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Analysis of Digital Transformation and Fintech Adoption in Fishermen Cooperatives: A Case Study on Kosela in Indonesia

Kridawati Sadhana[1], Eko Agus Susilo[2], Heri Nuryanto[3], Durratun Nashihah[1], Chandra Dinata[1]
[1] Departement of Public Administration, Faculty of Social and Political Sciences, Universitas Merdeka Malang
[2] Departement of Business Administration, Faculty of Social and Political Sciences, Universitas Merdeka Malang
[3] Departement of Culinary Management, Faculty of Economics and Business, Batam Tourism Polytechnic
e-mail: kridawati@unmer.ac.id

Abstract

The application of financial technology (Fintech) in fishing cooperatives is an important strategy for addressing the socio-economic problems faced by Indonesia's coastal communities. This study uses bibliometric analysis to investigate recent research on Fintech adoption, community empowerment, and digital transformation in the fishing industry, with a focus on the KOSELA semi-digital cooperative model. This analysis examines key articles and themes to provide insights into the relationship between Fintech adoption, social dynamics, and sustainable economic development in coastal locations. KOSELA helps local fishermen and improves financial inclusion, encouraging innovation and local economic resilience. KOSELA offers a model for improving financial access and community cooperation by combining digital tools with conventional cooperative structures. These findings show that user education and tailoring fintech services to meet the unique needs of cooperative members are essential to ensuring efficient use and optimal impact. In addition, this study identifies research gaps and suggests further research to examine how fintech adoption impacts fishing cooperatives in the long term. This includes the potential for fintech to improve market access, strengthen business models, and enhance cooperative social interaction. This paper enhances the discussion on community-based models in the context of economic development and technology integration in Indonesia by demonstrating the transformative potential of fintech in empowering fishing cooperatives and providing guidance for future research, policy, and practice aimed at promoting sustainable development in coastal communities.

Keywords: *Community Development, Digital Transformation, Financial Technology (Fintech).*

INTRODUCTION

The digital transformation and fintech adoption in fishermen's cooperatives are examined via a thorough lens of collaboration between technology, finance, and sustainable practices, particularly in light of the Kosela case study in Indonesia. According to studies, government rules have a significant impact on cooperatives' digital transformation, making the government's influence the most significant of these elements. For example, Zheng et al. looked into the need for collaborative organizations to interact with government organizations and tech firms in order to actually implement digital strategies that boost operational efficiency and market

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competitiveness [1].

In the agricultural sector, such as fishing cooperatives, the integration of digital tools marks a digital transformation that improves communication and coordination in the supply chain. The agricultural value chain is increasingly influenced by digital technology, which offers opportunities to improve efficiency and transparency. However, Martens and Zscheischler highlight major issues related to governance and ethical considerations [2]. Strategic partnerships between local cooperatives, government agencies, and technology companies can help address the challenges of digital integration and innovation.

It cannot be underestimated that fintech contributes to this change. Fintech has shown that it helps broader financial sustainability and simplifies parts of financial management operations. For example, according to Abdul [3], fishing cooperatives can achieve financial inclusion and sustainability through the use of fintech, which can result in better financial procedures, lower operational costs, and higher efficiency, all of which are very important factors in improving the financial viability of cooperatives [4].

In addition, the concept of "green fintech" has become an important component of discussions on digital transformation, especially when it comes to sustainable practices related to agricultural issues. Fintech solutions support sustainable development projects and promote responsible financial practices with a focus on sustainability, according to AboAlsamh [5], This conclusion aligns with the situation at the Kosela Cooperative, where environmental sustainability is of utmost importance. This encourages members to adopt methods that balance ecological concerns with economic objectives.

It is essential to analyze the benefits and drawbacks of adopting fintech within this framework of cooperation. To align technological innovation with user needs, the findings of Abdul [3] indicate that understanding consumer perceptions of the role of fintech in sustainable development can assist cooperatives in their digital transformation efforts [3]. Through a smoother transition to a digital operational framework, enabled by increased digital literacy and awareness, user engagement and participation increase.

The integration of financial technology (Fintech) into fishing cooperatives, especially in coastal communities in Indonesia, is an important strategy for addressing socio-economic issues. The case study of the semi-digital cooperative model KOSELA provides important insights into how digital tools can enhance financial inclusion and empower fishermen. The adoption of fintech has been studied in various contexts, but there is still significant room for research, particularly in the field of coastal fishing cooperatives. Addressing these issues and increasing knowledge about digital transformation in the fishing industry is the objective of this article.

Using bibliometric analysis, this study examines the development of fintech in the fisheries sector, with a particular focus on KOSELA. The aim of this study is to provide new insights into the role of fintech in community-driven digital models by looking at how fintech influences social dynamics and sustainable economic development in coastal communities. Two objectives of this study are to address gaps in existing research and provide recommendations on how to enhance the efficiency of fintech in fishermen's cooperatives. Additionally, this study will contribute to future research on fintech and community empowerment, as well as policy development and practical implementation.

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LITERATURE REVIEW

The Technology-Based Fishermen's Cooperative Model, also known as KOSELA, connects the growing fintech sector with conventional cooperative practices. The integration of fintech is considered important in Indonesia, especially among fishermen's cooperatives, to promote financial inclusion, community empowerment, and sustainable development. Fintech has the potential to transform businesses by presenting significant challenges and new opportunities [6], [7], [8].

Research shows that fintech can help small and medium-sized enterprises (SMEs), including fishing cooperatives, by facilitating access to financing and encouraging innovative business models. These two factors are crucial for SME growth [6], Businesses in the maritime and fisheries sectors can now obtain capital to operate in remote areas where conventional banking services are unavailable. For example, Pentury explains how fintech and the spread of online lending have encouraged fishermen and marine farmers to borrow funds for their capital needs, signaling a transformation in financial accessibility [7].

Financial access is more important than fintech empowerment. This encourages a culture of innovation in cooperation, according to Najib [6] This is in line with the current trend of small food businesses toward open innovation [6]. To understand the dynamics of the KOSELA model, it is essential to understand this perspective on cooperation. In this model, fintech companies, government agencies, and cooperatives must work together to solve operational problems.

Although Fintech offers promising prospects, the adoption of this technology is challenging. Studies show that fintech can not only improve operational efficiency, but also create new problems and threats. Cyberattacks and data privacy breaches are common [9]. Often, the adoption of fintech is delayed due to a lack of digital literacy and awareness among company members [10]. Therefore, it is crucial to inform people about the benefits of fintech and how to address these issues.

El-Said's review discusses the complex impact that fintech companies have on conventional banking. He predicts that such a transformation could generate resistance from established financial institutions, complicating relationships that should encourage cooperation and innovation [10]. This suggests that fintech solutions must be carefully integrated to meet the needs and capabilities of specific fishing cooperatives.

In addition, the integration of fintech into the KOSELA model opens up opportunities for sustainable development. According to Alalwan [11], fintech can help simplify payment systems and improve the financial management capabilities of cooperatives, which is crucial for the sustainability of practices in sectors such as fisheries that are highly problematic for the [11]. In the literature, aligning fintech solutions with sustainability goals is a key focus. This is based on a broader trend that combines economic viability with ecological management [8]. They also found that fintech's role in promoting financial inclusion in previously hard-to-reach sectors contributes significantly to community economic empowerment [12], [13], [14]. Additionally, innovative financial products tailored to fishermen's needs, such as customizable payment systems and sustainable financing options, can provide a supportive framework for their businesses.

The KOSELA model offers a strategic path for leveraging fintech to promote fishing cooperatives in Indonesia. While the adoption of fintech has many potential benefits, there are

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also issues that need to be addressed. In the literature on fintech, digital literacy, sustainable practices, and comprehensive consideration of community needs are crucial. Ultimately, successful fintech implementation in the KOSELA model can serve as a blueprint for improving the socio-economic conditions of coastal communities, promoting individual empowerment, and achieving broader sustainable development goals.

The study also shows that the adoption of fintech by cooperatives has several problems. Digital literacy is a major barrier to the effective use of fintech in rural areas [10]. KOSELA members may not have the digital skills necessary to make optimal use of fintech services. Previous studies have shown that ongoing education and training programs are needed to overcome resistance to technology and improve digital literacy [13]. The KOSELA model is an important example of how digital literacy programs can be integrated into the fintech adoption process. This will ensure that all members are ready to use these tools.

This study refers to previous literature and expands on it by linking this theoretical framework to the KOSELA case study. In addition, these models are applied to the context of fishing cooperatives in Indonesia. Based on what we know so far, the adoption of fintech in a cooperative environment is a complex process influenced by many internal and external factors. This research aims to expand knowledge about how digital technology can help sustainable economic growth in coastal areas.

METHOD

Bibliometric Analysis

Academic literature reviews generally use bibliometric statistical techniques to measure scientific evaluation. This method is very useful for analyzing broad and open subjects with large datasets, which usually consist of more than 100 documents [12]. Bibliometric analysis is used to identify trends and key elements (such as researchers, keywords, publications, journals, institutions, and countries) related to the adoption of fintech in fishing cooperatives. This method will help researchers understand the latest developments and key issues related to the integration of fintech into community-based models such as KOSELA.

Researchers can collaborate more effectively with Scopus because it provides detailed publication information, such as article titles, exact journal names, and a complete list of main authors [1]. Data was collected on May 23, 2025, using search parameters TITLE-ABS-KEY such as “adoption of fintech,” “financial technology,” “digital finance,” “fisheries cooperatives,” or “community empowerment.” This dataset includes articles from 2015 to 2025 that show the latest advances in the use of fintech in the fisheries sector. The data collected focuses on the titles and abstracts of publications related to specific keywords, particularly publications published between 2020 and 2025.

Using tools such as R Studio, Bibliometrix, and VOSviewer, this analysis looks at research trends, co-occurring topics, keyword frequencies, and author collaborations over the past ten years. This bibliometric analysis helps to understand research on the adoption of fintech in the fishing industry and highlights the main issues that are the focus of this paper.

The first step in the bibliometric research process is data collection. To collect data, Scopus, one of the largest and most comprehensive academic databases available today, uses accurate publication information, such as article titles, journal names, and complete author details. This

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provides an accurate and comprehensive picture of the research context. Scopus was used in this study to help researchers collaborate more effectively and provide a more accurate and in-depth understanding of fintech adoption trends, particularly in the fisheries sector. Data was collected using keywords such as "fintech adoption," "fisheries cooperatives," "financial technology," and "community empowerment," with a focus on publications from 2015 to 2025.

The second step, Before the analysis was conducted, the OpenRefine application was used to clean the collected data. This web-based tool helps standardize and harmonize datasets, eliminate inconsistencies, and ensure accurate data analysis. Keywords were adjusted to avoid duplicates or differences in spelling in an effort to improve the quality and reliability of the dataset. By cleaning this data, the study ensured that the bibliometric analysis accurately reflected trends in fintech adoption among fishing cooperatives. This prevented errors that could have been caused by inconsistent data.

Step three, After cleaning the data, the third step is to provide an overview of the data. R Studio (version 2023.09.0+463), the Bibliometrix and BiblioShiny packages, and VOSviewer (version 1.6.9) are required. These tools provide a better understanding of the research landscape by generating various data visualizations.

Step Four Understanding and Presenting Results: Analysis is conducted after the data is visualized, and the results are presented in the form of graphs, images, and tables. This step also involves reviewing additional literature to provide an in-depth overview of the development of each topic during the selected period. Bibliometric analysis will be used to identify trends, gaps, and research topics that may be of interest for future studies, particularly those related to the adoption of fintech in fishing cooperatives.

Data Sources and Data Search Strategy

This study will investigate recent research on the adoption of fintech in fishing cooperatives, with a particular emphasis on community-driven models such as KOSELA. From 2015 to the end of 2025, Scopus searches will use keywords such as "fintech adoption," "fisheries cooperatives," and "community empowerment." During the selected time period, financial technology has grown rapidly in the agriculture and fisheries sectors in recent years, especially in developing countries.

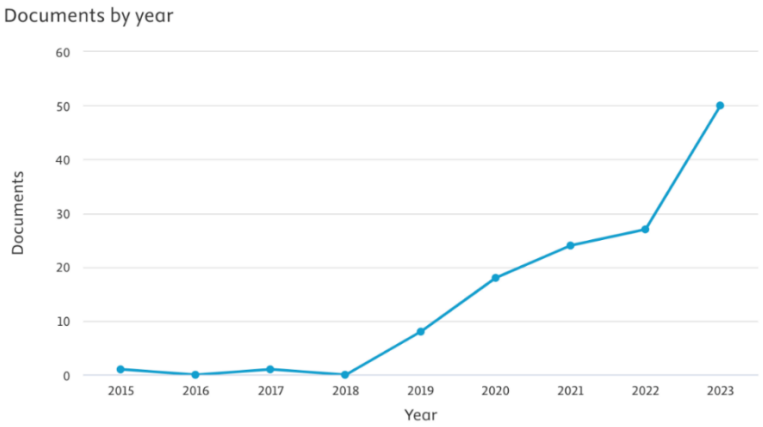

Figure 1. Initial Data Collection
(Source: Scopus, 2025)

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This study will focus on the titles and abstracts of 129 scientific articles that have the strongest correlation with the search keywords are the subject of this study. These documents will be the main source of data for bibliometric network analysis. The following Scopus search parameters were used to collect data, starting on July 2, 2025. Search strategy: TITLE-ABS-KEY: "adoption of fintech," "financial technology," "fisheries cooperatives," or "community empowerment," ensuring that only the most relevant articles are included in the study, providing a focused and comprehensive review of fintech adoption in fisheries cooperatives.

Based on the data shown, it can be seen that the number of documents has changed significantly each year. From 2015 to 2018, the number of documents was very low, ranging from only 1 document per year, indicating that there was no documentation or publication activity. However, starting in 2019, the number of documents has continued to increase, beginning with 8 documents that year and increasing to 18 in 2020 and 24 documents in 2021. The number of documents increased to 27 in 2022, indicating a steady growth trend. The most notable change occurred in 2023, when the number of documents nearly doubled to 50. This suggests that strong driving factors, such as new policies, improved human resource capabilities, or large-scale projects, contributed to the increase in the number of documents.

This increase indicates that, despite initial stagnation, document volume began to follow a steady upward trend. Document volume rose sharply in 2023. This surge suggests that some external or internal elements may have accelerated the documentation process. If this trend continues, it is estimated that the number of documents will increase rapidly in 2024, possibly exceeding 60 documents. Storage systems, archive management, and document retrieval must be improved to handle this increased volume of documents quickly. As a result, additional analysis is needed to determine whether the increase in 2023 is only temporary or will become a trend that will continue for several years to come.

Data Selection and Exclusion

To ensure that this study covers the most recent and relevant studies on fintech adoption in fishing cooperatives, particularly those focusing on the KOSELA model, several exclusion criteria were applied. First, only studies published between 2015 and 2025 that demonstrate rapid growth in fintech adoption in rural and coastal areas, particularly in the agriculture and fisheries sectors, were included. Second, the selection of documents was not limited to journal articles; to provide a broader picture of the topic, reviews, book chapters, and conference papers were also included. Third, only publications indexed in the Scopus database were included to ensure the academic reliability and accuracy of the selected studies. To increase inclusion, there are no restrictions on the language of publication. In addition, only publicly accessible research articles are selected to increase the transparency and accessibility of research. Finally, to ensure the accuracy and integrity of the analysis, articles selected for review must have complete bibliographic data. A summary of these exclusion criteria is presented in the following table.

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Table 1. Exclusion criteria are summarized

Analysis and Data Visualization Criteria	Exclusion
Period	Before 2015 or after 2025
Document Type	Not limited to journal articles; includes book chapters, conference papers, and reviews
Source	Not indexed in Scopus
Study Area	Excluded fields: Social Human
Access	Open access research articles
Bibliographic Data	Complete bibliographic data

(Source: Author Processed, 2025)

Several exclusion criteria were applied to ensure that this study included the most recent and relevant research on the adoption of fintech in fishing cooperatives, particularly those focusing on the KOSELA model. These criteria ensured that high-quality, globally relevant research was selected and could help to understand the role of fintech in empowering coastal communities. The following criteria were used for exclusion:

1. Period: Only research published between 2015 and 2025 is included. During this period, the use of fintech has grown rapidly in rural and coastal areas, particularly in agriculture and fisheries.
2. Document Type: To provide a better understanding of the topic, the selection is not limited to journal articles; reviews, book chapters, and conference papers are also included.
3. Source: Only publications indexed in the Scopus database are included to ensure data reliability and academic accuracy.
4. Language: There are no restrictions on the language of publication to enhance data inclusion.
5. Open-Access: Only open access research articles were selected to ensure transparency and wider access to data.
6. Bibliographic Data: Reviewed articles must have a complete bibliography to ensure the accuracy and integrity of the analysis.

Data Analysis

Data analysis in this study includes observation, assessment, understanding, and interpretation of the results of data collection. The data collected from the Scopus database were analyzed using the previously mentioned inclusion and exclusion criteria. Before being processed, the final dataset was converted into CSV and RIS formats

Documents were organized by publication date (2015–2025) and categorized by author, affiliation, field of study, publication type, and other relevant factors. Next, the cleaned data were analyzed using specialized software to identify important trends and relationships. Data analysis included observing, assessing, understanding, and interpreting the results obtained during the data collection process. Data collected from the Scopus database were adjusted according to the

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inclusion and exclusion criteria outlined previously. The final dataset was converted into CSV and RIS formats for analysis.Keyword Analysis: After importing the data file into the software, the most frequently occurring keywords related to fintech adoption in fishermen cooperatives were identified. Manual selection was also performed to refine the keywords most relevant to the topic from the authors' perspective.

1. Network Visualization: Using bibliometric software, network visualizations were generated to illustrate:
    a) The evolution of fintech adoption in fishermen cooperatives.
    b) Clustering of related topics within the network.
    c) The density of topics related to specific keywords, such as financial inclusion, community empowerment, and sustainable development.

This visualization provides a clearer understanding of the broader context of fintech adoption in the fisheries industry, as well as the impact of KOSELA on community empowerment. This visualization also shows key trends and relationships in the integration of fintech into the cooperative model.

The criteria for data inclusion and exclusion are described in this section to ensure that only relevant and high-quality studies on fintech adoption in fishermen cooperatives, with a focus on KOSELA, are included in the analysis. To visualize networks and trends, bibliometric techniques are used. This technique allows for a deeper investigation into how fintech can enhance efficiency and influence cooperative models such as KOSELA.

RESULTS AND DISCUSSION

This study employs a methodological framework that integrates relevant literature analysis from the Scopus database, Scopus visualization, VOSviewer visualization, and Biblioshiny analysis. The Scopus database provides complete bibliographic data, including article titles, author affiliations, and URLs, which are essential for understanding the extent of fintech adoption in fishermen's cooperatives.

Scopus visualization is essential for identifying relationships between authors, publications, and leading institutions involved in fintech research within the cooperative model. This study uses such collaboration network visualizations to identify key contributors and significant research connections in the field. In addition, network visualizations with the most frequently occurring keywords, authors, and publications related to fintech adoption in fishermen's cooperatives can be created using VOSviewer. This tool helps to discover new research trends, keyword clusters, and areas where fintech is applied.

The temporal patterns in the research focus area are presented using Biblioshiny analysis to refine the study. These patterns show how the issue of fintech adoption in fishermen's cooperatives has evolved. This analysis observes shifts in interest and highlights significant progress in integrating digital financial tools into cooperative models such as KOSELA. This methodological approach is particularly important, as systematic bibliometric analyses of fintech adoption within the context of fishermen's cooperatives, especially related to KOSELA, remain limited. By using these tools, this research gains new insights into the transformational role of fintech in empowering coastal communities and provides a better understanding of how digital financial tools can enhance cooperative structures and improve the socio-economic conditions of

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local fishermen.

Influential Scholars and Scholars Connectivity

Based on the number of documents, there are three authors who stand out as the most significant contributors to the literature on fintech adoption in fishermen cooperatives, particularly with a focus on the KOSELA model. Wójcik, D., Al-Afeef, M.A.M., and Appiah-Otoo, I. have each authored two publications. These authors have made significant contributions to the development of this topic, especially in terms of financial technology and business models.

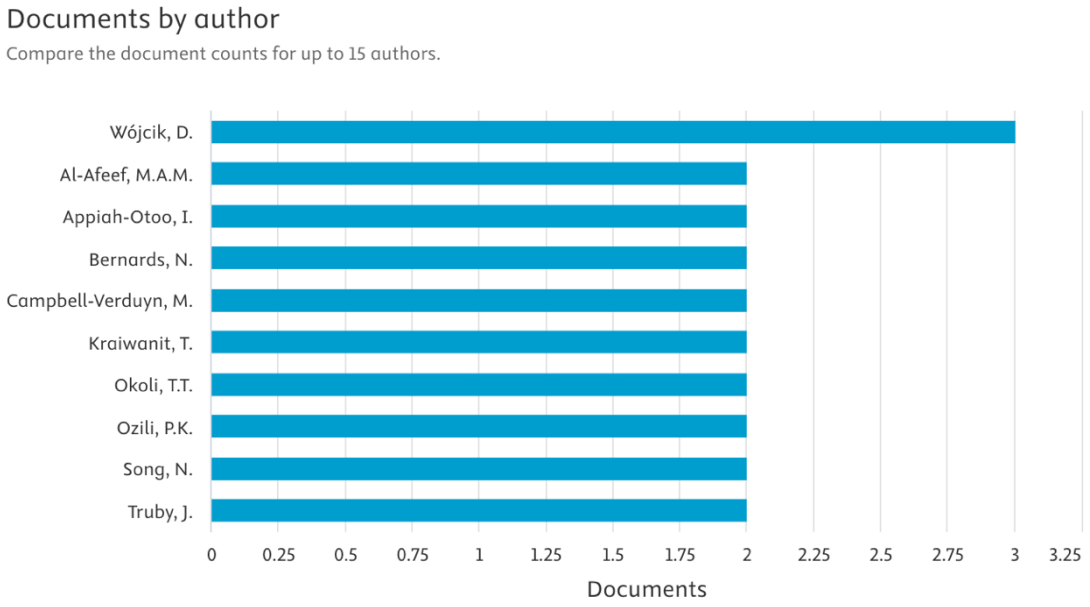

Figure 2. Documents By Author
(Source: Scopus, 2025)

By using our bibliometric approach, we are able to demonstrate a broader intellectual ecosystem on fintech adoption within community-based models. On the other hand, while policy analysis may focus on official narratives and implementation strategies, our bibliometric results provide remarkable insights into how academic discourse responds to fintech adoption in fishermen's cooperatives, particularly the KOSELA model. Based on the number of studies, three authors stand out as the most significant contributors to the literature on fintech adoption in the context of fishermen's cooperatives: Wójcik, D., Al-Afeef, M.A.M., and Appiah-Otoo, I. These authors have made substantial contributions to the development of this topic, particularly in understanding how fintech can empower local communities, enhance financial inclusion, and support fishermen's cooperatives.

In the same way that Chenoweth (2010) examined how local jurisdictions effectively utilize U.S. domestic security resources, our bibliometric findings highlight key components in the adoption of fintech in fishermen cooperatives such as KOSELA. Chenoweth's research identified how governance, institutional context, and structured frameworks influence local performance in homeland security, particularly in interoperability. Her study showed that cities with advanced,

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multilevel, and formal governance are more effective in utilizing security resources. Similarly, the research by Wójcik, D., Al-Afeef, M.A.M., and Appiah-Otoo, I. emphasizes that governance maturity, institutional frameworks, and structured financial tools are crucial for the successful adoption of fintech in fishermen cooperatives. Their work provides important insights into how these components can enhance operational performance, foster community empowerment, and support the sustainable development of coastal communities.

Table 2. Most relevant authors

Author	Number Of Publication	Year	Tittle	Key Contribution
Wójcik, D. [15]	3	2021	Financial Geography II: The Impacts Of Fintech – Financial Sector And Centres, Regulation And Stability, Inclusion And Governance	Significant Contributions To Fintech Adoption In Fishermen Cooperatives, With A Focus On Community-Driven Models And Financial Inclusion In Coastal Areas.
		2021	Financial Geography I: Exploring Fintech – Maps And Concepts	
		2020	The Impact Of Brexit On London's Entrepreneurial Ecosystem: The Case Of The Fintech Industry	
Al-Afeef, M.A.M. [16]	2	2023	Factors Affecting Middle Eastern Countries' Intention To Use Financial Technology	Focused On Financial Inclusion Through Fintech, Contributing Valuable Insights Into Sustainable Development And Empowerment Of Coastal Communities.
		2023	The Effect Of Big Data Governance On Financial Technology In Jordanian Commercial Banks: The Mediation Role Of Organizational Culture	
Appiah-Otoo, I. [19]	2	2022	The Impact Of Fintech On Economic Growth: Evidence From China	Explored The Role Of Fintech In Promoting Economic Empowerment And Financial Stability Within Fishermen Cooperatives, Contributing To Community-Driven
		2021	The Impact Of Fintech On Poverty Reduction: Evidence From China	

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				Development.
Bernards, N. [20]	2	2019	Tracing Mutations Of Neoliberal Development Governance: 'Fintech', Failure And The Politics Of Marketization	Contributed To The Understanding Of Fintech's Impact On Financial Literacy And Inclusion In Coastal Communities.
		2019	Understanding Technological Change In Global Finance Through Infrastructures: Introduction To Review Of International Political Economy Special Issue 'The Changing Technological Infrastructures Of Global Finance'	
Campbell-Verduyn, M. [21]	2	2022	Enrolling Into Exclusion: African Blockchain And Decolonial Ambitions In An Evolving Finance/Security Infrastructure	Investigated The Application Of Fintech For Enhancing The Financial Capabilities Of Coastal Cooperatives,
		2019	Understanding Technological Change In Global Finance Through Infrastructures: Introduction To Review Of International Political Economy Special Issue 'The Changing Technological Infrastructures Of Global Finance'	Focusing On Community Empowerment And Economic Development.
Kraiwanit, T. [22]	2	2023	The Use Of Financial Technology Through Banking Agency In Emerging Economy	Examined The Integration Of Fintech Tools Within Cooperative Models,
		2022	The Acceptance Of Financial Robo-Advisors Among Investors: The Emerging Market Study	Aiming At Improving Financial Access For Fishermen In Coastal Regions.

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Okoli, T.T. [23]	2	2020	An Empirical Assessment Of Probability Rates For Financial Technology Adoption Among African Economies: A Multiple Logistic Regression Approach	Focused On The Use Of Fintech For Rural Development And Its Role In Transforming Financial Access For Underserved Communities In Coastal Regions.
		2020	Is The Relationship Between Financial Technology And Credit Risk Monotonic? Evidence From The Brics Economies	
Ozili, P.K. [24]	2	2023	Determinants Of Interest In Enaira And Financial Inclusion Information In Nigeria: Role Of Fintech, Cryptocurrency And Central Bank Digital Currency	Investigated How Fintech Solutions Can Be Leveraged To Overcome Financial Barriers In Coastal Communities, With Emphasis On Financial Inclusion.
		2021	Financial Inclusion Research Around The World: A Review	
Song, N. [25]	2	2022	The Impact Of Fintech On Economic Growth: Evidence From China	Contributed To The Discourse On Fintech Adoption, Exploring Its Potential To Empower Local Communities And Improve Financial Systems Within Fishermen Cooperatives.
		2021	The Impact Of Fintech On Poverty Reduction: Evidence From China	
Truby, J. [26]	2	2022	Sandboxes In The Desert: Is A Cross-Border 'Gulf Box' Feasible?	Provided Insights Into The Regulatory And Institutional Frameworks Necessary For Effective Fintech Adoption In Community Cooperatives Like KOSELA.
		2020	Governing Artificial Intelligence To Benefit The UN Sustainable Development Goals	

(Source: Author Processed, 2025)

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Figure 3 shows the collaboration network among authors involved in research on fintech adoption in fishermen cooperatives, particularly focusing on the KOSELA model. Wójcik, D., [15] Al-Afeef, M.A.M., [16] and Appiah-Otoo, I [17]. are key members of this network. They also hold strategic positions and maintain direct connections with several other authors, such as Bernards, N. and Campbell-Verduyn, M., who have demonstrated strong collaboration within certain academic or institutional communities. These authors frequently work together, highlighting the importance of academic collaboration in advancing research in this field. As demonstrated by their shared focus and ongoing collaboration, this network is crucial for advancing knowledge on fintech adoption and its potential to empower coastal communities through models such as KOSELA.

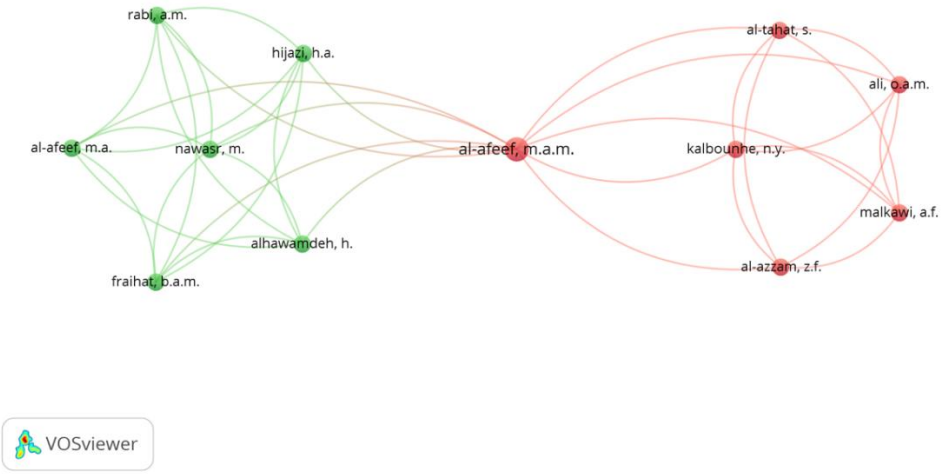

Figure 3. Author nertwork
(Source: VOSviewer)

This research uncovered significant insights into multi-actor collaboration in fintech adoption in fishermen's cooperatives during the 2015–2025 period, particularly the KOSELA model. A bibliometric analysis of 129 Scopus-indexed publications reveals that the concept of multi-actor collaboration in fintech adoption has evolved from a government policy idea to an academic one. The connections between authors such as Wójcik, D., Al-Afeef, M.A.M., and Appiah-Otoo, I. demonstrate this development. Table 2 displays two articles that fit within this author network.

For instance, Wójcik, D.'s 2021 articles, "Financial Geography II: The Impact of Fintech – Financial Sectors and Centres, Regulation and Stability, Inclusion and Governance," and "Financial Geography I: Exploring Fintech – Maps and Concepts," focus on the role of fintech in enhancing inclusion and stability in the financial ecosystem in coastal regions. These works demonstrate that strong financial governance structures are crucial for driving fintech adoption, particularly community-based models like KOSELA. Wójcik, D.'s seminal 2020 work, "The Impact of Brexit on London's Entrepreneurial Ecosystem: The Case of the Fintech Industry," also examines how the fintech economy shapes entrepreneurial ecosystems and can offer important lessons for fintech growth in coastal communities.

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Al-Afeef, MAM, has made significant contributions through his work, such as "Factors Influencing the Willingness to Use Financial Technology in Middle Eastern Countries" and "The Influence of Big Data Governance on Financial Technology in Jordanian Commercial Banks: The Mediating Role of Organizational Culture," both published in 2023. How fintech adoption in developing countries is influenced by culture and data governance is the subject of this research. Al-Afeef, MAM, emphasized the need for multi-actor collaboration to create an ecosystem that supports the adoption of fintech solutions that empower communities and promote financial inclusion. This collaboration should involve regulatory bodies, financial institutions, and technology providers.

Additionally, Appiah-Otoo is the author of several books, including "The Impact of Fintech on Economic Growth: Evidence from China" (2021, 2022) and "The Impact of Fintech on Poverty Reduction: Evidence from China." Her studies demonstrate how fintech can play a transformational role in poverty reduction and economic growth, and provide guidance for implementing similar models in coastal communities like KOSELA.

With a focus on governance, cultural understanding, and institutional cooperation, this research demonstrates that multi-actor collaboration is crucial for improving fintech implementation. This research aims to enhance financial inclusion and sustainable development in coastal communities.

Table 3. Scholar Connectivity

Author	Year	Tittle	Journal Tittle
Wójcik, D.	2021	Financial Geography II: The Impacts Of Fintech – Financial Sector And Centres, Regulation And Stability, Inclusion And Governance	Financial Geography
	2021	Financial Geography I: Exploring Fintech – Maps And Concepts	Financial Geography
	2020	The Impact Of Brexit On London's Entrepreneurial Ecosystem: The Case Of The Fintech Industry	Journal of Entrepreneurial Ecosystem
Al-Afeef, M.A.M.	2023	Factors Affecting Middle Eastern Countries' Intention To Use Financial Technology	Campbell Systematic Reviews
	2023	The Effect Of Big Data Governance On Financial Technology In Jordanian Commercial Banks: The Mediation Role Of Organizational Culture	Campbell Systematic Reviews
Appiah-Otoo, I.	2022	The Impact Of Fintech On Economic Growth: Evidence	Campbell Systematic

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		From China	Reviews
	2021	The Impact Of Fintech On Poverty Reduction: Evidence From China	Campbell Systematic Reviews
Bernards, N.	2019	Tracing Mutations Of Neoliberal Development Governance: 'Fintech', Failure And The Politics Of Marketization	Review of International Political Economy
	2019	Understanding Technological Change In Global Finance Through Infrastructures: Introduction To Review Of International Political Economy Special Issue 'The Changing Technological Infrastructures Of Global Finance'	Review of International Political Economy
Campbell-Verduyn, M.	2022	Enrolling Into Exclusion: African Blockchain And Decolonial Ambitions In An Evolving Finance/Security Infrastructure	Review of International Political Economy
	2019	Understanding Technological Change In Global Finance Through Infrastructures: Introduction To Review Of International Political Economy Special Issue 'The Changing Technological Infrastructures Of Global Finance'	Review of International Political Economy
Kraiwanit, T.	2023	The Use Of Financial Technology Through Banking Agency In Emerging Economy	Emerging Market Study
	2022	The Acceptance Of Financial Robo-Advisors Among Investors: The Emerging Market Study	Emerging Market Study
Okoli, T.T.	2020	An Empirical Assessment Of Probability Rates For Financial Technology Adoption Among African Economies: A Multiple Logistic Regression	International Journal of Finance and Economics

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		Approach	
	2020	Is The Relationship Between Financial Technology And Credit Risk Monotonic? Evidence From The Brics Economies	International Journal of Finance and Economics
Ozili, P.K.	2023	Determinants Of Interest In Enaira And Financial Inclusion Information In Nigeria: Role Of Fintech, Cryptocurrency And Central Bank Digital Currency	Journal of Financial Inclusion
	2021	Financial Inclusion Research Around The World: A Review	Journal of Financial Inclusion
Song, N.	2022	The Impact Of Fintech On Economic Growth: Evidence From China	Campbell Systematic Reviews
	2021	The Impact Of Fintech On Poverty Reduction: Evidence From China	Campbell Systematic Reviews
Truby, J.	2022	Sandboxes In The Desert: Is A Cross-Border 'Gulf Box' Feasible?	International Journal of Regulatory Studies
	2020	Governing Artificial Intelligence To Benefit The UN Sustainable Development Goals	International Journal of Regulatory Studies

This table presents a summary of key publications on fintech adoption, particularly those related to fishing cooperatives like KOSELA, with various authors highlighting their work. Wójcik, D. has written extensively on the broader impact of fintech. In his two books, *Financial Geography I: Exploring Fintech – Maps and Concepts* (2021), and *Financial Geography II: The Impacts of Fintech – Financial Sector and Centers, Regulation and Stability, Inclusion and Governance* (2021), he demonstrates the crucial role of fintech in enhancing financial inclusion and governance in coastal communities. His 2020 study, The Impact of Brexit on London's Entrepreneurial Ecosystem: The Case of the Fintech Industry, provides a global perspective on how fintech is impacting the economic ecosystem.

Al-Afeef, MAM, broadens the understanding of fintech's role in enhancing financial inclusion, particularly in Middle Eastern countries. In his 2023 book, "Factors Influencing Middle Eastern Countries' Intention to Use Financial Technology and the Effect of Big Data Governance on Financial Technology in Jordanian Commercial Banks: The Mediating Role of Organizational Culture," he examines how data governance and organizational culture influence fintech adoption in developing countries, with a particular emphasis on enhancing financial inclusion.

Appiah-Otoo focuses on the impact of fintech on the economy, particularly in China. Her

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2021 study, "The Impact of Fintech on Economic Growth: Evidence from China," and her 2022 follow-up study, "The Impact of Fintech on Poverty Reduction: Evidence from China," examine how fintech can foster economic empowerment and reduce poverty, offering valuable insights for implementing similar models in coastal communities like KOSELA.

Bernards, N., explores the political aspects of fintech adoption, which helps us understand how fintech affects financial literacy and inclusion in coastal communities. In his 2019 article, "Tracing Mutations of Neoliberal Development Governance: "Fintech," Failure and the Politics of Marketing, and Understanding Technological Change in Global Finance Through Infrastructure," he examines the infrastructural changes needed to support fintech adoption in rural economies.

Campbell-Verduyn, M. discusses blockchain technology and its role in empowering community-based models. Her forthcoming 2022 work, "Enrolling Into Exclusion: African Blockchain and Decolonial Ambitions in an Evolving Finance/Security Infrastructure," and her 2019 article on technological change in global finance, emphasize the potential of fintech to drive economic development in underserved communities.

T. Kraiwanit examines how cooperative models can integrate fintech technologies like robo-advisors with banking institutions. His 2023 study, "The Use of Financial Technology Through Banking Institutions in Developing Economies," and his 2022 study on robo-advisors, help understand how fintech can help coastal fishermen earn more money.

In Okoli, T.T.'s 2020 studies, "An Empirical Assessment of Probability Rates for Financial Technology Adoption Among African Economies" and "Is the Relationship Between Financial Technology and Credit Risk Monotonic?", he focused on the role of fintech in rural development. "Evidence From the BRICS Economies" suggests that fintech can help address financial challenges in underserved regions.

Ozili, P. K. provides important insights into how fintech solutions, such as cryptocurrencies and central bank digital currencies (CBDCs), can promote financial inclusion. His work from 2021, Global Financial Inclusion Research Review, dan 2023, Determinants Of Interest In eNaira And Financial Inclusion Information In Nigeria: Role Of Fintech, Cryptocurrency, And Central Bank Digital Currency, are critical to understanding how digital currencies can empower coastal communities.

Song, N., also discusses fintech adoption, particularly its impact on the Chinese economy. His 2021 study on poverty alleviation and his 2022 study, "The Impact of Fintech on Economic Growth: Evidence from China," provide important insights into how fintech can empower local communities and improve the financial system.

Truby, J. examines the laws and institutional structures necessary for successful fintech adoption. His work, "Sandboxes in the Ocean: Is a "Cross-Border Sandbox" Possible?" was released in 2022. It is crucial to use the 2020 UN Sustainable Development Goals study on AI governance to understand how fintech adoption policies impact the global financial ecosystem, particularly community-based models like KOSELA.

Overall, these authors emphasize the importance of fintech for driving financial inclusion, economic progress, and sustainable development in underserved coastal communities. They find that collaboration, regulatory frameworks, and the use of advanced technologies like AI and blockchain are essential to drive systemic change and empower local economies.

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Countries and Influential Institutions

A more detailed analysis of the major countries reveals that industrialized countries account for the majority of publication contributions. For instance, the United Kingdom, which has the most publications, ranks #1. Indonesia ranks second with a significant number of documents. Countries like China, Germany, and South Africa also make substantial contributions, albeit not as much as the UK and Indonesia. Moreover, the most powerful countries appear to control the author collaborative network. The United States, Jordan, Nigeria, Australia, and Hungary are among the other countries that make considerable contributions, but in smaller sums. Even if nations like China, Canada, and Turkey are mentioned as contributors, their publications are still quite small. The figure shows this data.

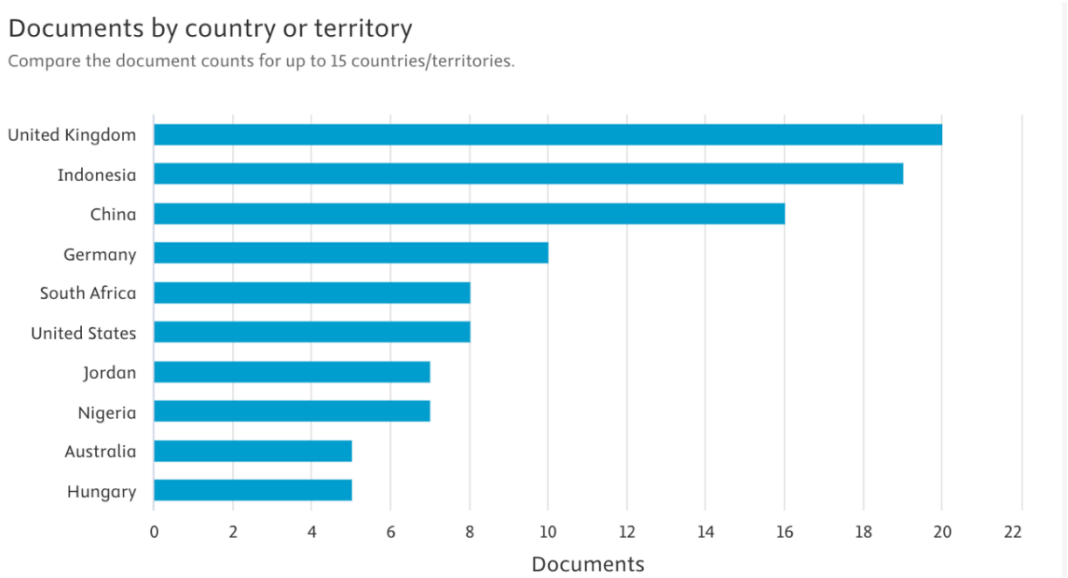

Figure 4. Documents by Country
(Source: Scopus, 2025)

Meanwhile, the visualization of worldwide collaboration reveals a highly thorough structure of collaboration, including the countries with the highest publishing productivity. According to the country collaboration map, the United Kingdom is a major player in the global collaboration network, with link lines that cover numerous continents. This is consistent with previous evaluations that show the UK has the biggest impact on publications about multi-actor collaboration in global governance and fintech research. Australia and Indonesia continue to have the strongest collaborative relationships with the United Kingdom, according to the collaboration map. Australia is also an important center for international collaboration.

Furthermore, this study shows that developed countries have conducted research involving various parties involved in the fintech industry. Leading countries in this area are the United Kingdom, the United States, and Australia. This is not surprising, as these countries play a crucial role in fostering collaboration to address global fintech challenges. They encourage integration between communities, states, and non-state actors, and have initiated cross-sector engagement involving both governmental and non-governmental actors (Arsenault et al., 2024). Furthermore, in international fintech research, these three internationally dominant countries utilize their policy

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approaches to develop collaborative strategies (Miller et al., 2011). Their well-documented collaborative practices allow for more in-depth empirical analysis.

Furthermore, the affiliation analysis revealed that Al-Bayt University had the four highest number of publications on the topic. Three papers were then provided by Newcastle University, Rijksuniversiteit Groningen, and Xiamen University. These institutions in Jordan, the Netherlands, and China have made significant contributions to the field of fintech research. Other institutions, such as the University of Oxford, UNSW Sydney, Syarif Hidayatullah State Islamic University, the University of Cape Town, the University of Johannesburg, and Budapesti Corvinus Egyetem, each provided two papers.

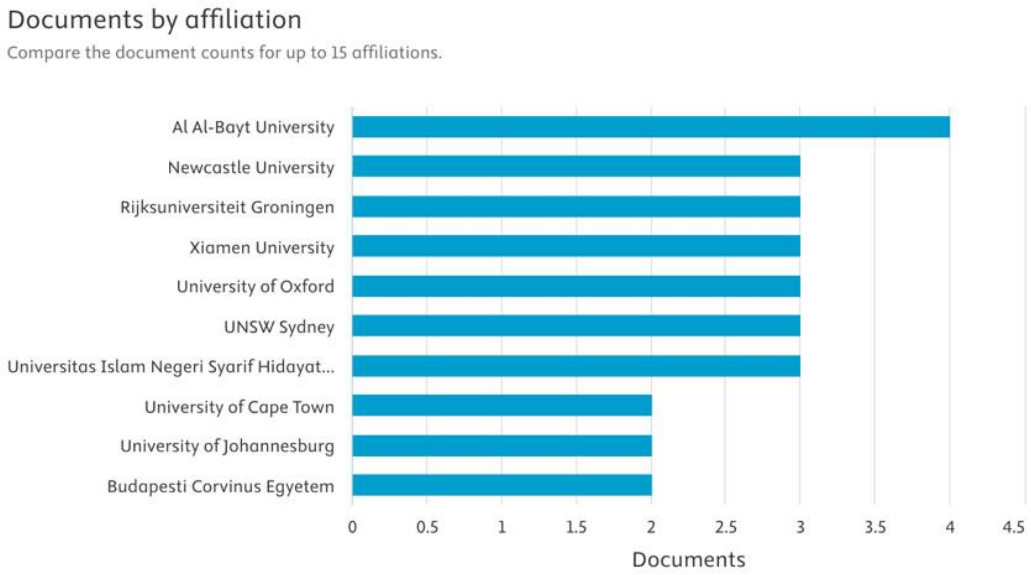

Figure 5. Documents by Affiliation
(Source: Scopus, 2025)

Distribution and Trends of Keywords

Based on the co-occurrence analysis of keyword distribution in fintech research, several key nodes are evident. According to Figure 7, the most frequently occurring terms in research on this topic are "Fintech," "Blockchain," "Digital Payments," "Financial Inclusion," "Regulation," "Cryptocurrency," and "E-commerce." The red and orange clusters contain keywords such as "Emerging Markets," "Africa," and "Asia," indicating specific locations and regions where fintech research is conducted. Furthermore, in the yellow cluster with the "Blockchain" node, terms related to "Smart Contracts," "Security," "Cryptocurrency," and "Financial Services" demonstrate institutional and technological perspectives. The term "fintech" has evolved into a key term that signifies the relationship between technology, finance, and regulation. This demonstrates the importance of cross-sector collaboration (technology, financial institutions, and regulators) to address emerging issues in the digital financial world.

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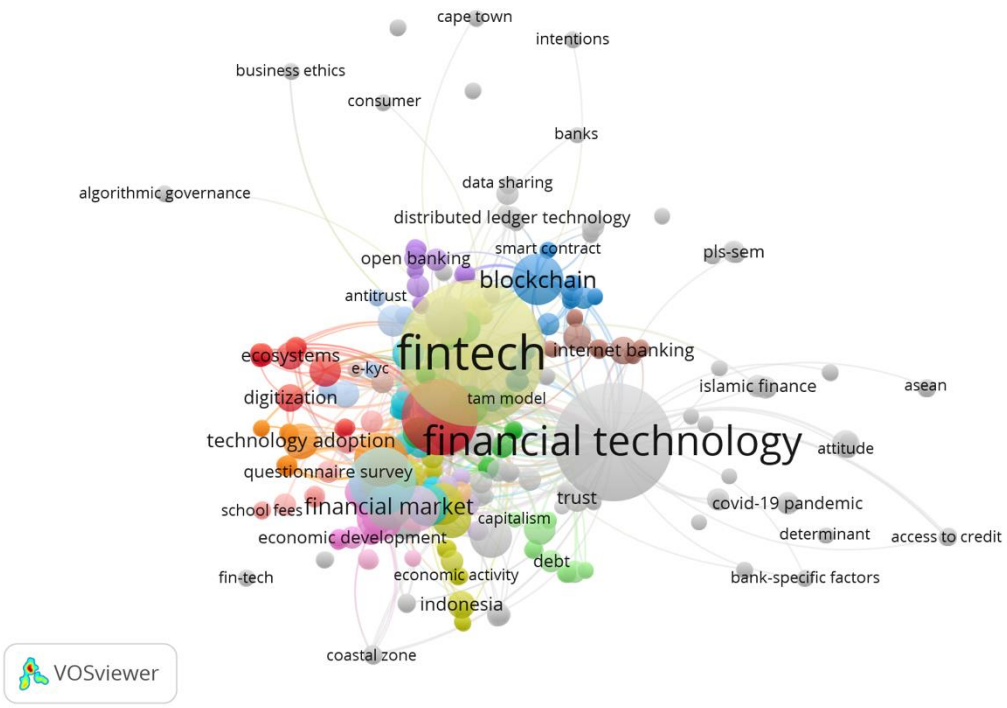

Figure 6. Co-occurance
(Source:VOSviewer, 2025)

Meanwhile, the trend topic graph in Figure 8 shows how the essential terms in fintech research have evolved over time. In certain years, research appears to have concentrated on a small number of topics. For example, the phrase "financial inclusion" has become more well-known in recent years, indicating its significance to the scientific community. Then, in 2023, "cryptocurrency" became a novel and well-liked topic. Biblioshyni's hot themes based on document analysis also contain the terms "blockchain," "financial services," "digital payments," "regulation," and "security," which are part of the yellow cluster in Figure 7. Thus, fintech research is not solely focused on the phrase "fintech"; it also uses terms like "financial inclusion," "digital payments," "blockchain," "financial regulation," and "security.". These topics demonstrate how, since 2016, a technologically-driven, collaborative model that incorporates financial institutions, technology companies, and regulatory bodies has replaced the traditional finance approach. This model encompasses both local and global perspectives.

In the thematic analysis, Figure 1 shows how various research topics in the fintech field are distributed and positioned based on two main dimensions: centrality and density. The themes in the upper right quadrant, or driving themes, are those that have developed internally and attracted attention in broader discussions. Terms such as "financial regulation," "blockchain," "digital payments," "cryptocurrencies," and "financial inclusion" are used in this section. These topics have grown and become important in the field, generating growing interest from various key institutions, such as financial institutions, technology companies, and authorities.

Basic themes located in the lower right quadrant show themes that are very central but are

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still in the development stage. Terms like "financial services," "security," "network security," cryptocurrency law, "financial smart contracts," and "financial technology" are some examples. While these topics are crucial to the fintech industry, they are still developing in terms of theoretical research and real-world applications.

Additionally, "marginal themes," depicted in the bottom left quadrant, exhibit low density and centrality. This suggests that these topics may be small, new, or fading. This quadrant includes terms such as "financial privacy," "digital banking," "peer-to-peer lending," "crowdfunding," and "social finance." These themes continue to evolve in the fintech landscape, and their future progress depends on the wider adoption of digital financial services and the evolving legal framework.

Based on the thematic mapping and subject area distribution from the data, the following analysis can be aligned with the information on fintech development: Four key areas of focus in fintech development were identified through thematic mapping: driving themes, niche themes, emerging/declining themes, and foundational themes. This distribution indicates that fintech research is moving from a theoretical phase to practical applications, with an increasing focus on topics such as financial inclusion, blockchain, cryptocurrencies, digital payments, financial regulation, and security. These themes are crucial to the ongoing development of fintech and ripe for further research to enhance their practical impact on financial services.

For example, recent research has explored blockchain. Smith et al. (2024) investigated how distributed ledger technology can address issues such as security, transparency, and the cost of international payments. This aligns with the growing interest in blockchain as a tool with the potential to transform the financial system. By lowering costs and increasing trust, blockchain could potentially transform global financial transactions.

Based on research subject matter, business and economics contributed the largest number of publications (68.2%), largely focused on the economic and financial impact of fintech innovation. Computer science contributed the third-largest number of publications (12.7%), in part due to technological advances in research and the importance of cross-sector collaboration to drive technological progress. The future of global financial services is determined by the ever-evolving combination of financial innovation and technology. This multidisciplinary collaboration demonstrates this.

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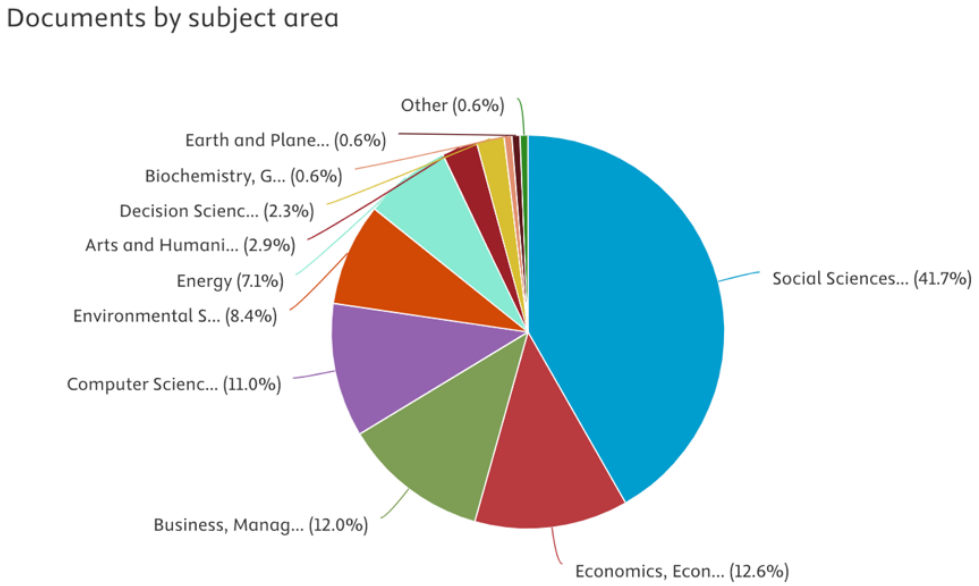

Figure 7. Subject Area
(Source: Scopus, 2025)

CONCLUSION

This study provides a comprehensive bibliometric analysis of the emerging research trends on fintech adoption, community empowerment, and digital transformation in the fisheries industry. It finds that the integration of Financial Technology (Fintech) in fishermen cooperatives, particularly through the KOSELA model, holds great potential to address socio-economic issues in Indonesia's coastal communities.

KOSELA, a semi-digital cooperative model, is an illustration of how fintech could transform financial inclusion and advance sustainable development. Through the use of fintech, KOSELA improves member financial accessibility, encourages resilience and inventiveness in local economies, and strengthens community collaboration. Collaboration between fintech firms, governmental organizations, and cooperative members is crucial to overcoming operational challenges and ensuring the long-term sustainability of such models.The findings demonstrate how important digital literacy and user education are to the effective use of fintech services, which must be customized to meet the particular needs of fishermen's cooperatives. Even while fintech adoption in these regions has a lot of potential, challenges including members' lack of digital skills must be addressed through continuous education and training programs.

The bibliometric analysis has shown that research remains limited, particularly regarding the long-term impact of fintech adoption on fishermen’s cooperatives. Future research should focus on how fintech can strengthen business models, increase market access, and improve social dynamics within cooperatives. In addition, greater attention should be given to how fintech can support environmental sustainability and enhance employee welfare.

In conclusion, by highlighting the potential of fintech to assist fishermen's cooperatives, this article adds to the conversation around community-based models in Indonesia. The findings will

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provide useful information for future scholars, practitioners, and politicians who want to use digital transformation to advance sustainable development, accelerate economic growth, and improve financial inclusion in coastal communities.

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