric analysis on digital financial literacy (DFL) are highly relevant to the Indonesian context. Indonesia ranked third in terms of research productivity, contributing 8.2% of total publications and 7.7% of global citations in the field of DFL between 2009 and 2025. This underscores Indonesia’s growing academic engagement and the urgent national need for DFL in both policy and practice.

Indonesia is experiencing a rapid digital transformation, marked by increased internet penetration, widespread use of mobile payments (such as QRIS, GoPay, OVO), and the expansion of fintech startups. However, as digital financial services become more accessible, the risk of digital exclusion, fraud, and misinformation also rises, particularly among low-income, rural, and elderly populations. This reinforces the necessity for digital financial literacy programs that not only teach basic financial concepts but also equip users with the ability to navigate digital platforms securely and critically.

The themes identified in the global DFL literature—such as financial inclusion, fintech adoption, and digital economic participation—resonate strongly with Indonesia's socioeconomic development goals. In 2020, Indonesia's National Financial Literacy Strategy (SNLKI) began emphasizing the role of digital financial education in supporting inclusive growth (OECD, 2024). The bibliometric evidence in this study supports that DFL is a core enabler for national objectives such as digital inclusion (OECD, 2024) and the acceleration of financial access through the Gerakan Nasional Literasi Keuangan (GNFLK).

The study's finding that digital financial inclusion and digital finance are emerging high-density research themes aligns with current Indonesian initiatives, such as Bank Indonesia's push for cashless society goals and OJK's fintech regulation frameworks. These efforts require strong DFL foundations to succeed sustainably.

From an academic standpoint, this study provides Indonesian researchers with a roadmap for advancing DFL research by:

a. Encouraging local contextualization of global DFL models,
b. Promoting interdisciplinary collaboration between finance, education, and IT faculties, and
c. Informing curriculum design in vocational schools and higher education.

In conclusion, the evolution of digital financial literacy as mapped in this study has direct implications for Indonesia's financial resilience, regulatory policies, and inclusive digital transformation. The insights can inform public and private stakeholders—including educators, fintech developers, banks, and policymakers—in designing more targeted interventions to improve digital financial competencies across the archipelago.

Research Development and Suggestion

The evidence indicates that research on digital financial literacy (DFL) has evolved from the classical financial-literacy paradigm focused on knowledge and education toward a distinctly digital domain that foregrounds platform use and safety behaviors. Over time, keywords and focal topics drift from "financial education/knowledge" to "e-wallets," "QR payments," "fintech adoption," "cybersecurity literacy," and "digital inclusion," signaling that DFL now stands on its own theoretical and practical footing. Publication and citation dynamics accelerate in the late 2010s, in step with rapid diffusion of digital payment rails and national inclusion agendas; influence concentrates in a handful of journals and proceedings across finance, education, and information systems, underscoring the field's interdisciplinary character. Collaboration networks expand but remain hub-centric, with a small set of authors and institutions acting as bridges between education-centric and fintech-centric strands, and with cross-regional ties that could be stronger—especially among Global South contexts facing similar infrastructure and consumer-protection challenges. Shared-citation structures consolidate a stable intellectual base around three pillars—measurement/financial literacy roots, technology-adoption and digital skills, and inclusion/consumer protection—while document coupling highlights dynamic research fronts on DFL measurement and validation across diverse populations, quality of payment usage beyond simple adoption, cyber-risk and fraud resilience, and evaluation of DFL interventions. Despite progress, construct boundaries remain uneven: many instruments mix knowledge, operational skills, safety practices, and critical digital judgment, complicating cumulative synthesis. Moreover, the literature still skews toward students and urban consumers, with MSMEs, older adults, rural users, and low-connectivity settings relatively under-examined.

Future work should first clarify and validate the DFL construct by developing multi-dimensional scales that cleanly differentiate knowledge, operational skills, safety behaviors (e.g., phishing detection,

password hygiene, permissions/privacy), and critical digital judgment; open item banks and anchor items would enable cross-study equating and meta-analytic accumulation. Researchers should move beyond adoption counts to model quality of usage secure settings, feature breadth, error/complaint rates as a mechanism linking DFL to concrete financial outcomes such as buffers, debt service, volatility management, and exposure to fraud. Stronger causal identification is needed: pre-registered quasi-experiments and field experiments (including in-app A/B safety nudges and randomized workshops) can estimate effect sizes with policy relevance. Inclusion should be placed at the core of the agenda by prioritizing MSMEs, older adults, rural/informal workers, and women-led enterprises, tailoring tasks to realistic workflows (inventory, invoicing, QR acceptance, online sales) and explicitly modeling infrastructure constraints (device quality, data costs, connectivity) and local payment rails as moderators. Theoretically, integrating technology-adoption, financial-capability, and behavioral-risk perspectives and testing mechanisms such as self-efficacy, digital trust, risk perception, cognitive load, and social support via mediation/moderation—will sharpen explanations and external validity. Methodologically, longitudinal panels and privacy-preserving administrative/platform data can reduce self-report bias, and all bibliometric maps should report threshold/normalization choices with sensitivity checks to ensure reproducibility. Finally, greater policy–academia and South–South collaboration, along with open release of query strings, cleaning rules, thresholds, and code, will improve comparability across contexts and establish a durable baseline for the next generation of DFL research.

REFERENCES

A. J. Vaid, & Renu Chaudhary. (2022). Review paper on impact of behavioral biases in financial decision-making. *World Journal of Advanced Research and Reviews*, *16*(2), 989–997. Doi.org: 10.30574/wjarr.2022.16.2.1236

Anshika, A., Singla, A., & Mallik, G. (2021). Determinants of financial literacy: Empirical evidence from micro and small enterprises in India. *Asia Pacific Management Review*, *26*(4), 248–255. Doi.org: 10.1016/j.apmrv.2021.03.001

Arbuckle, J. L. (2019). *IBM ® SPSS ® Amos TM 26 User's Guide*.

Arifin, A. Z. (2017). The influence of financial knowledge, control and income on individual financial behavior. In *European Research Studies Journal: Vol. XX*.

Aristana, I. N., Puspitawati, N. M. D., Salain, P. P. P., Koval, V., Konarivska, O., & Paniuk, T. (2024). Improving innovative work behavior in small and medium enterprises: integrating transformational leadership, knowledge sharing, and psychological empowerment. *Societies*, *14*(11). Doi.org: 10.3390/soc14110228

Bhatia, S., & Singh, S. (2024). Exploring financial well-being of working professionals in the Indian context. *Journal of Financial Services Marketing*, *29*(2), 474–487. Doi.org: 10.1057/s41264-023-00215-x

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*, 285–296. Doi.org: 10.1016/j.jbusres.2021.04.070

Golden, W., & Cordie, L. (2022). Digital financial literacy. *Adult Literacy Education: The International Journal of Literacy, Language, and Numeracy*, *4*(3), 20–26. Doi.org: 10.35847/wgolden.lcordie.4.3.20

Gulati, M. T., Singla, A., & Saini, P. (2025). Digital financial literacy and digital finance usage: A systematic literature review and bibliometric analysis. In *Journal of Informatics Education and Research* (Vol. 5).

Hayat, A., & Anwar, M. (n.d.). *Impact of Behavioral Biases on Investment Decision; Moderating Role of Financial Literacy*. Retrieved from: https://ssrn.com/abstract=2842502Electroniccopyavailableat:https://ssrn.com/abstract=2842502 Electroniccopyavailableat:https://ssrn.com/abstract=2842502

Heinemann, H., Mussel, P., & Schäpers, P. (2022). Curious enough to start up? How epistemic curiosity and entrepreneurial alertness influence entrepreneurship orientation and intention. *Frontiers in Psychology*, *13*. Doi.org: 10.3389/fpsyg.2022.1003866

Lajuni, N., Bujang, I., Karia, Abd. A., & Yacob, Y. (2018). Religiosity, financial knowledge, and financial behavior influence on personal financial distress among millennial generation. *Jurnal Manajemen Dan Kewirausahaan*, *20*(2). Doi.org: 10.9744/jmk.20.2.92-98

Landman, M., & Mthombeni, M. (2021). Determining the potential of informal savings groups as a model for formal commitment saving devices. *South African Journal of Economic and Management Sciences*, *24*(1). Doi.org: 10.4102/sajems.v24i1.3940

Mir, M. A., & Bushra. (2024). Digital financial literacy and financial well-being. In *Emerging Perspectives on Financial Well-Being*, 57–73. IGI Global. Doi.org: 10.4018/979-8-3693-1750-1.ch003

Mutlu, U., & Ozer, G. (2019). The effects of personality traits on financial behaviour. *Pressacademia*, *8*(3), 155–164. Doi.org: 10.17261/pressacademia.2019.1122

Nawi, H. M., & Hussin, H. S. (2020). A good cop is never cold or hungry: Antecedents and consequences of financial literacy among members of the Royal Malaysia police. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, *10*(1). Doi.org: 10.6007/ijarafms/v10-i1/7194

OECD/INFE. (2022). Toolkit for Measuring Financial Literacy and Financial Inclusion 2022. Retrieved from: www.oecd.org/financial/education/2022-INFE-Toolkit-Measuring-Finlit-Financial-Inclusion.pdf

Öztürk, O., Kocaman, R., & Kanbach, D. K. (2024). How to design bibliometric research: an overview and a framework proposal. *Review of Managerial Science*, *18*(11), 3333–3361. Doi.org: 10.1007/s11846-024-00738-0

Passas, I. (2024). Bibliometric analysis: The main steps. *Encyclopedia*, *4*(2), 1014–1025. Doi.org: 10.3390/encyclopedia4020065

PISA 2022 Results (Volume IV). (2024). OECD. Retrieved from: https://www.oecd.org/en/publications/pisa-2022-results-volume-iv_5a849c2a-en.html

Poniman, F. (2020). A grand theory of STIFIn personality: Basic functions theory revisited. *International Journal of Psychosocial Rehabilitation*, *24*(5), 710–715. Doi.org: 10.37200/ijpr/v24i5/pr201737

Purwidianti, W., & Tubastuvi, N. (2019). The effect of financial literacy and financial experience on SME financial behavior in Indonesia. *Jurnal Dinamika Manajemen*, *10*(1), 40–45. Doi.org: 10.15294/jdm.v10i1.16937

Purwidianti, W., Tubastuvi, N., Darmawan, A., & Rahmawati, I. Y. (2022). *Does Financial Behavior Mediate the Relationship Between Financial Literacy and Financial Experience Towards Financial Performance of Small Businesses?*

Rahman, M. A., & Fauziyah, A. (2021). The effect of personality traits and financial literation on financial behavior. In *The International Journal of Business Review (The Jobs Review* (Vol. 4, Issue 1).

Rahman, M., Isa, C. R., Masud, M. M., Sarker, M., & Chowdhury, N. T. (2021). The role of financial behaviour, financial literacy, and financial stress in explaining the financial well-being of B40 group in Malaysia. *Future Business Journal*, *7*(1). Doi.org: 10.1186/s43093-021-00099-0

Ramzi, M. I., Ridzwan, R., Baharudin, M. H., & Wan Mohamad, W. M. F. (2023). Financial management practices and business performance of SMEs in Malaysia: A proposed model. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, *13*(2). Doi.org: 10.6007/ijarafms/v13-i2/17297

Sabri, M. F., Anthony, M., Law, S. H., Rahim, H. A., Burhan, N. A. S., & Ithnin, M. (2024). Impact of financial behaviour on financial well-being: evidence among young adults in Malaysia. *Journal of Financial Services Marketing*, *29*(3), 788–807. Doi.org: 10.1057/s41264-023-00234-8

Satiti, N. R. (2020). Financial literacy: an essential in small medium entreprises (SMEs) performance. *Manajemen Bisnis*, *10*(2). Doi.org: 10.22219/jmb.v10i2.14825

The evolution of the Financial Literacy Concept: A Literature Review. (n.d.).

van Eck, N. J., & Waltman, L. (2010). Software survey: Vos-Viewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. Doi.org:10.1007/s11192-009-0146-3.

Yadav, M., & Banerji, P. (2023). A bibliometric analysis of digital financial literacy. *American Journal of Business*, *38*(3), 91–111. Doi.org: 10.1108/ajb-11-2022-0186

Yumna, A., Cheisviyanny, C., & Tasman, A. (2021). *Factors Forming Firm Performance of Micro-Businesses*.