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The Intellectual Map of Digital Financial Literacy: Patterns and Trends through Bibliometrics

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ABSTRACT

Digital Financial Literacy has emerged as a critical competence in an increasingly digitized financial ecosystem, yet the intellectual structure of this rapidly growing research domain remains fragmented. This study aims to systematically map the evolution, thematic structure, and scholarly impact of digital financial literacy research using bibliometric analysis. Drawing on a comprehensive dataset of peer-reviewed publications retrieved from major academic databases over the covid period, the study employs performance analysis and science mapping techniques to examine publication trends, influential authors, institutions, countries, and leading journals. Co-citation, co-authorship, and keyword co-occurrence analyses are conducted using bibliometric tool R Studio to uncover the conceptual foundations and emerging research themes within the field. The Findings reveal a steady growth in DFL research, with dominant themes centered on financial inclusion, digital banking, fintech adoption, consumer behaviour, and financial well-being, alongside emerging areas such as crypto currency literacy, artificial intelligence in finance, and digital financial resilience. The study also highlights geographical disparities in research output and collaboration patterns. By offering a structured overview of the intellectual landscape of digital financial literacy, this paper contributes to theory development, identifies research gaps, and provides valuable insights for academics, policymakers, and practitioners seeking to advance digital financial capability in the digital economy.

***Keywords**: Digital Financial Literacy, Fintech, Science Mapping, Intellectual Structure, Financial Well-Being, Emerging Economies.*

Introduction

In an era of unprecedented digital transformation, concepts such as globalization and sustainability have been propelled forward by the rapid rise of digitalization, automation, and the proliferation of Fintech solutions (Goyal et al., 2021). Financial technology has enhanced efficiency, accessibility and convenience in transactions, payments and investments (Ali et al., 2024; Alkhwaldi, 2024; Han et al., 2024; Namagembe and Ntayi, 2024; Pal et al., 2021). Yet these gains are accompanied by new risks when technological adoption outpaces users' capabilities. This shift is particularly evident in the financial services sector, where the growing use of smartphones has expanded access to complex instruments such as digital wallets, cryptocurrency, and peer-to-peer lending (Isaia and Oggero, 2022).While these advancements have significantly enhanced financial inclusion by providing affordable and convenient services to underserved populations, they have also introduced a new layer of complexity to personal financial decision-making.

As financial systems evolve, the capability to navigate these technology-driven environments has become a critical life skill, giving rise to the concept of Digital Financial Literacy (DFL) Alliance for

Financial Inclusion, 2021). DFL is defined as the knowledge, skills, confidence, and competencies required to safely use digitally delivered financial instruments and make informed decisions that promote one's best interests. Research consistently shows that DFL is a major predictor of financial well-being (FWB) and is essential for advancing Sustainable Development Goals (SDGs), particularly those related to poverty reduction and reduced inequalities (SDGs 1, 8, and 10). Conversely, a lack of DFL exposes individuals to significant vulnerabilities, including susceptibility to online fraud, cybercrime, and phishing(Abdallah et al., 2024a, b; Firmansyah et al., 2024; Hidayat-Ur-Rehman, 2024).

The scholarly interest in DFL has experienced an exponential surge, particularly in the aftermath of the COVID-19 pandemic, which acted as a catalyst for rapid technological integration and shifts in consumer behavior. Bibliometric indicators show a significant increase in document production from 2020 onwards, as researchers pivot to address post-pandemic financial resilience and digital inclusion. Despite this growing body of literature, the field remains fragmented, with much of the research focused on specific demographics or isolated geographic regions.

To address this fragmentation, this study employs bibliometric analysis, a robust quantitative and statistical framework used to map the evolution of a discipline, identify research gaps, and foster scholarly collaboration. By leveraging tools for science mapping and performance analysis, this research aims to delineate the intellectual lineages and thematic structures of DFL research.

Literature Review

Financial Literacy to Digital Financial Literacy

Financial literacy and digital literacy are prerequisites of DFL (Toronto Center, 2022). Financial literacy is a basic literacy that people need so that they can avoid financial problems (Hayati and Syofyan, 2021). Financial literacy facilitates better financial decision-making (Shen et al., 2018). Young individuals are less financially literate (Fanta and Mutsonziwa, 2021). DFL will certainly become a more important component of education in the current digital era. There is a need for enhancing the financial literacy rate and digital literacy rate (Stephen, 2022). Available digital platforms or systems accessible through electronic devices such as computer, desktop, laptop, smartphones etc. has significantly improved the financial learning experience of the users (Tiwari et al., 2020).

The importance of DFL in education for the digital age is anticipated to rise. Individuals will be more accountable for their own financial planning as the "gig"1 economy develops. Due to the trend of moving from defined-benefit pension plans and towards defined-contribution pension plans, individuals will need to manage their own retirement savings and pensions more. For consumers to use fintech products and services effectively, avoid fraudand make expensive mistakes, they will need to have a greater level of financial knowledge. These changes highlight the requirement for the creation of digital financial education programmes in order to increase DFL (Morgan et al., 2019).

The studies examine DFL in several ways. Knowledge of DFS, awareness of the risk associated with DFS, knowledge on controlling digital financial risk and knowledge on consumer rights and issue redressal are the measures of DFL (Morgan et al, 2019). DFL is directly link or knowledge of online purchasing, online payment through different modes and online banking system (Prasad et al., 2018). DFL is a combination of two concepts including financial literacy and digital platforms is stated by (Tony and Desai, 2020). OECD (2018) theoretically suggested that DFL can improve saving and spending behaviour.The level of DFL in Rajasthan state of India indicates a pressing need to educate more individuals about the significance of digital financial transactions. The author asserts that late need in the country (Prasad et al., 2018).

Oggero et al. (2020) identified that the role of financial literacy and digital skills, in entrepreneurship had been overlooked in entrepreneurship research. Their study determined that financial literacy and digital skills have a substantial impact on the likelihood of being an entrepreneur. Kass-Hanna et al. (2022) found that financial and digital literacy are important factors in promoting inclusiveness and financial resilience, with heterogeneities found across regions and household types. The study suggests that traditional financial literacy should be redefined to include digital literacy, with implications for countries seeking to improve households' long-term financial resilience.

Defining DFL, creating tools to measure it and creating programmes to promote digital financial education are all urgently needed. Special programmes should be created for vulnerable groups, such as women, the elderly, people with lower levels of education, people who own small to medium-sized businesses, people who are just starting out in business and people who are less educated. Also,

countries need to include digital financial education in their national financial education strategies (Morgan et al., 2019). Tony and Desai (2020) found that DFL had a 65.8% impact on digital financial inclusion in Bangalore, India showing that DFL is a key contributor to digital financial inclusion and further recommending that there is the need to identify different areas that need to be addressed under DFL to have digital financial inclusion in the nation.

Bibliometric Analysis

The most popular technique for measuring anatomy knowledge within a study subject is bibliometrics (Wu and Wu, 2017). It is also employed to evaluate research topics (Blanco-Mesa et al, 2017). Studies on bibliometric analysis examine trends in previously published literature using mathematical and statistical methods (Singh and Dhir, 2019). A bibliometric study examines and maps the published literature in a particular field of study. Bibliometric analysis studies in the field of finance have recently been published in fields like financial literacy (Abad-Segura and Gonzalez-Zamar, 2019; Bedi et al, 2019), accounting research (Merigo and Yang, 2017), green finance (Zhang et al., 2019), Islamic insurance (Khan et al., 2020), supply chain finance (Xu et al., 2018) and business internships (Gilbert et al, 2021).

The study started in September 2022 and collected data from 2014 to 2022. The study began with a search term in the "Topic" field of the Scopus and (WoS) database: "digital financial literacy" OR "digital finance" OR "retirement planning," yielding 1,022 initial results. To ensure the inclusion of relevant articles, articles related to DFL or digital finance and articles dealing with a relatively broader and closely related topic were shortlisted for final analyses. Furthermore, only scientific articles published in peer-reviewed journals were considered, excluding proceedings papers, book chapters, working papers, communications and conferences, to ensure the inclusion of top-tier publications (Liu et al., 2015). Duplicate articles were removed to avoid potential repercussions. The search was then narrowed to just include English-language articles and 930 results were returned. After reading the abstracts, 930 full-length papers were selected for additional analysis.

Over time, the field of digital finance and financial literacy has developed into an interdisciplinary one. In light of this, it is crucial to examine the available literature with the aim of identifying the way in which the research field is advancing. Therefore, this study uses bibliometric analysis tools to analyse important tendencies in the conceptual, intellectual and social structure of the fragmented work. The following research questions are the focus of this bibliometric study.

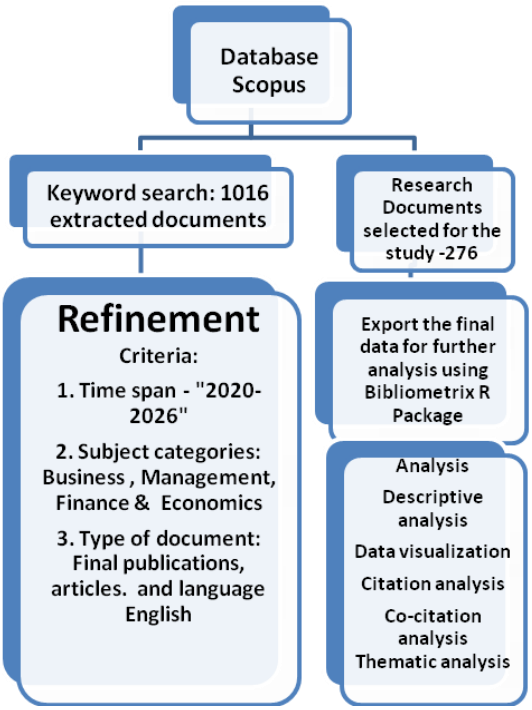
Research Objectives

- To know Intellectual structure about DFL research distribution between 2020 and 2026 in terms of publications, citations and research areas?
- To identify patterns or trends in the growth of knowledge in the field of DFL
- To understand the science mapping through thematic and network analysis.

Research Methodology

Identification of the database for this study is the first step and then data are collected using the search technique (Figure 1). For bibliometric analysis, database indexed articles and papers described in a structured manner. Data is retrieved from Scopus database depending on their coverage of publications as well as database's compatibility with the Bibliometrix' programme from R-studio. Keywords searched as ("digital financial literacy" OR "digital financial capability" OR "fintech literacy. Data refined by inclusion of Peer-reviewed journal articles, final publications from time period 2020-2026 in the subject areas as finance, economics, business & management with English language only.

The study used a bibliometric approach for extensive science mapping. It is an age-old research method of statistical and mathematical analysis of scientific literature practised in libraries. This study uses Bibliometrix R-package, a tool developed in R language by (Ariaa and Cuccurullo, 2017). Even those who do not know how to code can utilise it.The Bibliometrix' package's primary capabilities linked to automated workflow are used to execute science mapping analysis.



Source: Figure 1, created by author

Data Analysis and Findings

Descriptive analysis and scientific mapping were the two ways that data analysis was organised.

- Descriptive statistics concentrates on analysing bibliometric information in terms of the fundamental components of the set of data, including "sources", "journals", "authors" and "documents".
- "Scientific mapping" uses a variety of visualisation techniques, including "network analysis", "three field plots" and "thematic maps" and extracts the earning structures to support the additional study of literature review in any field and bibliometric analysis.

"Scientific mapping" uses a variety of visualisation techniques, including network analysis, three-field plots, themed maps and extracts the knowledge structures to support further study. Scientific mapping conducts extensive science mapping through visualisation methods such as network analysis, three-field plots, thematic maps and derives the knowledge structures to facilitate further analysis.

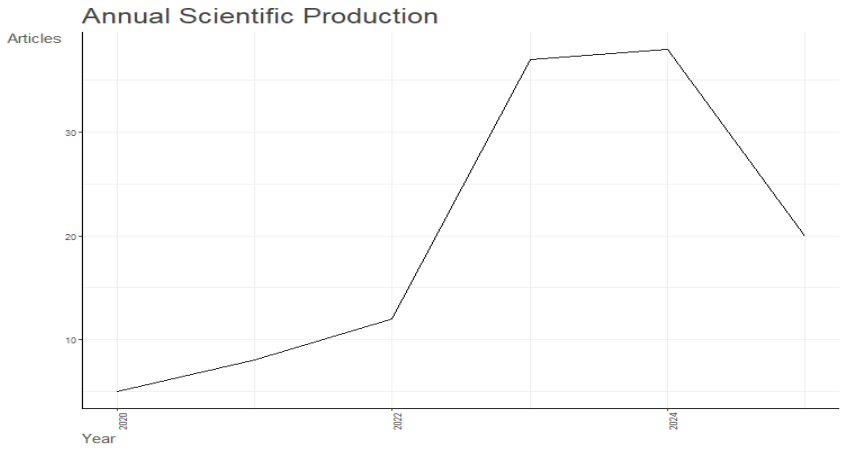
Descriptive Analysis

The numerous dimensions used for analysis are covered in this section.

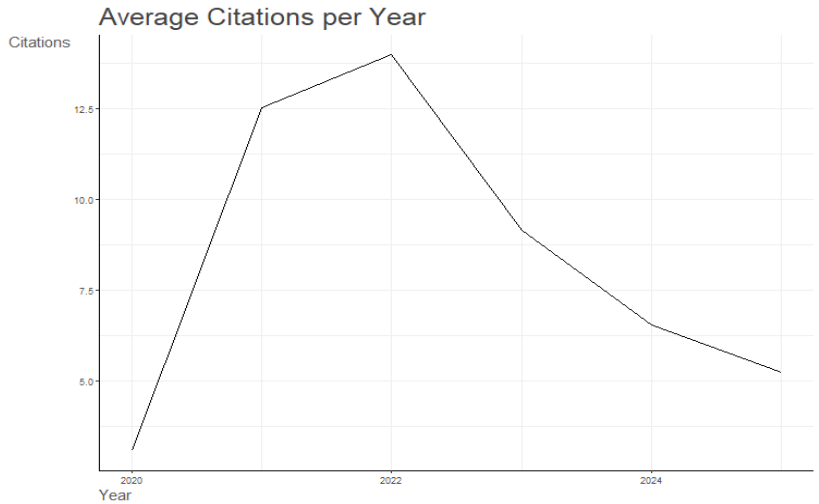
- **Data Set: Total 276 publications carefully chosen for the research study.**

Description	Results
Timespan	2020:2026
Sources (Journals, Books, etc)	134
Documents	276
Annual Growth Rate %	17.26
Document Average Age	1.82
Average citations per doc	14.51
References	0
Document Contents	
Keywords Plus (ID)	296
Author's Keywords (DE)	832
Authors	

Authors	835
Authors of single-authored docs	22
AUTHORS COLLABORATION	
Single-authored docs	25
Co-Authors per Doc	3.39
International co-authorships %	36.96
Document Types	
article	260
conference paper	4
review	12

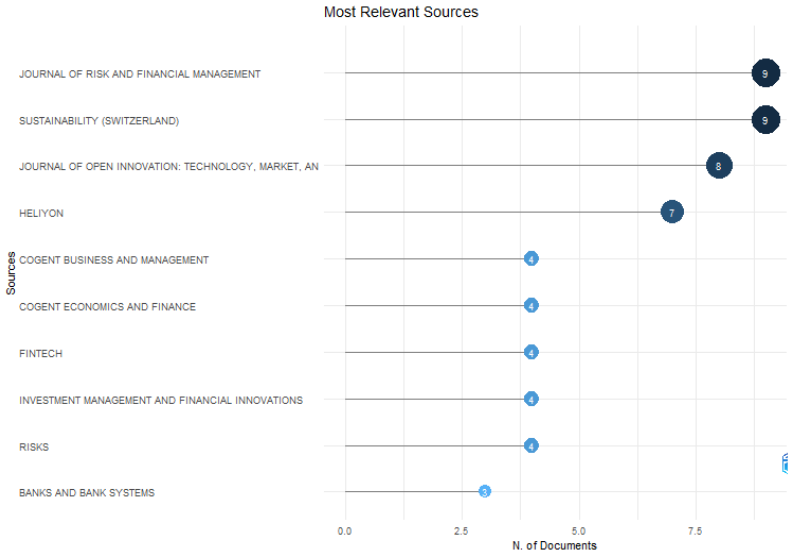


The figure titled “Annual Scientific Production” shows the year-wise distribution of published articles from 2020 to 2025, revealing an overall upward trend followed by a slight decline. Publications start at a low level in 2020 (around 5 articles) and increase steadily through 2021 and 2022, indicating growing scholarly interest. A sharp rise is observed between 2022 and 2023, reaching about 35 articles, with the peak sustained in 2024, reflecting strong research momentum and field maturity. However, a decline to nearly 20 articles in 2025 is noted, possibly due to incomplete data or publication lag. Overall, the trend highlights significant growth in research activity, particularly after 2022.

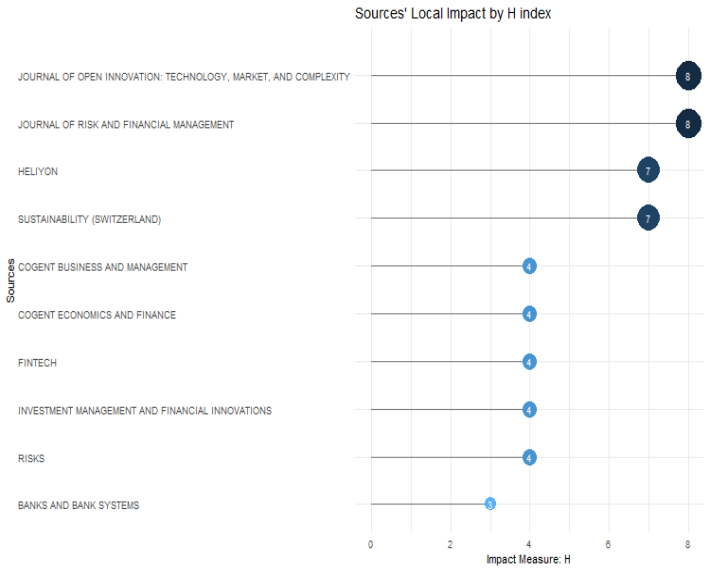


The figure titled “Average Citations per Year” presents the trend of citations from 2020 to 2025, showing an initial rise followed by a gradual decline. Citations increase sharply from a low level in 2020 to

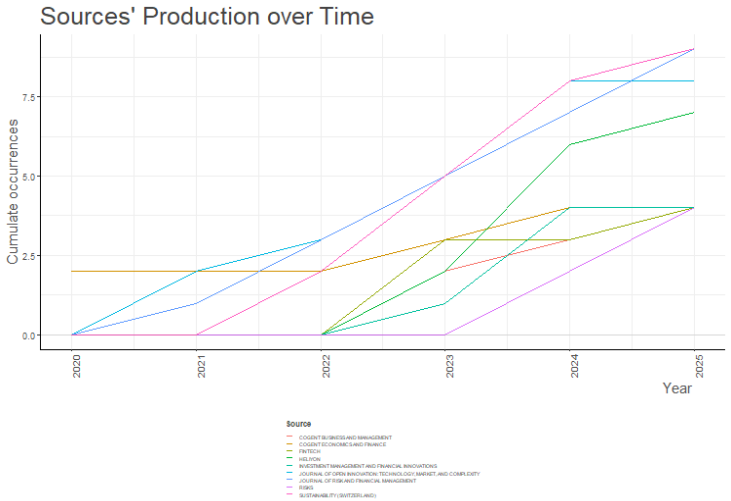
a peak in 2022 (around 14 citations), indicating strong early impact and recognition of published research. However, from 2023 onwards, a steady decrease is observed, dropping to nearly 5 citations by 2025. This decline may be due to the recency of publications, as newer articles typically have less time to accumulate citations. Overall, the pattern suggests that while earlier studies gained higher visibility, recent works are yet to reach similar citation impact.



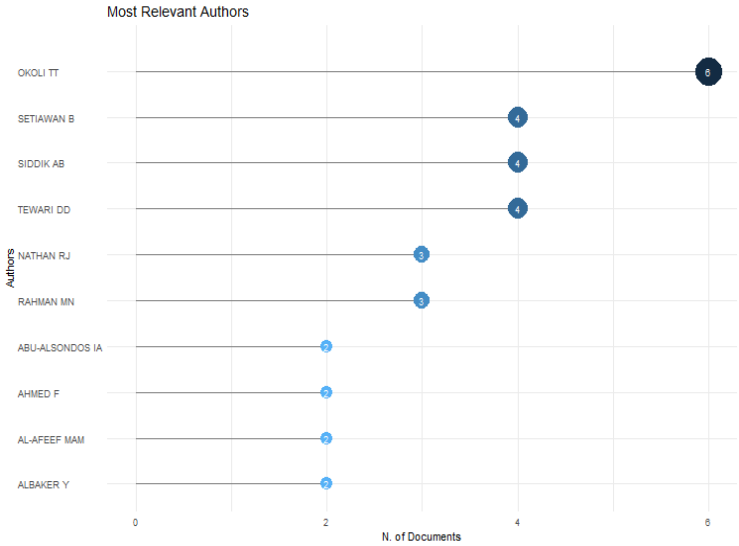
The figure titled “Most Relevant Sources” highlights the leading journals contributing to the research domain based on the number of published documents. Journal of Risk and Financial Management and Sustainability (Switzerland) emerge as the top sources with the highest contributions (9 documents each), followed by the Journal of Open Innovation: Technology, Market, and Complexity with 8 documents and Heliyon with 7. Several other journals, including Cogent Business and Management, Cogent Economics and Finance, FinTech, Investment Management and Financial Innovations, and Risks, show moderate contributions (around 4 documents each), while Banks and Bank Systems have the least (3 documents). Overall, the distribution indicates that research output is concentrated in a few key journals, with a broader spread across other sources.



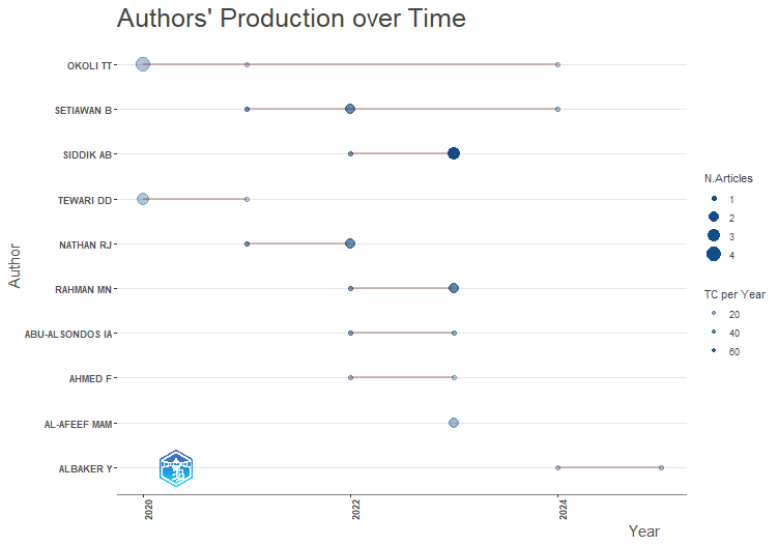
The figure titled “Sources’ Local Impact by H-index” presents the relative influence of key journals based on their H-index. The Journal of Open Innovation: Technology, Market, and Complexity and Journal of Risk and Financial Management show the highest impact (H-index = 8), indicating strong citation performance and scholarly influence. Heliyon and Sustainability (Switzerland) follow closely with an H-index of 7, reflecting substantial impact. Other journals, including Cogent Business and Management, Cogent Economics and Finance, FinTech, Investment Management and Financial Innovations, and Risks, exhibit moderate impact (H-index = 4), while Banks and Bank Systems have the lowest impact (H-index = 3). Overall, the findings suggest that a few leading journals dominate in terms of research influence, while others contribute at a moderate level.



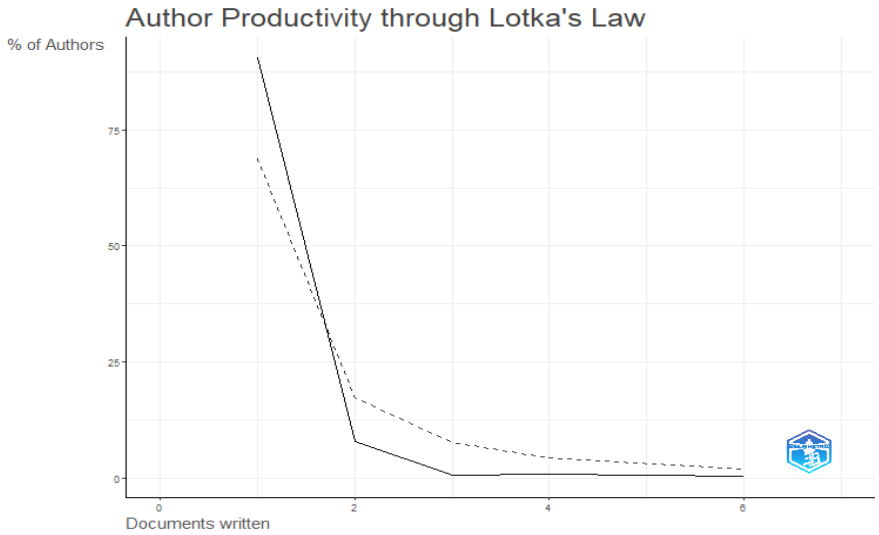
The figure titled “Sources’ Production over Time” illustrates the cumulative publication trends of various journals from 2020 to 2025. Most sources show a gradual increase in output, with a notable acceleration after 2022, indicating growing research activity across journals. Leading sources such as Sustainability (Switzerland) and the Journal of Risk and Financial Management demonstrate the highest cumulative growth by 2025, reflecting consistent and strong contributions over time. Other journals like Heliyon and Journal of Open Innovation also exhibit steady upward trends, while several sources show moderate but continuous growth. Overall, the pattern suggests participation of multiple journals, with a few dominant sources driving the majority of research output in recent years.



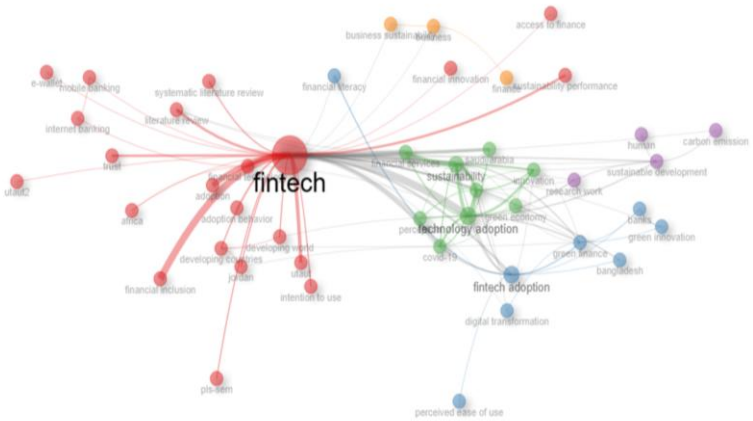
The chart highlights the most prolific contributors within the study's dataset, ranking authors based on their total number of published documents. Okoli TT emerges as the most prominent figure with a leading output of 6 documents, significantly outpacing other researchers in the field. This is followed by a secondary tier of high-impact authors—Setiawan B, Siddik AB, and Tewari DD—each contributing 4 documents. The remaining authors show a gradual decline in productivity, with publication counts ranging from 3 to 2. This distribution suggests a concentrated core of "relevant authors" who drive the majority of the research discourse, serving as a key indicator of scholarly influence and leadership within this specific research domain.



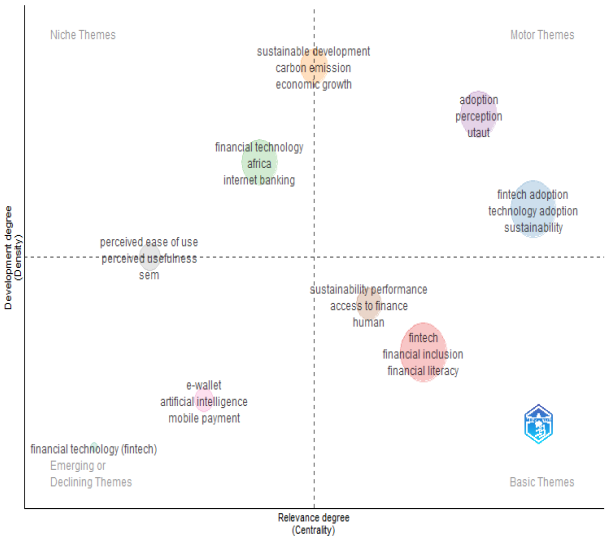
The "Authors' Production over Time" chart illustrates the research longitudinally and citation impact of the field's key contributors from 2020 to 2025. Okoli TT and Tewari DD represent the early established presence in this dataset, with Okoli TT maintaining a consistent, long-term output through 2024. The size of the bubbles indicates publication volume, while the colour intensity reflects total citations (TC) per year; notably, Siddik AB and Rahman MN show significant "bursts" of productivity and high citation impact around 2023. While authors like Setiawan B exhibit sustained activity across several years, newer contributors like Albaker Y suggest an evolving field with emerging research interests appearing as late as 2025. Overall, the timeline reveals a shift from early foundational work to a high-impact peak in productivity between 2022 and 2023



The chart demonstrates Lotka's Law, comparing the theoretical distribution (dotted line) with the actual observed productivity in your dataset (solid line). It shows a classic inverse square relationship: the vast majority of authors (nearly 90%) have written only a single document, while a very small percentage of "prolific" authors contribute multiple papers. The sharp drop-off between one and two documents indicates a high number of transient contributors, suggesting that while the field attracts many researchers, only a few maintain sustained productivity.



The Thematic Co-occurrence Network illustrates the conceptual landscape of the research field, identifying "Fintech" as the primary nexus of scholarly activity. The visualization reveals several distinct thematic clusters: the red cluster focuses on behavioural and developmental aspects like "financial inclusion" and "adoption behavior" in developing regions; the green cluster bridges "technology adoption" with "sustainability" and the "green economy"; and the blue cluster emphasizes the "digital transformation" and "perceived ease of use." The thickness of the connecting lines signifies a strong interdisciplinary link between fintech and sustainability, suggesting that recent research has transitioned from purely technical adoption toward the societal and environmental impacts of financial technology.

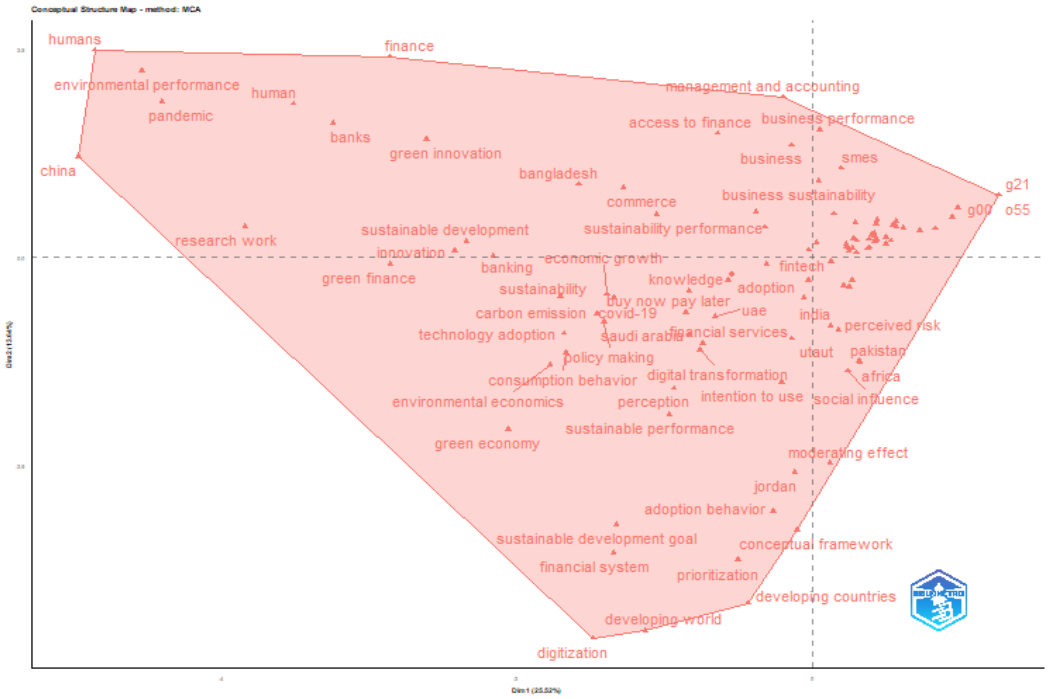


The Thematic Map categorizes the research field into four quadrants based on Centrality (relevance) and Density (development).

- Motor Themes (Top-Right): Themes such as "adoption," "perception," and the "UTAUT" model, alongside "sustainability," are both well-developed and essential to the field, representing the current core drivers of research.

- Basic Themes (Bottom-Right): "Fintech," "financial inclusion," and "financial literacy" show high relevance but lower density, indicating they are fundamental, cross-cutting topics that support the entire research domain but require further specialized development.
- Niche Themes (Top-Left): Topics like "sustainable development" and "carbon emissions" are highly specialized and internally well-developed but remain peripherally connected to the broader fintech discourse.
- Emerging or Declining Themes (Bottom-Left): Mobile-centric technologies like "e-wallet," "artificial intelligence," and "mobile payment" appear in this quadrant, suggesting they are either nascent areas or, conversely, have become so integrated that they no longer spark independent thematic development.

Overall, the map reveals a strategic shift toward merging behavioural adoption theories with global sustainability goals within the fintech ecosystem.



The Conceptual Structure Map, generated using Multiple Correspondence Analysis (MCA), visualizes the proximity and relationship between various keywords, identifying the dominant cognitive structures in the research field.

The map reveals a high concentration of terms in the right-central region, where "fintech," "adoption," "perceived risk," and "digital transformation" cluster together. This indicates a primary research focus on the behavioural and technical mechanisms of financial technology adoption. Conversely, terms like "environmental performance," "green economy," and "sustainable development" are more widely distributed across the left and bottom sectors, suggesting that while sustainability is an integrated theme, it encompasses a broader, more diverse range of sub-topics—from macro-economic growth to specific policy-making. The spatial distribution also highlights a significant geographic focus, with "developing countries," "Africa," and "Pakistan" positioned near adoption-centric clusters, reflecting a scholarly emphasis on fintech as a tool for financial inclusion in emerging markets.

Conclusion

The bibliometric analysis of Digital Financial Literacy (DFL) from 2020 to 2026 reveals a field in a state of rapid intellectual expansion and strategic transition, moving from niche technical exploration to

amultidisciplinary pillar of global development. The research distribution highlights a significant surge in scholarly interest between 2022 and 2024, identifying a concentrated core of prolific authors—most notably Okoli TT—and key journals like the *Journal of Risk and Financial Management* and *Sustainability* that drive the majority of the discourse. While early foundational works achieved high citation impact, the current knowledge growth is increasingly centered on emerging economies such as Pakistan and various African nations, where DFL is positioned as a critical tool for financial inclusion. Thematic and network mapping further illustrate a sophisticated evolution in the field's conceptual structure, showing a clear shift from basic technology adoption theories toward a "green fintech" paradigm that links digital competence with environmental performance and the UN Sustainable Development Goals. Ultimately, the intellectual map of DFL is anchored by motor themes like the UTAUT model and perceived risk, yet it remains dynamic, with nascent areas such as artificial intelligence and carbon emissions signalling the next frontier for research at the intersection of behavioural economics and digital transformation.

To advance the field of digital financial literacy (DFL), future research should transition from broad adoption theories toward the granularity of "Agentic AI" and "Hyper-personalization," examining how autonomous AI financial co-pilots can proactively bridge the "knowledge-to-action" gap for underserved users. There is a critical need for longitudinal studies that measure the actual environmental performance of DFL-enabled green fintech initiatives, moving beyond perception-based models to quantify real-world impacts on carbon footprints and sustainable investment. Additionally, researchers should investigate the "Digital-Safety Paradox," exploring how DFL interventions can evolve into real-time defense mechanisms against increasingly sophisticated, AI-driven financial fraud. Geographically, while the focus on emerging markets is strong, future studies must explore cross-border DFL frameworks for interoperable systems like Central Bank Digital Currencies (CBDCs) and embedded finance. Finally, a significant opportunity exists to integrate behavioural ethics into the DFL discourse, ensuring that as financial tools become "invisible" and embedded into daily life, consumer protection and algorithmic transparency remain at the forefront of the academic and policy agenda.

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