

Mapping the Landscape of Fintech and Financial Inclusion: A Bibliometric and Thematic Analysis

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Abstract

In an era marked by rapid technological advancements and changing financial landscapes, the intersection of fintech and financial inclusion has assumed paramount importance. This research paper undertakes a rigorous bibliometric and thematic analysis to elucidate the significance of this critical topic. The research dataset comprises 244 articles published between 2015 and 2023, sourced from the Scopus database. Data analysis is conducted with the aid of Vos Viewer, R-Studio and Microsoft Excel, focusing on key parameters such as publication year, journal sources, study locations, and a thorough thematic analysis of Fintech & Financial Inclusion literature. The findings underscore a notable surge in research studies related to fintech and financial inclusion, particularly over the last four years. Ozili P.K. emerges as the most prominent author in this domain, while the Journal of Risk and Financial Management ranks as the primary publication source for articles in this field. Thematic analysis provides keywords that categorize the findings into motor, basic, emerging, and niche themes. This approach provides a structured framework for comprehending the diverse facets of the fintech and financial inclusion landscape.

Keywords: Fintech, Financial Inclusion, Financial Technology, PRISMA, Thematic analysis, Bibliometric Analysis.

1. Introduction

In recent years, the financial landscape has witnessed a remarkable surge in the expansion of Financial Technology, popularly referred to as Fintech. This phenomenon has not only revolutionized conventional banking services but also holds the promise of fostering long-term positive impacts on financial inclusion in society. Fintech, a condensed term for financial technology, signifies the dynamic procedure of revolutionizing financial services using technology-based solutions. In essence, fintech encompasses the application of technology to streamline and simplify the provision of financial services, creating a more accessible and efficient financial ecosystem. The driving forces behind fintech's expansion are rooted in technological advancements, shifts in consumer behaviour, and evolving regulatory conditions (Olowookere, 2019). It is within this context that Fintech is increasingly recognized as an emerging and pivotal tool for advancing the agenda of financial inclusion (Zetzsche et al., 2019; Makina, 2019). Notably, Arner et al., (2018) document a significant milestone, with 1.2

billion people worldwide opening new financial accounts from 2010 to 2017. However, despite this remarkable advancement in promoting financial inclusion, the same document underscores a concerning statistic: 1.7 billion people, representing 31% of the global adult population, remain financially excluded. Interestingly, a significant segment of the population without access to financial services can be found in the most economically challenged communities within developing nations (Demirguc-Kunt et al., 2018). It is believed that Fintech has the potential to bring about transformation by addressing this challenge through cost reduction, broadening the accessibility of financial services, and reaching remote areas that traditional financial institutions have failed to serve. As a result, there is a growing call for economies worldwide to embrace digital financial transformation strategies in order to advance the cause of financial inclusion (Queralt et al., 2017; Baber, 2020). The assertion by Zetzsche et al., (2019) further underscores that Fintech, by offering savings/investment opportunities, insurance choices, long-term funding for projects and firms, and payment services, has the potential to directly and indirectly support the attainment of several of the United Nations' SDGs.

Despite the growing recognition of fintech's potential in driving financial inclusion, there exists a notable research gap. While many studies have explored the theoretical and empirical aspects of fintech's role, there is limited research that provides a comprehensive bibliometric and thematic analysis of the existing literature in this domain. This study seeks to address this research gap by conducting a bibliometric examination and thematic trends and patterns in scholarly articles, thereby offering a consolidated and holistic comprehension of the multifaceted connection between fintech & financial inclusion.

The paper is structured in the following manner: Section 2 presents an extensive literature review, providing an in-depth exploration of the current body of knowledge. Section 3 delves into the specifics of the research methodology employed in this study, outlining the approaches and techniques used for data collection and analysis. Section 4 is dedicated to the presentation of our descriptive bibliometric analyses. Section 5 focuses on the keyword co-occurrence analysis, exploring the main topics within the dataset and delving into various themes identified through thematic analysis. Lastly, in Section 6, the concluding section encapsulates the paper by summarizing key takeaways and paving the way for potential directions in future research.

2. Literature Review

As per UNDP (2019), Financial Inclusion is characterized by the widespread access and responsible use of various financial services within a well-regulated environment. Given the rapid evolution of the FinTech landscape, a clear consensus regarding its precise definition remains elusive. As noted by Fernández (2017), the global financial crisis of 2008-2009 played a pivotal role in propelling FinTech into the spotlight, driving its rapid acceptance. This period witnessed a notable shift as consumers gravitated from traditional banking to non-core financial institutions. Ozili (2018) highlights the role of FinTech companies in enhancing financial inclusion by delivering essential financial services via digital platforms, expanding their accessibility to adults without access to banking services in distant and underserved regions that conventional banks or non-bank financial institutions fail to adequately serve. Gomber et al. (2017) offers a succinct definition of FinTech as the amalgamation of "Financial" and "Technology," emphasizing its fusion of contemporary internet technologies with activities in banking sector. On a similar note, Leong & Sung (2018) define FinTech as an inventive concept that enhances the efficiency of financial service operations by employing technology-based solutions customized for particular business scenarios. Indeed, FinTech has ushered in transformative ideas and business models with the potential to reshape the entire operational landscape.

The definition of financial inclusion remains a subject of ongoing debate, with various researchers employing distinct criteria to assess it. A comprehensive analysis of the existing literature reveals a notable lack of consensus in the definition of financial inclusion, as pointed out by Cihak et al., (2021). Generally, Financial Inclusion can be understood as the accessibility and delivery of financial services to all members of society, with a particular focus on those in low-income brackets, experiencing poverty, or marginalized (Ozili, 2018). Alternatively, it can be described as an individual's ability to access formal financial institutions and services, encompassing features like having an account that facilitates formal savings and borrowing options (Zins & Weill, 2016). These multifaceted perspectives on financial inclusion underscore the complexity and diversity of approaches in assessing and addressing this crucial aspect of economic development.

Fintech is increasingly acknowledged as a pivotal catalyst for advancing financial inclusion, with a specific emphasis on the crucial roles played by mobile banking and digital wallets. As highlighted by Asif et al., (2023), fintech innovations, particularly in mobile banking, play a critical role in delivering financial services to unbanked and underbanked populations, effectively bridging geographical and infrastructural divides. Notably, the majority of research (with a few exceptions, as observed in Peruta, 2018) underscores the significance of ICT & fintech as potent motivators of financial inclusion, as documented in studies like Gosavi (2018); Tchamyu et. al., (2019). The link between mobile phone adoption & financial inclusion, both within and across nations, is unmistakable, as emphasized by Ghosh (2016). Moreover, there is strong evidence indicating a favourable association between the utilization of mobile money and the improved financial inclusion of households and businesses. Households having mobile money accounts tend to exhibit higher levels of bank account ownership, engage more frequently in remittances, and accumulate greater savings, as observed in the research by Ouma et. al., (2017). In a broader context, the work of Song & Appiah (2022) presents compelling evidence that expanded financial inclusion, facilitated by fintech, can potentially yield positive spillover effects, encompassing economic growth and the reduction of poverty. This underscores the enduring advantages of adopting fintech solutions to address wider socio-economic challenges.

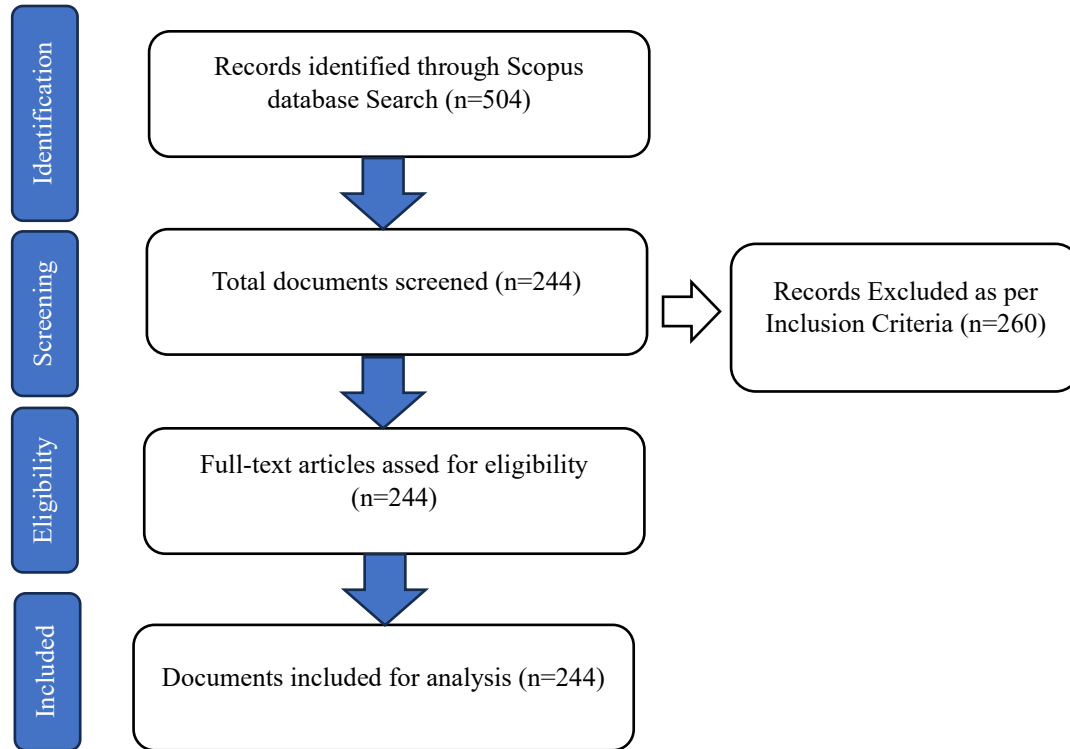
3. Research Methodology

This research adopts a hybrid literature review approach, employing both descriptive bibliometrics and data analysis visualization using VOS Viewer software, along with thematic analysis through biblioshiny. This comprehensive methodology allows us to gain a deep understanding of the content and trends in studies related to fintech and financial inclusion. Bibliometric analysis is recognized as an objective and systematic approach for exploring patterns within various facets of research, including disciplines, institutions, authors, journals, documents, and keywords (Chawla & Goyal, 2022). In this research, we employ bibliometrics to perform performance analysis and science mapping, two crucial components of this methodology. Performance analysis involves assessing numerous publications and their citations, providing insights into productivity and impact within the research field. On the other hand, science mapping visualizes the structural and dynamic aspects of the field (Gao et al., 2021). By integrating these approaches, our research aims to fulfil its objectives through a robust bibliometric analysis, enabling us to uncover the intricacies of the research landscape concerning fintech and financial inclusion.

The study adhered to the PRISMA review protocol, which stands for "Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols." This protocol provides authors with a structured framework for designing protocols aimed at systematic reviews and meta-analyses, thus ensuring the

incorporation of vital elements within the protocol (Moher et al., 2015). The study encompassed 3 fundamental phases: identification, screening, & eligibility, as depicted in Figure 1.

Figure 1: PRISMA Framework



Source: Author

In this systematic review, the primary source of papers was the Scopus database. The initial step involved selecting keywords, which were determined based on established definitions from prior literature. The chosen search terms for sample selection were: (TITLE-ABS-KEY (“financial inclusion” OR “inclusive finance”) AND TITLE-ABS-KEY (“fintech” OR “financial technology” OR “fintech” OR “financial technology” OR “fin-tech”)). It was essential for these keywords to appear in either the title, abstract, or keywords of the articles. This search process across the main databases resulted in a total of 504 articles.

Subsequently, this research employed a screening process to manage the large number of articles. Using predefined criteria for article selection, the database's sorting function was employed to automatically filter and exclude articles. This initial screening eliminated 260 articles that did not align with the inclusion criteria (Table 1).

Following this screening phase, 244 articles remained for the subsequent stage. These 244 articles underwent an eligibility assessment, which involved a careful review of their abstracts and titles in relation to the research questions and inclusion/exclusion criteria. Ultimately, 244 final articles that met the criteria were selected for inclusion in this research. Data from each of these studies were systematically extracted and recorded in a Microsoft Excel spreadsheet for further analysis.

Table 1: Inclusion Criteria

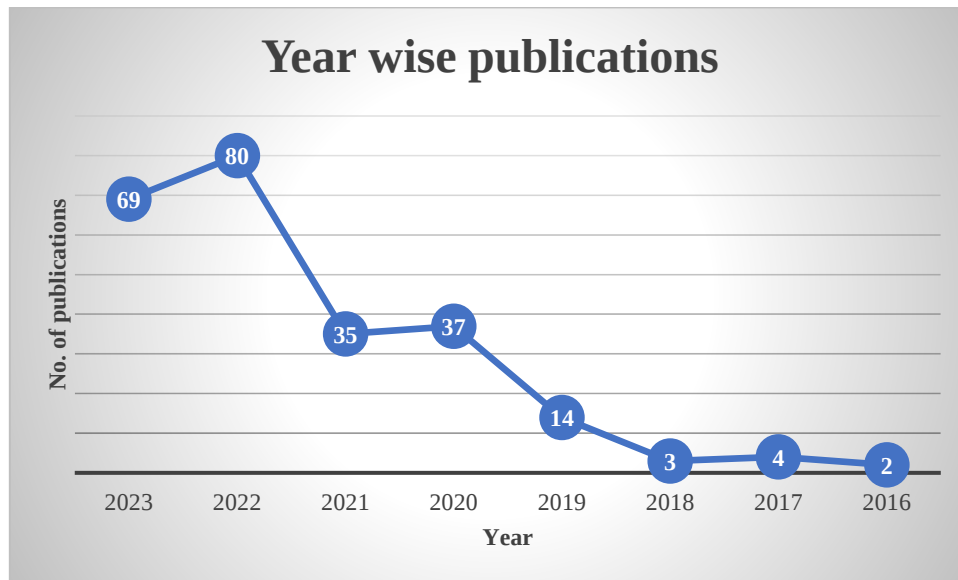
Inclusion Criteria
1. The article covers the time period 2015 to 2023.
2. Manuscripts for studies must be written in English.
3. Subject Area - Economics, Econometrics and Finance, Business, Management and Accounting, Social Sciences, Multidisciplinary and Arts and Humanities.
4. Research papers were limited to the document type as Article, Conference paper and Review.

4. Descriptive Bibliometric Analysis

4.1. Publication Trend Analysis

The articles have been categorized based on their year of publication, spanning from 2015 to 2023. Figure 2 provides a visual representation of the evolving trend and growth in research publications related to fintech and financial inclusion. In the period between 2015 and 2018, there was a relatively limited number of studies conducted within this domain. However, post-2018, there has been a noticeable upswing in the publication of research papers on the subject. This trend is particularly underscored by the substantial volume of articles published in 2022 (80 articles) and 2023 (69 articles), revealing a rising interest among researchers in this field. This upsurge in research activity reflects the increasing significance and relevance of fintech & financial inclusion as critical components of the modern financial environment.

Figure 2: Classification of Articles by Publication

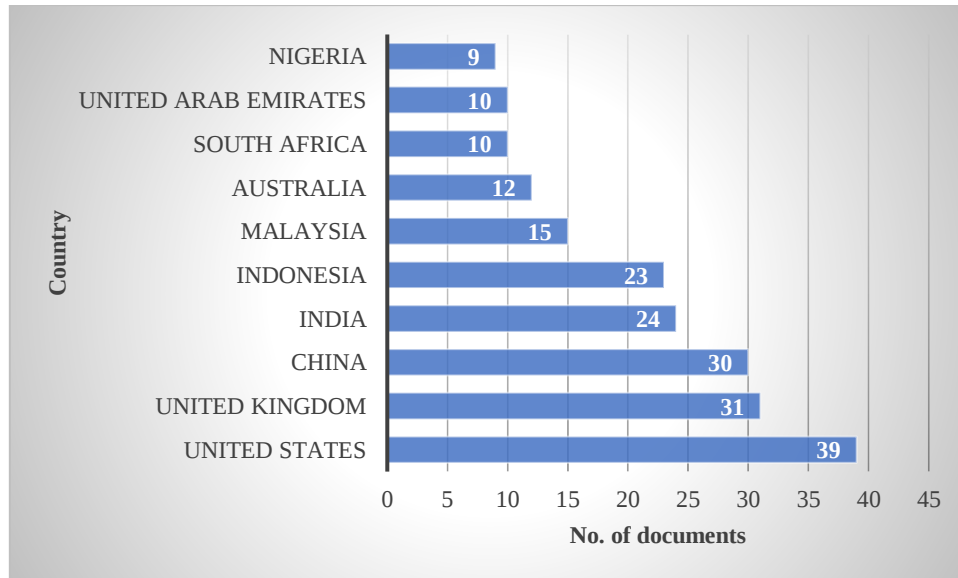


4.2. Most Productive Country

Figure 3 offers an insight into the categorization of articles based on the countries where the sample data were sourced or the studies were conducted. A substantial portion, comprising 39 of the articles, originated from universities or organizations in the United States. Another prevalent publication country was the United Kingdom with a total of 31 papers. The remaining countries, including China, India, and Indonesia, accounted for 30, 24, and 23 papers, respectively. This geographic distribution of the

selected primary papers clearly illustrates the global research interest in the intersection of financial inclusion and fintech, indicating that this area has attracted attention from researchers across the world.

Figure 3: Classification of Articles by Country



4.3 Most Productive Journal

In this study, a dataset of 213 research papers drawn from 72 distinct journals was utilized. An analysis was conducted to pinpoint the journals that have been frequented by researchers in the fields of fintech & financial inclusion. Table 2 offers a summary of the leading 10 journals in this domain, shedding light on their publication frequency. At the forefront, the "Journal of Risk and Financial Management" emerges as the leading journal with a remarkable 8 publications. Additionally, journals like "Cogent Economics and Finance," "Digital Policy Regulation and Governance," "International Journal of Social Economics," and "Review of International Political Economy" have each featured 5 publications, reflecting their significant presence in this research area. This data not only underscores the popularity of these journals but also signifies the substantial scholarly activity and the rising importance of fintech & financial inclusion in the academic landscape.

Table 2: Leading Journals

Rank	Source	Publisher	No. of publication	Citation
1	Journal of Risk and Financial Management	MDPI	8	49
2	Cogent Economics and Finance	Taylor & Francis	6	22
3	Digital Policy, Regulation and Governance	Emerald Publishing	5	61
4	International Journal of Social Economics	Emerald Publishing	5	16
5	Review of International Political Economy	Taylor & Francis	5	138
7	European Journal of Finance	Taylor & Francis	4	184
8	Finance Research Letters	Elsevier	4	100
9	Financial Innovation	Springer Nature	4	55

10	Journal of Open Innovation: Technology, Market, And Complexity	MDPI	4	18
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4.4. Author Influence

Table 3 provides an overview of the top five authors who have made significant contributions to the realm of fintech and financial inclusion. Leading the pack is Ozili P.K. from the Central Bank of Nigeria, who stands out as the most prolific researcher in this field, amassing a remarkable 652 citations. Ozili P.K. has authored a total of 5 research articles. Following closely is Baber H. from the American University of Sharjah, with 2 published articles. Notably, other researchers have also engaged in fruitful collaborations, including Gonzalez L., Mehrotra A., Neelam, and Bhattacharya S. In line with the findings of Feng et al. (2017), it is evident that authors with fewer publications are in the process of evolving in their research careers and have yet to attain the status of dominant authors. However, the results underscore that the experts in this field are still in the early stages of their development. Nonetheless, these authors have demonstrated their research prowess by producing a substantial body of work over the span of a decade.

Table 3: Most Productive Author

Ra nk	Author	No. of Publications	Citati on	Coun try	Current Affiliation
1	Ozili P.K.	5	651	Niger ia	Central Bank of Nigeria, Abuja, Nigeria
2	Baber H.	2	26	UAE	American University of Sharjah, Sharjah, United Arab Emirates
3	Gonzalez L.	2	19	USA	California State University, Long Beach, Long Beach, United States
4	Mehrotra A.	2	11	India	Amity University, Noida, India
5	Neelam; Bhattacharya S.	2	2	India	Symbiosis International (Deemed University), Pune, India

4.5. The Most Cited Documents

Table 4 showcases the ten most cited documents in the field of fintech and financial inclusion. A thorough document citation analysis was conducted, considering documents with a minimum of 32 citations. This analysis yielded the top highly-cited documents within this field. The document ranked first is titled "Impact of digital finance on financial inclusion and stability," and it has been cited by Ozili P.K. Following closely in second place is the paper "Blockchain disruption and decentralized finance: The rise of decentralized business models" authored by Chen Y. and Bellavitis C. This paper, along with "Nurturing a FinTech ecosystem: The case of a youth microloan startup in China" by Leong C., Tan B., Xiao X., Tan F.T.C., and Sun Y., occupies the third rank in terms of citations. The remarkable number of citations these papers have accrued can be attributed to various factors, including their groundbreaking insights, their relevance to contemporary issues, and their substantial impact on the evolving landscape of fintech and financial inclusion. These documents likely served as foundational references, shaping subsequent research endeavours and scholarly discussions in this dynamic field.

Table 4: Most Cited Document

Rank	Author	Title	Year	Source	Cited By
1	Ozili P.K.	Impact of digital finance on financial inclusion and stability	2018	Borsa Istanbul Review	512
2	Chen Y.; Bellavitis C.	Blockchain disruption and decentralized finance: The rise of decentralized business models	2020	Journal of Business Venturing Insights	234
3	Leong C.; Tan B.; Xiao X.; Tan F.T.C.; Sun Y.	Nurturing a FinTech ecosystem: The case of a youth microloan startup in China	2017	International Journal of Information Management	181
4	Arner D.W.; Buckley R.P.; Zetzsche D.A.; Veidt R.	Sustainability, FinTech and Financial Inclusion	2020	European Business Organization Law Review	148
5	Demir A.; Pesqué-Cela V.; Altunbas Y.; Murinde V.	Fintech, financial inclusion and income inequality: a quantile regression approach	2022	The European Journal of Finance	123
6	Mhlanga D.	Industry 4.0 in Finance: The Impact of Artificial Intelligence (AI) on Digital Financial Inclusion	2020	International Journal of Financial Studies	120
7	Larios-Hernández G.J.	Blockchain entrepreneurship opportunity in the practices of the unbanked	2017	Business Horizons	120
8	Senyo P.K.; Osabutey E.L.C.	Unearthing antecedents to financial inclusion through FinTech innovations	2020	Technovation	113
9	Chen L.	From Fintech to Fin life: the case of Fintech Development in China	2016	China Economic Journal	96
10	Ozili P.K.	Financial inclusion research around the world: A review	2021	Forum for Social Economics	90

5. Bibliometric Analyses of the Main Topics and Thematic Analysis

5.1. Keyword Co-occurrence Analysis

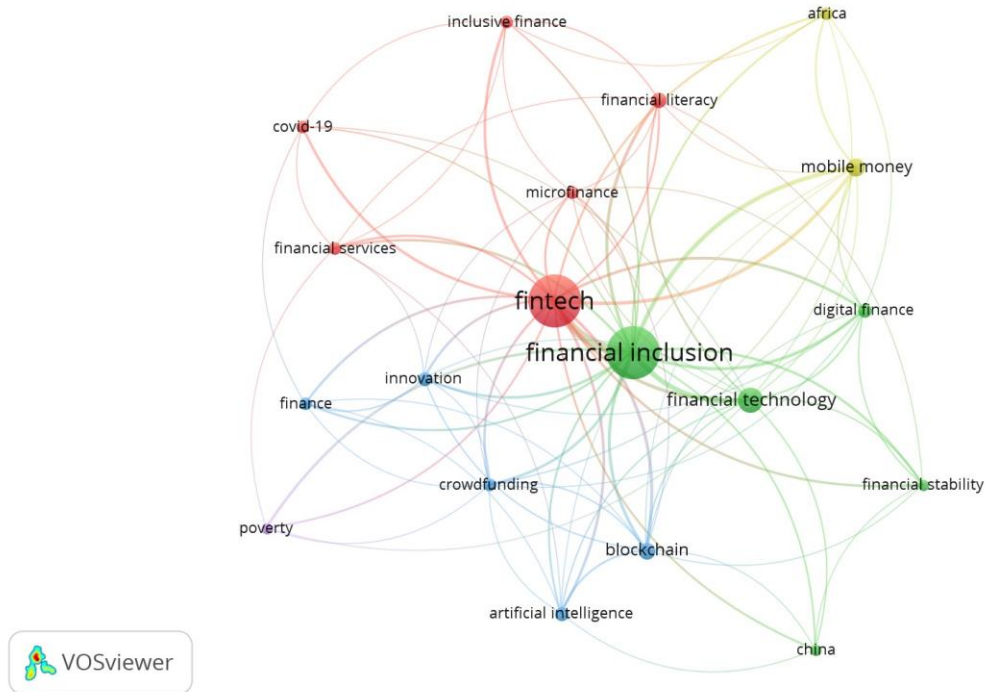
Table 5 provides a compilation of the 20 most frequently used keywords, shedding light on the key research topics that authors consider highly significant in this specific research area. This table offers insights into keyword co-occurrences within the network, with a focus on keywords that appear at least six times in the list. At the forefront, "Financial Inclusion" emerges as the most commonly used keyword, with a substantial 141 occurrences. It is closely followed by "fintech," another prominent keyword that appears 139 times. Furthermore, the list includes three additional notable keywords:

"Financial Technology," which occurs 33 times, "Mobile Money," with 18 occurrences, and "Blockchain," appearing 14 times. These prominent keywords underscore the central themes that authors and researchers in this field find of utmost importance, providing valuable insights into the core subjects that have garnered significant attention within this research domain.

Table 5: Keyword Co-Occurrence

Rank	Author Keyword	Frequency	Total Link Strength
1	Financial Inclusion	141	270
2	Fintech	139	252
3	Financial Technology	33	68
4	Mobile Money	18	49
5	Blockchain	14	41
6	Financial Literacy	13	31
7	Artificial Intelligence	10	26
8	Digital Finance	10	37
9	Innovation	10	28
10	Financial Services	9	20
11	Inclusive Finance	9	20
12	Africa	8	18
13	Covid-19	8	16
14	Crowdfunding	8	29
15	Finance	8	22
16	Microfinance	8	19
17	China	7	14
18	Financial Stability	7	19
19	Poverty	7	18
20	Digital Financial Inclusion	6	10

Figure 4 offers valuable insights into the knowledge structure and research themes within the fintech and financial inclusion research field, as determined through author keyword co-occurrence analysis in VOS viewer. This figure allows us to pinpoint the prominent areas of focus within this domain. In this visualization, the authors have delineated four distinct fields, each characterized by a unique colour coding. The first field, depicted in green, encompasses keywords such as "financial inclusion," "financial technology," "digital finance," and "financial stability." These keywords collectively represent a core theme within the research landscape. The second field, highlighted in red, is marked by terms like "fintech," "financial literacy," "inclusive finance," "microfinance," and "financial services," indicating a second significant area of focus. The third field, represented by blue, includes terms like "blockchain," "artificial intelligence," "crowdfunding," "finance," and "innovation." These keywords underscore another crucial aspect of research within this domain. The final field, depicted in yellow, primarily consists of the terms "mobile money" and "Africa," signifying a distinct thematic area of interest. This visualization enables us to recognize the distinct hotspots and research clusters that have emerged within the fintech and financial inclusion research field, shedding light on the diverse subjects that authors are exploring.

Figure 4: Network Visualization of Keywords Co-Occurrence

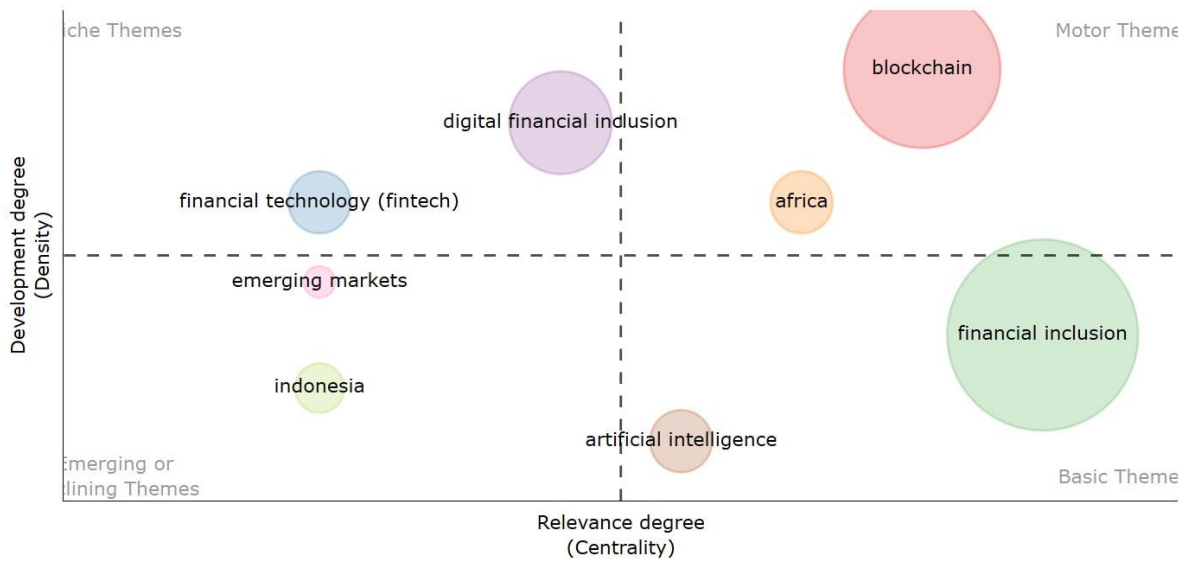
5.2. Thematic Analysis

A strategic diagram, generated using R Studio software (specifically, biblioshiny), has been developed to enhance the utility of the relevant literature for this study. The diagram utilizes two key measures centrality and density, as outlined by Sharma et al. (2023), to visually represent and group various research topics. This strategic diagram provides a two-dimensional visualization of the research landscape, where topics are categorized into four distinct types, each associated with a specific quadrant. These categories are referred to as "motor," "peripheral," "emerging," or "vanishing," and "basic." To effectively monitor the evolution of topics within the research domain, the research period has been bifurcated into two segments: 2015–2020 & 2021–2023. This approach enables the detection of focal areas of research interest during each time interval and provides valuable perspectives on the evolution of subjects in the corresponding field of study.

Time slice 2015-2020 (Figure 5): Fintech providers play a pivotal role in promoting financial inclusion by delivering essential financial services via digital platforms, thereby reaching unbanked adults residing in remote and underserved areas, which traditional non-bank and banks financial institutions often overlook (Ozili, 2018). Within the broad spectrum of relevant research, a concise set of eight keywords emerges. The primary theme revolves around "artificial intelligence and financial inclusion," reflecting its substantial significance. Notably, select research works, such as those by Mhlanga (2020) and Shen et al. (2019) during the timeframe of 2015–2020, underscore the importance of integrating new digital technologies, particularly artificial intelligence, to advance financial inclusion. These studies demonstrate the positive impact of these technologies on economic development by providing cost-effective and basic financial services to marginalized segments of society. During this period, terms like "digital financial inclusion" and "financial technology (fintech)" represent a niche theme, indicating

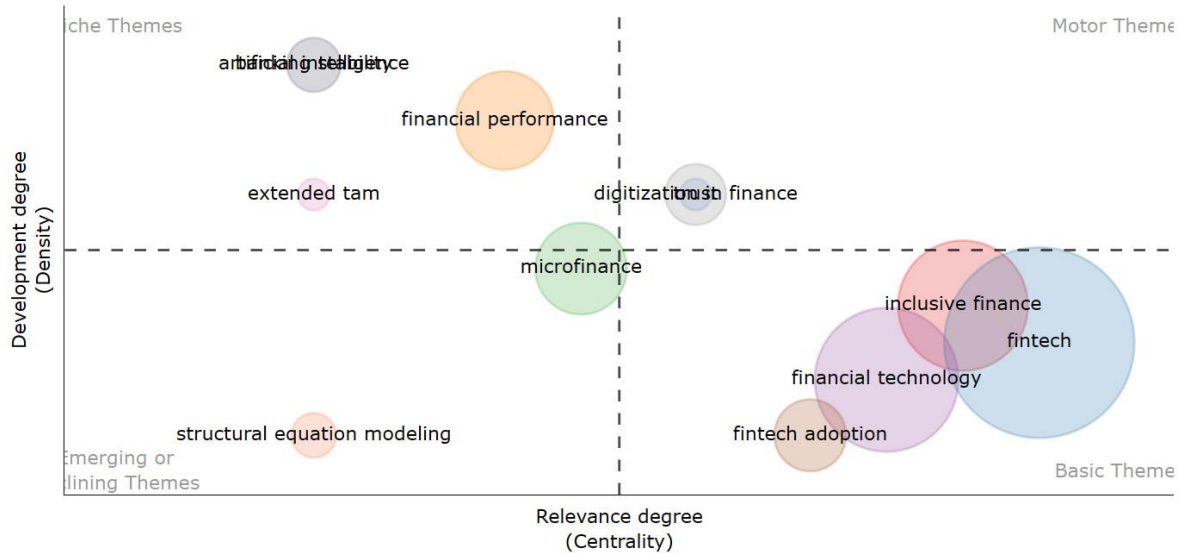
their relatively limited prevalence. Meanwhile, "emerging market" and "Indonesia" fall under the emerging theme category, featuring infrequently in the literature between 2015 and 2020. On the other hand, "blockchain" and "Africa" serve as emerging themes during this period, reflecting their potential to revolutionize traditional financial systems. In regions around the world, particularly in developing areas like Africa and Southeast Asia, a substantial portion of the population lacks access to fundamental financial services.

Figure 5: Thematic Evolution from 2015 To 2020



Time slice 2021-2023 (Figure 6): Fintech adoption, financial technology, and the synergy between fintech and inclusive finance have evolved into pivotal and well-developed themes, captivating increasing attention in the academic discourse. The process of digitalization within the realm of finance has emerged as a prominent "motor" theme during this period. This surge can be attributed to the rapid technological advancements and a rising demand for financial services that offer greater convenience, efficiency, and accessibility. Moreover, themes like artificial intelligence, financial performance, extended TAM (Technology Acceptance Model), and digital finance have started to gain traction as "niche" themes. These topics are gradually becoming more specialized and focused in the research landscape. In the current timeframe spanning 2021 to 2023, emerging keyword trends include "structural equation modelling" and "microfinance," reflecting an increasing interest in data-driven decision-making and innovative financial solutions. This suggests a growing emphasis on research that explores advanced statistical modelling techniques and microfinance strategies to address contemporary financial challenges and opportunities.

Figure 6: Thematic Evolution from 2021 To 2023



6. Conclusions and Future Directions

This study conducted a thorough review of existing research on the topics of Fintech & Financial Inclusion, aiming to identify research trends and gaps in knowledge for future exploration. Articles were categorized systematically based on criteria like database source, publication year, journal, and study location. Key findings include the emergence of Fintech & Financial Inclusion research in 2015, with a significant increase in publications, particularly in 2022. This field of study has gained global attention, with research conducted in various countries, including the United States, the United Kingdom, and China. The "Journal of Risk and Financial Management" was a prominent publication source. An examination of the most prolific authors reveals the significant contributions of researchers such as Ozili P.K., Baber H., and Gonzalez L. In terms of the most frequently cited documents, "Impact of digital finance on financial inclusion and stability," authored by Ozili P.K., stands out as the document with the highest number of citations. Furthermore, the keyword network analysis unveils four primary clusters, with "financial inclusion," "fintech," and "financial technology" emerging as prominently recurring terms within these clusters. Thematic analysis revealed that in the period 2015-2020, "blockchain" was a major theme, while "financial inclusion" and "artificial intelligence" were foundational themes. In the subsequent period from 2021 to 2023, "digitalization in finance" became a central theme, while "fintech," "fintech adoption," and "inclusive finance" remained fundamental. "Microfinance" emerged as an evolving and specialized theme.

This study offers a pathway for future research. Gender inclusivity is a critical dimension, investigating how fintech can address the specific financial needs of women. Cybersecurity and data protection in fintech demand further investigation as digital financial services proliferate. Additionally, exploring the intersection of financial inclusion and sustainable development goals (SDGs) can unveil how fintech can contribute to broader societal objectives. Lastly, as fintech continues to evolve, examining emerging models and technologies like decentralized finance (DeFi) and central bank digital currencies (CBDCs) is imperative to understand their impact on financial inclusion.

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