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ROBOTICS IN ISLAMIC BANKING: BIBLIOMETRIC ANALYSIS AND FUTURE RESEARCH AGENDA

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Abstract

This study aims to map and analyze scientific developments related to robotics and artificial intelligence (AI) within the Islamic banking ecosystem using a bibliometric approach and network visualization. The analysis was conducted using Bibliometrix (RStudio) for performance analysis and VOSviewer for science mapping, encompassing networks of authors, institutions, countries, keywords (both author keywords and index keywords), and citation networks. A total of 626 Scopus-indexed articles discussing robotics and AI in the context of Islamic banking were analyzed. And the results identified three main clusters: (i) the Islamic fintech and digital transformation cluster (including fintech, blockchain, and AI), (ii) the digital/mobile banking cluster focusing on aspects of trust, cybersecurity, and customer satisfaction, and (iii) the TAM/UTAUT model-based technology adoption cluster highlighting factors such as risk perception and behavioral intention. In terms of collaboration, authors such as Rabbani and Hassan, institutions such as the Islamic Business School (UUM), and countries such as India, Malaysia, and Indonesia occupy central positions. Conceptually, connecting keywords such as fintech, mobile banking, technology adoption, artificial intelligence, and Sharia compliance form bridges between the main topics. The novelty of this research lies in the first comprehensive mapping that explicitly links robotics with the Islamic banking ecosystem, while identifying opportunities for further research in the fields of Sharia based automation, halal virtual assistants, and real time Sharia compliance monitoring.

***Keywords:** Bibliometrics, Robotics, Artificial Intelligence, Islamic Banking.*

INTRODUCTION

The development of digital technology has brought significant changes to various sectors, including the Islamic finance sector. One of the technological innovations that has garnered considerable attention is the integration of robotics and artificial intelligence (AI) into banking systems (Hamadou et al., 2024). Amidst the wave of global digital transformation, Islamic banking has begun to explore the integration of robotic technology as part of its strategy to improve efficiency, services, and Sharia compliance (Sarea et al., 2021). However, despite the rapid development of studies on Islamic banking, the focus on the role of robots and AI in this sector is still very limited (Busari, 2024).

Literature related to Islamic banking has experienced exponential growth in the last two decades, with various themes covering financial performance, risk management, Sharia compliance, and comparisons between conventional and Islamic banking (Alshater et al., 2022); (Biancone et al., 2020). Bibliometric studies have become an effective method for mapping these dynamics, identifying research trends, key contributors, and gaps that remain open for further exploration (Aldhawyan et al., 2024).

Although various bibliometric analyses have been conducted on Islamic banking literature, there has been no comprehensive study that explicitly maps the relationship between robot technology and its application in Islamic financial systems. Available bibliometric studies still focus on general topics such as efficiency, risk management, digital service adoption, and customer satisfaction (Bonang et al., 2024); (Apriantoro et al., 2025). This indicates a research gap in the integration of robotic technology studies and the context of Sharia compliant Islamic banking.

In the context of globalization and automation, robots have significant potential to transform the way Islamic financial services are operated, from customer service to transaction monitoring, in accordance with Sharia principles. However, the literature review of this application is still very sporadic and lacks systematic quantitative analysis. This indicates the urgency of compiling a comprehensive and structured scientific mapping through a bibliometric approach to the relationship between robotics and Islamic banking.

The novelty of this research lies in its first attempt to conduct bibliometrics that integrates robotics studies in the context of Islamic banking. Thus, this study not only complements existing literature but also paves the way for the exploration of new topics such as Sharia-based automation, virtual assistant technology in halal financial transactions, and robot algorithms for real time Sharia compliance monitoring (Morshidi et al., 2024).

The bibliometric methodology used in this study enables quantitative tracking of scientific trends, including analysis of keyword networks, top citations, and collaboration between authors. This approach has also been proven effective in identifying areas that have not been optimally explored in the field of Islamic banking (Fahamsyah et al., 2023); (Mainata et al., 2025). Therefore, bibliometrics is the right approach to explore new relationships between robots and Islamic finance principles.

Furthermore, this study also aims to provide an academic basis for researchers, policymakers, and practitioners in evaluating and designing robotics-based innovations in the Islamic banking sector. Given that Islamic banking increasingly emphasizes efficiency and inclusiveness, robotics can be a future solution in achieving these goals effectively and in accordance with Islamic ethical principles (Raza et al., 2024).

Thus, the main contribution of this study is to provide an initial mapping of the global literature on the relationship between robotics and Islamic banking and to highlight conceptual and thematic gaps that have not been addressed in the literature. The results of this study are expected to serve as an important reference for future research agendas that are more integrated between technology and Islamic financial ethics.

LITERATURE REVIEW OR THEORITICAL BACKGROUND

Bibliometric studies have become an important approach in understanding the dynamics of Islamic banking literature. Over the last two decades, there has been a significant surge in the number of scientific publications in this field, reflecting the growing interest in Sharia-based financial systems. A study by Biancone et al. (2020) analyzed more than 7,000

publications and found that the focus of the literature was on financial performance, governance structures, and Islamic financial ethics (Biancone et al., 2020). However, this study also revealed limitations in the exploration of technology topics, particularly robotics. Mainata et al. (2025) added that most research still centers on the themes of efficiency, risk, and customer satisfaction, while exploration of disruptive technology is still relatively rare (Mainata et al., 2025). This opens up a significant gap in literature that can be bridged through new approaches.

Digital transformation has encouraged financial institutions, including Islamic banks, to adopt advanced technologies such as artificial intelligence and automation. However, challenges arise when these innovations must be aligned with Islamic legal principles. A study by Ali et al. (2023) identified that the main barriers to technology adoption in Islamic banking include a lack of customer understanding, levels of religiosity, and limitations in digital infrastructure (Ali et al., 2023). Unfortunately, despite an increase in studies related to digitalization, most of the literature still limits its discussion to online services (e.g., e-banking) without further discussing aspects of robotics or AI based on physical interaction and cognitive processing.

Robotics in the context of Islamic finance is an area that has yet to be explored. A study by Morshidi et al. (2024) is one of the few works that attempt to integrate artificial intelligence into the framework of Islamic ethics, including its application in Islamic banking (Morshidi et al., 2024). This research shows that although AI can assist in service automation and system efficiency, its use in an Islamic context raises ethical challenges such as moral responsibility and Sharia law provisions. However, there has been no bibliometric study that systematically maps how robots are used or discussed in Islamic banking literature. This is the conceptual gap that forms the basis of the novelty of this research, combining bibliometric analysis with an explicit focus on the application of robots in the Islamic financial ecosystem.

RESEARCH METHOD

This study uses a bibliometric approach to map and analyze scientific literature related to the topic of robots in the context of Islamic banking. The bibliometric method was selected because it can identify publication patterns, collaboration networks, thematic trends, and gaps in the literature broadly and systematically, as demonstrated by its effectiveness in various studies in the social and technological fields (Kumar, 2025). This approach is considered appropriate given that the topic under study is still relatively new and has not been explicitly discussed in academic literature.

The data sources in this study were obtained from the Scopus-indexed scientific database, which was selected because it is one of the most comprehensive and recognized databases in the global academic world (Cobos-Alvarado et al., 2024). The search was conducted using a combination of keywords such as “robot,” “robotics,” “artificial intelligence,” and “Islamic banking” to capture relevant publications. The data obtained included article metadata such as title, author name, affiliation, year of publication, abstract, and keywords. The inclusion criteria included articles published in Scopus-indexed journals, written in English, and explicitly discussing Islamic banking or digital technology. Irrelevant articles, such as general studies on AI or robotics without any connection to Islamic finance, were excluded from the analysis. Publication dates were not strictly limited, but the focus was on publications from the last two decades, given the rapid development of digital technology

and Islamic banking literature during that period. A total of 626 articles were observed using the following search criteria:

(TITLE-ABS-KEY("robot" OR "robotics" OR "artificial intelligence" OR "AI" OR "machine learning" OR "deep learning" OR "intelligent system" OR "automation" OR "autonomous system" OR "chatbot" OR "virtual assistant" OR "intelligent agent" OR "algorithmic system" OR "digital transformation" OR "fintech" OR "financial technology" OR "automated process" OR "technology adoption"))

The analysis process was conducted using Bibliometrix (RStudio) and VOSviewer software, two tools that have been proven effective for bibliometric visualization and analysis (Li, Deacon, & Keezer, 2023). Visualization in the form of network mapping was used to identify thematic clusters and new topics with potential for development (Barra, Saputro, & Widianingsih, 2024).

The analysis consisted of three main stages: (1) Performance Analysis to identify publication trends, author and institutional productivity, and the most active journals; (2) Science Mapping to explore conceptual relationships between topics through co-word and co-citation analysis; and (3) Thematic Evolution to trace changes in research focus over time (Guechairi, 2024). Through this approach, researchers can compile an intellectual map related to the application of robotics in the Islamic banking sector.

Validation was conducted by triangulating with previous bibliometric studies in the field of Islamic banking, such as studies by (Mainata et al., 2025) and (Raza et al., 2024). The results of visualization and descriptive statistics from bibliometrics were compared with previous findings to ensure consistency and new thematic contributions offered by this study.

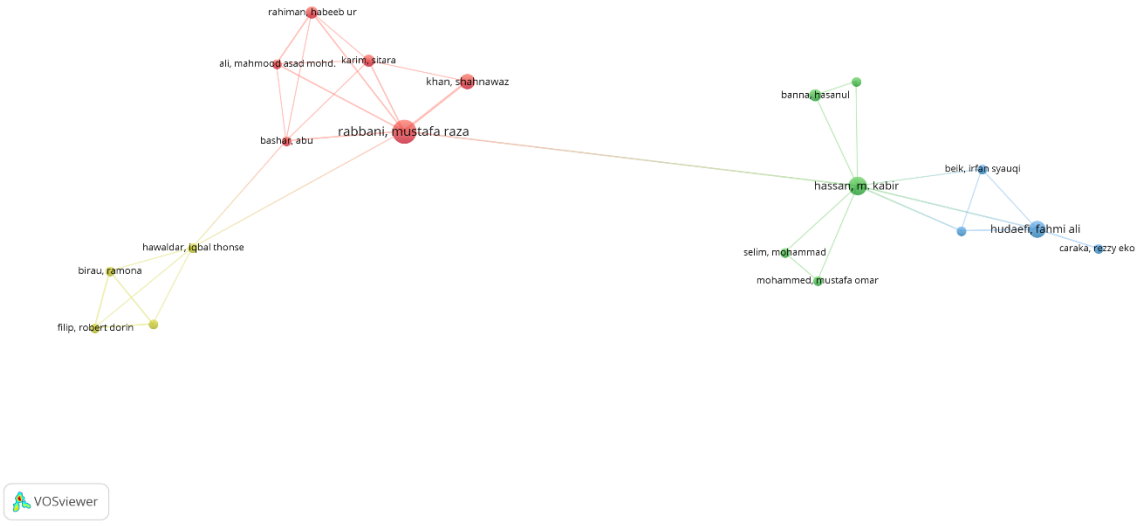
RESULT AND DISCUSSION

1. *Co-authorship*

a. Author

The visualization results illustrated three main clusters. The first cluster (red) was led by Rabbani, Mustafa Raza, who acted as a central node with high connectivity. This indicated Rabbani's strategic role in building a collaborative network across authors. This cluster displayed a dense structure, signifying strong collaboration within the community. The second cluster (green), centered on Hassan, M. Kabir, shows a more dispersed but still coherent pattern of collaboration, indicating a collaborative ecosystem that is developing with connections that bridge other sub-communities. Meanwhile, the third cluster (blue), dominated by Hudaefi, Fahmi Ali, shows a more linear structure with limited but stable connections between authors. The presence of inter cluster connecting nodes, such as Rabbani and Hassan, indicates the existence of key actors who act as bridging scholars, strengthening integration between research communities. These findings are relevant in the context of strengthening multidisciplinary collaboration and in strategies to increase scientific impact through network connectivity.

Figure 1. Writer Network



Source: data processed

b. Organization

In this visualization, each node represents an institution, while the connecting lines illustrate collaborative relationships based on joint publications. Different colors indicate clusters of institutional collaboration that are automatically formed based on the frequency and strength of interactions.

The visualization results show that the Islamic Business School acts as a central node in the collaboration network, with high connectivity to several internal units such as the Department of Accounting, Faculty of Accountancy, and Department of Finance and Business. This indicates intensive and institutionally structured internal collaboration.

In addition, there are also external connections from the Islamic Business School to other institutions such as the School of Economics, Finance and Banking, which, although fewer, indicate efforts to strengthen cross institutional external networks. More separate clusters, such as institutions grouped in red, indicate a more limited but still strategically significant collaboration structure.

This visualization provides important insights into the dynamics of institutional collaboration and identifies key institutional actors that can play a strategic role in expanding scientific networks and facilitating cooperation between faculties and universities.

Figure 2. Organizational Collaboration Network

Source : data processed

c. Country

The image shows a visualization of international collaboration networks based on country affiliations in scientific publications, mapped using VOSviewer software. This analysis is categorized as a country-level co-authorship network, which aims to identify the strength and structure of research partnerships between countries at the global level.

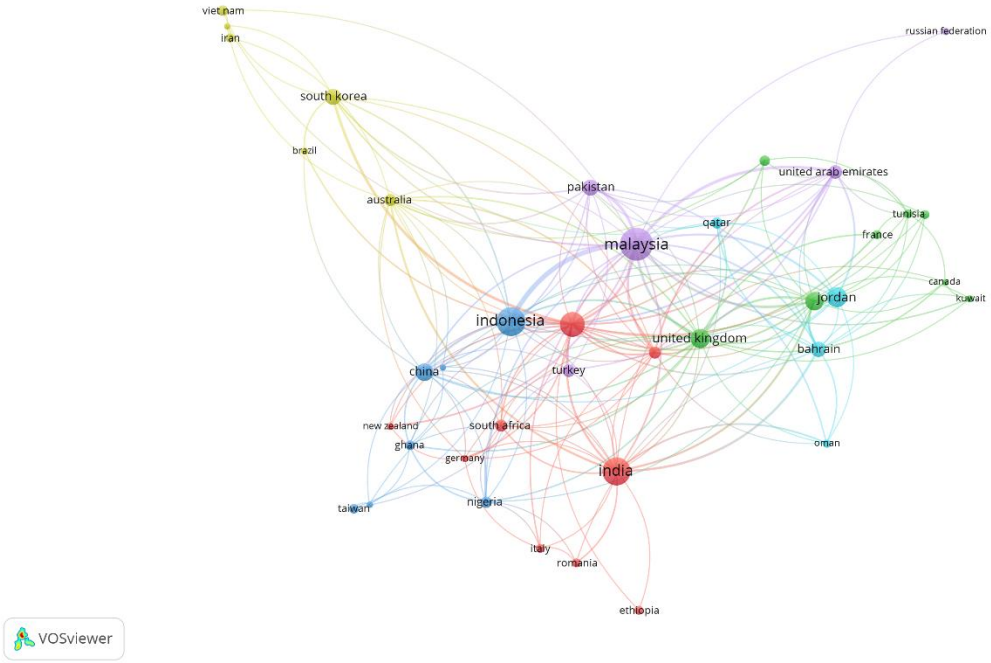
Each node in the network represents a country, while the connecting lines (edges) indicate collaboration in the form of joint publications. The size of the nodes indicates the number of publications or frequency of collaboration, while the colors indicate collaborative clusters that are naturally formed based on the intensity and frequency of interaction.

The visualization results reveal that India, Malaysia, and Indonesia are dominant centers of collaboration, marked by large node sizes and central positions in the network. India emerges as a key node connecting many countries, such as Nigeria, Romania, Ethiopia, and the United Kingdom, signifying its strategic position in the global collaborative network. Malaysia also shows extensive collaborative relationships, particularly with countries such as Pakistan, Qatar, and the United Arab Emirates, reflecting strong academic networks in Asia and the Middle East.

Indonesia appears to be building intensive collaborations with countries such as China, the United Kingdom, and Turkey, as well as several ASEAN countries. The clusters that have formed indicate grouping based on geographical factors, scientific culture, and similarity of research topics.

This network structure reflects global dynamics in scientific collaboration, highlighting the importance of regional actors such as Malaysia and Indonesia in bridging cooperation between Asian, Middle Eastern, and Western countries. These findings have important implications for strengthening research diplomacy and higher education internationalization strategies.

Figure 3. State Collaboration Network



Source : data processed

2. *Co-occurrence*

a. All keywords

The image shows a keyword co-occurrence network visualized using VOSviewer software. This analysis aims to identify thematic relationships and dominant research trends in scientific literature related to digital finance and technology adoption. Each node represents a keyword, while the connecting lines indicate the frequency of co-occurrence in the same document. The colors indicate thematic clusters that are automatically formed based on semantic associations and keyword co-existence in the data corpus.

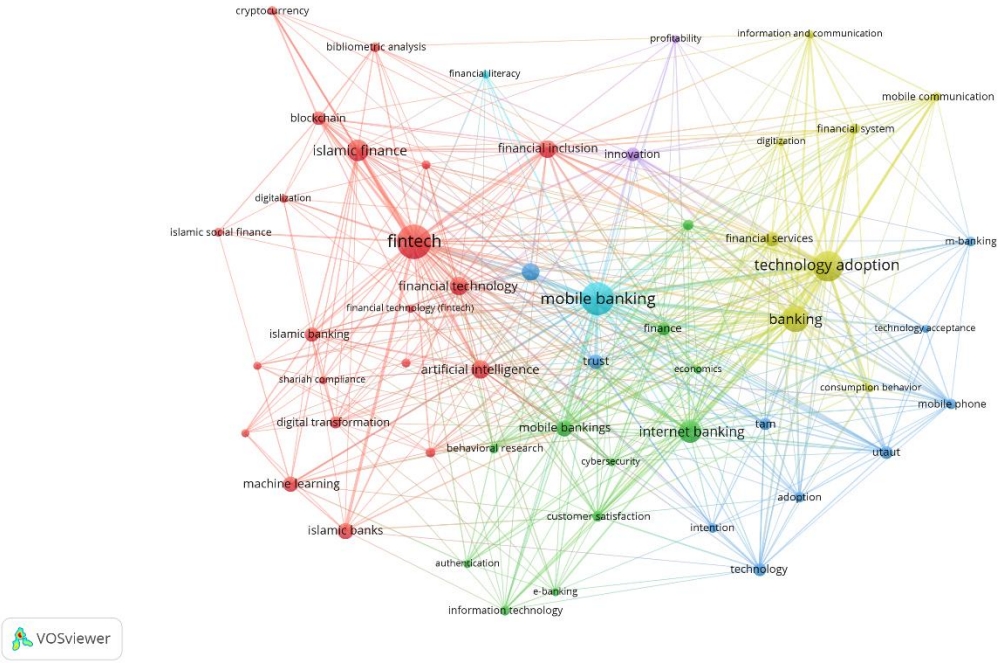
The visualization results show that several main clusters dominate the knowledge structure:

1) Red cluster (fintech and Islamic finance): The main focus of this cluster is the keyword fintech, which is closely connected to Islamic finance, blockchain, digital transformation, and machine learning. This reflects a strong research focus on the integration of financial technology in the context of Islamic finance and digital transformation.
2) Blue cluster (mobile banking and trust): The keyword mobile banking serves as the main node, connected to concepts such as trust, cybersecurity, and customer satisfaction. This cluster highlights the importance of trust and security in the use of mobile-based financial services.
3) Yellow cluster (technology adoption): Dominant keywords such as technology adoption, mobile communication, and technology acceptance describe theoretical approaches in the study of financial technology adoption behavior, particularly through models such as TAM and UTAUT.

4) Green cluster (internet banking and user experience): The focus on internet banking, customer satisfaction, authentication, and e-banking shows attention to user experience and security in the digital banking ecosystem.
5) Purple cluster (innovation and financial inclusion): There is a close relationship between innovation, financial inclusion, and financial literacy, reflecting public policy discourse and financial empowerment through technological innovation.

This network structure illustrates a complex and integrated thematic landscape in studies on financial technology. The presence of central nodes such as fintech, mobile banking, and technology adoption indicates the key position of these topics in the research ecosystem, while also reflecting the dominant direction in the scientific development of this field.

Figure 4. Keyword Co-occurrence Network



Source : data processed

b. Author keyword

This image depicts the co-occurrence network of keywords used by authors (author keywords), visualized using VOSviewer software. This analysis identifies thematic structures and conceptual relationships in the fields of digital finance, technology adoption, and Islamic finance. Each node represents a keyword, and the connecting lines indicate the frequency of co-occurrence between keywords in the same document. The colors indicate thematic clusters formed based on semantic relationships.

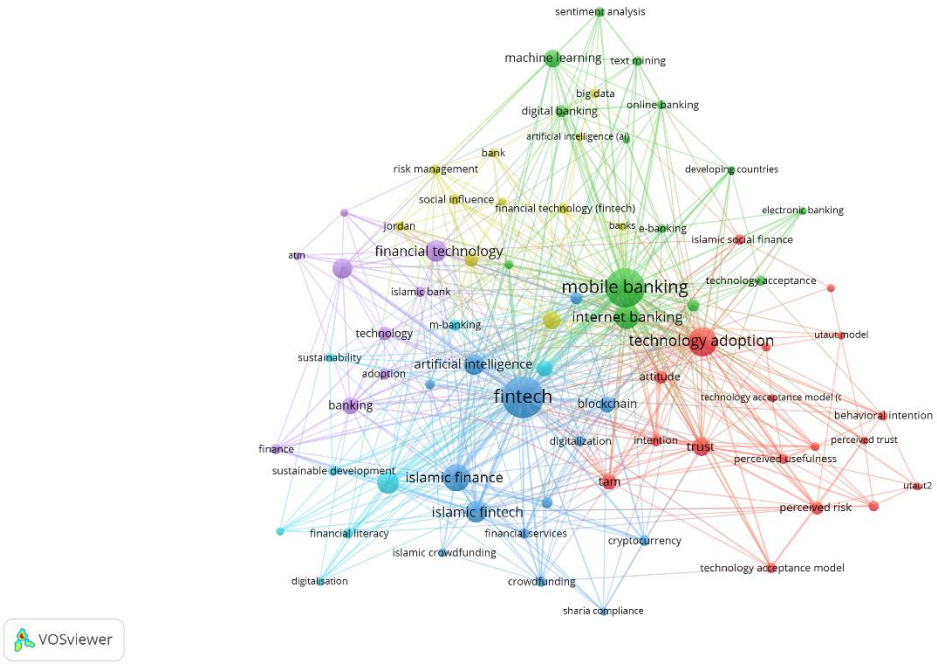
The visualization reveals five main thematic clusters:

1) Green cluster (digital transformation and digital banking): Keywords include mobile banking, internet banking, digital banking, and machine learning. This cluster indicates a focus on the integration of advanced technology in modern banking services, as well as issues such as risk management, sentiment analysis, and big data.

2) Red cluster (technology adoption and behavioral models): Keywords include technology adoption, TAM, UTAUT, perceived risk, behavioral intention, and trust. This cluster dominates research examining the psychological and behavioral factors of users in adopting financial technology.
3) Light blue cluster (Islamic finance): Focuses on keywords such as Islamic finance, Islamic fintech, Sharia compliance, and Islamic crowdfunding. This cluster shows a growing interest in the integration of Sharia principles into the digital financial system.
4) Dark blue cluster (fintech and new technology): Led by terms such as fintech, blockchain, cryptocurrency, and artificial intelligence. This cluster represents the exploration of technological innovations in creating more efficient and inclusive financial services.
5) Purple cluster (financial technology and sustainability): Consists of keywords such as financial technology, sustainability, financial literacy, and Jordan, indicating a research direction that links financial technology with sustainable development and specific regional contexts.

The central position of keywords such as mobile banking, technology adoption, and fintech reflects the dominance of these topics in the conceptual structure of the literature. The dense network between clusters also shows that research in this field is multidisciplinary and highly integrated, with significant overlap between the domains of technology, user behavior, and Islamic finance principles.

Figure 5. Author Keywords



Source : data processed

c. Keyword Index

This image displays a visualization map of keyword index co-occurrence generated using VOSviewer, which aims to identify thematic relationships between keyword indexes in academic literature. Each node represents a keyword used in document indexing, while the

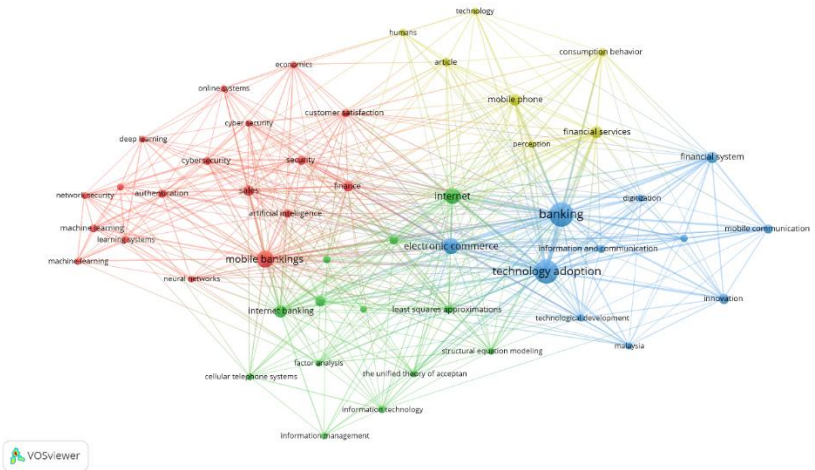
connecting lines reflect the frequency of co-occurrence in the same document. The colors indicate thematic clusters that are automatically formed through a clustering algorithm based on semantic proximity.

This visualization produces five main clusters:

1) Red cluster (digital security and AI): Keywords such as cybersecurity, machine learning, deep learning, neural networks, and authentication form a dense network that shows a strong focus on security issues, machine learning systems, and artificial intelligence applications in the context of finance and digital systems.
2) Green cluster (e-commerce and technology infrastructure): Consists of keywords such as internet, electronic commerce, internet banking, information management, and unified theory of acceptance. This cluster indicates a close relationship between digital infrastructure and technology acceptance models in the online financial sector.
3) Blue cluster (technology adoption and information systems): Focuses on terms such as technology adoption, banking, information and communication, mobile communication, and technological development. This cluster highlights theoretical approaches and information systems in understanding digital transformation in the banking and financial services sector.
4) Yellow cluster (consumer behavior and financial services): Contains terms such as financial services, consumption behavior, mobile phone, and perception. This cluster reflects an interest in the user perspective in their interactions with financial and communication technologies.
5) Orange cluster (sales and customer satisfaction): Focused on keywords such as sales, customer satisfaction, security, and online systems, indicating a focus on business aspects and customer satisfaction in the context of digital financial platforms.

The central position of keywords such as internet, mobile banking, technology adoption, and banking indicates that these topics are connecting themes across various research domains. This complex yet well-organized network structure provides a holistic picture of the conceptual dynamics and dominant trends in literature that combines digital technology and the financial sector.

Figure 6. Keyword Index Co-occurrence



Source: data processed

3. *Citation*

a. Document

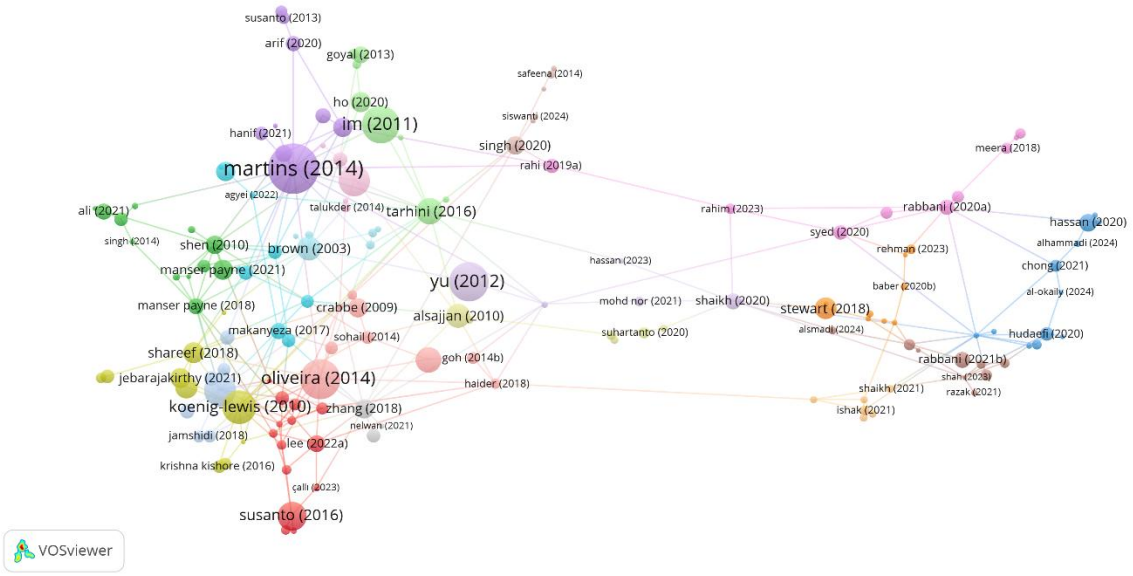
This image presents a visualization of the citation network of documents analyzed using VOSviewer. Each node represents a document (usually a scientific article), and the connecting lines between nodes show citation relationships, i.e., which documents cite or are cited by other documents. The size of the nodes reflects the number of citations received, while the colors indicate clusters or groups of citations that are automatically identified based on the strength of the relationships between documents.

The visualization results identify several major clusters that form the intellectual structure in the field of study:

1) Purple cluster (Martins, 2014 and Team, 2011): This cluster is very central and widely connected to other documents, reflecting its significant influence on the development of conceptual frameworks and technology adoption models. Documents such as Martins (2014) and Yu (2012) are central references in many studies.
2) Red cluster (Oliveira, 2014 and Susanto, 2016): Focuses on empirical testing of technology adoption models in specific contexts such as e-government or mobile banking. Articles in this cluster tend to have a strong quantitative approach and high relevance in technology implementation studies.
3) Orange cluster (Stewart, 2018 and Rabbani, 2021b): Reflects newer research trends, particularly in the context of Islamic financial technology adoption, digital literacy, and user trust. This cluster overlaps with other clusters, demonstrating its interdisciplinary nature.
4) Blue cluster (Hassan, 2020 and Hudaefi, 2020): This cluster focuses on studies based on the context of specific countries or regions, particularly in the Middle East and Southeast Asia, and touches on aspects of policy and Sharia-based financial inclusion.
5) Pink cluster (Rabbani, 2020a and Meera, 2018): Focuses on Islamic finance and fintech studies, highlighting the importance of early literature that builds the foundation for thinking about Islamic-based digital finance.

This citation network provides insight into key documents that form the conceptual and methodological framework in research on technology adoption, fintech, and Islamic finance. Cluster identification enables the mapping of major contributions, scientific influence flows, and potential for further study.

Figure 7. Document Citation Network



Source : data processed

4. *Source*

The image depicts a source co-citation network visualized using VOSviewer software. Each node represents a scientific journal, and the connecting lines indicate co-citation relationships, i.e., two journals that are often cited together in the same literature. Different colors indicate clusters that are automatically formed based on the frequency and strength of these relationships.

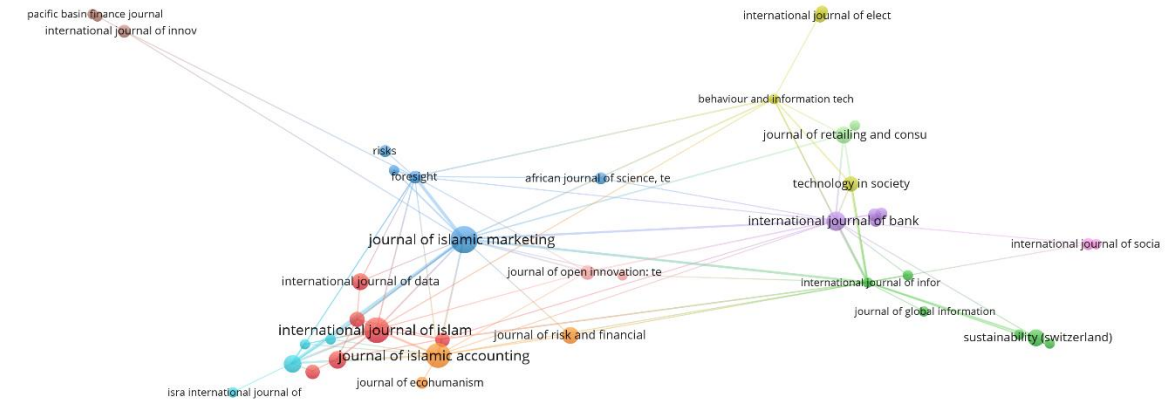
From the visualization results, several main clusters can be identified:

a. Blue Cluster (Islamic marketing and financial risk): Journals such as the Journal of Islamic Marketing, Foresight, and Risks are at the center of this cluster. These journals have a strong focus on Islamic value-based marketing and risk management in the context of digital and Islamic finance.
b. Red Cluster (Islamic accounting and Islamic studies): Journals such as the Journal of Islamic Accounting, International Journal of Islam, and ISRA International Journal form a cluster that focuses on Sharia finance and accounting research as well as social studies based on Islamic values.
c. Green Cluster (Innovation, information, and sustainability): Consisting of journals such as Technology in Society, Sustainability (Switzerland), Journal of Global Information Management, and International Journal of Bank Marketing. This cluster emphasizes the integration of technological innovation, sustainability, and information systems in modern finance.
d. Yellow Cluster (Consumers and Technology): Covering journals such as the Journal of Retailing and Consumer Services and Behaviour and Information Technology, this cluster highlights user interaction, technology adoption, and consumer behavior in the context of financial technology.

e. Light Brown Cluster (Innovation and Risk Management): Pacific Basin Finance Journal and International Journal of Innovation Management demonstrate a focus on risk management and open innovation in the financial and economic sectors.

The Journal of Islamic Marketing emerges as a central node in the network, demonstrating its important role in bridging various clusters through the themes of economic Islamization, marketing, and digital finance. This network structure reveals strong dynamics in the literature between Islamic finance approaches, technological innovation, and user behavior.

Figure 8. Source Co-citation Network



Source : data processed

5. *Authors*

The image above shows a co-authorship network visualized using VOSviewer software. Each node represents an author, while the lines connecting the nodes indicate collaborative relationships formed through joint publications. The size of the nodes reflects the number of publications or the strength of an author's involvement in the network, while the colors indicate collaboration clusters that are automatically identified based on the frequency and strength of these relationships.

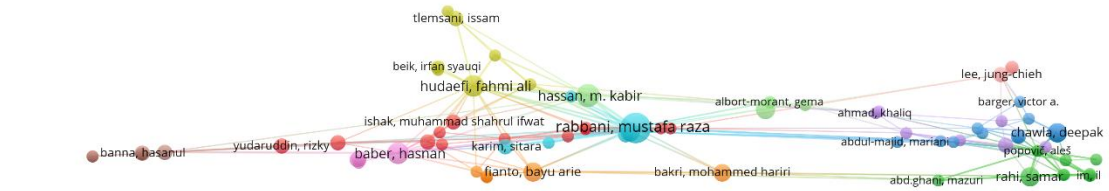
From this visualization, several key nodes can be identified:

a. Rabbani, Mustafa Raza emerged as the largest central node (hub), indicating his dominant role in the collaboration network. He has widespread collaborative relationships, reaching across various clusters.
b. The blue cluster contains names such as Rahi, Samar, Chawla, Deepak, and Popoola, Ilesanmi O., indicating relatively dense cross-geographical collaboration, most likely on topics such as financial technology and user behavior.
c. The light green and yellow clusters contain collaborators such as Hassan, M. Kabir, Hudaefi, Fahmi Ali, and Beik, Irfan Syauqi, which generally indicate research groups focusing on Islamic finance and financial literacy.

d. The orange cluster, such as Fianto, Bayu Arie, Karim, Sitara, and Bakir, Mohamed Hariri, shows a smaller but concentrated collaboration network, likely with a more specific thematic focus.
e. The purple and pink cluster, with figures such as Baber, Hassan and Yudaruddin, Rizky, depicts a group of researchers who are active in the field of digital technology and financial adoption in developing countries.
f. The bright red cluster, on the right, containing names such as Lee, Jung-Chieh and Bargero, Victor A., shows the affiliation of authors from different institutions with global connections that bridge other clusters.

This network structure reflects a close-knit and fairly diversified collaborative ecosystem, indicating that research themes around Islamic finance, technology adoption, and user behavior have facilitated numerous cross-institutional and cross-country collaborations.

Figure 9. Co-authorship Network



Source : data processed

6. *Organization*

This image shows an institutional collaboration network visualized using VOSviewer, where each node represents an institution or academic unit. The size of the node represents the volume of the institution's publication contributions, while the connecting lines indicate collaborative relationships based on joint involvement in scientific publications. The color of the nodes indicates collaboration clusters that are automatically formed based on the strength of the relationships.

From the visualization, several significant nodes and dominant patterns are apparent:

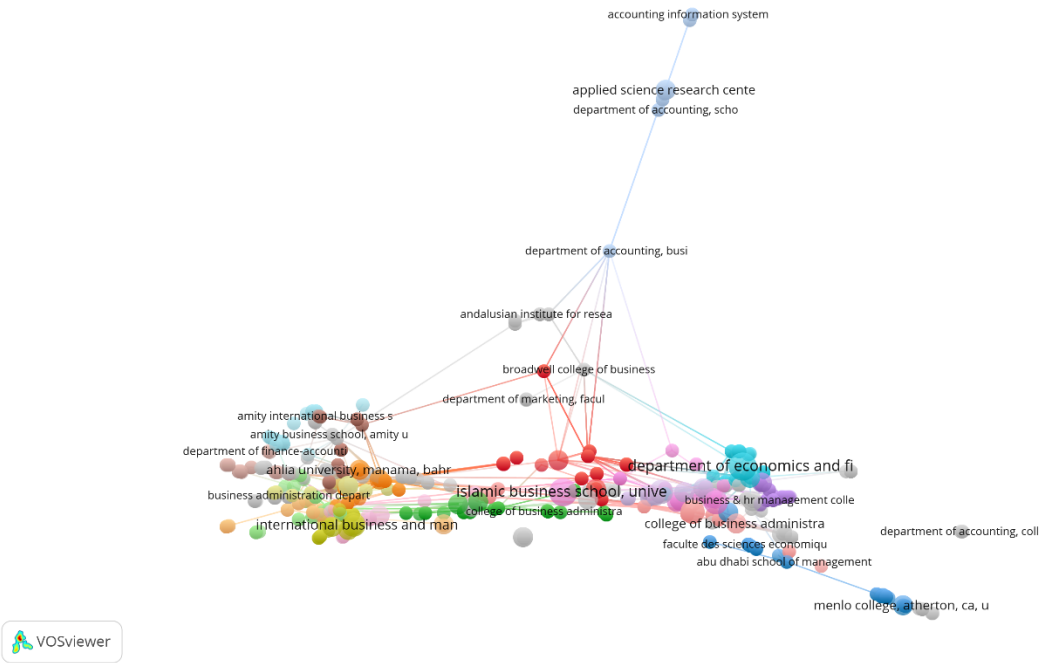
a. The Islamic Business School, Universiti Utara Malaysia is at the center of the network, acting as the main collaborative node. This shows the dominant role of this institution as a driver of cross-departmental and cross-institutional research collaboration.
b. The Department of Economics and Finance and the Department of Marketing, Faculty of Business also appear as important nodes that are closely connected to the Islamic Business School, reflecting an internal collaborative ecosystem between faculties.
c. The red cluster represents institutions from Southeast Asia and the Middle East, such as Ahlia University, Bahrain, Amity Business School, and International Business and

Management Departments, which show active involvement in collaborative research projects focused on Islamic business and finance.

d. The light blue cluster is located at the top right and consists of institutions such as the Applied Science Research Center and Accounting Information System, which appear to be more focused on the fields of digital accounting and managerial information.
e. The dark blue and gray clusters show the involvement of other international institutions such as Menlo College, Atherton CA, USA, which, despite being in a more peripheral position, still show strategic involvement in the global collaborative network.
f. The green and orange clusters show the diversity of fields of study and the possibility of multidisciplinary collaboration, particularly in the fields of business administration, management, and Islamic finance.

Overall, this network reflects a growing collaborative research ecosystem, with the center of gravity being institutions that focus on Islamic business and finance studies. Cross-institutional and cross-country collaboration within this network strengthens the scientific impact and internationalization of research in the fields of economics, accounting, and Islamic business.

Figure 10. Institutional Collaboration Network



Source : data processed

7. *Countries*

This image presents a map of international collaboration networks by country, visualized using VOSviewer software. Each node represents a country involved in scientific publications, while the connecting lines indicate collaborative relationships formed through involvement in joint publications. The size of the nodes illustrates the volume of a country's publication contributions, while the colors indicate collaborative clusters that are automatically

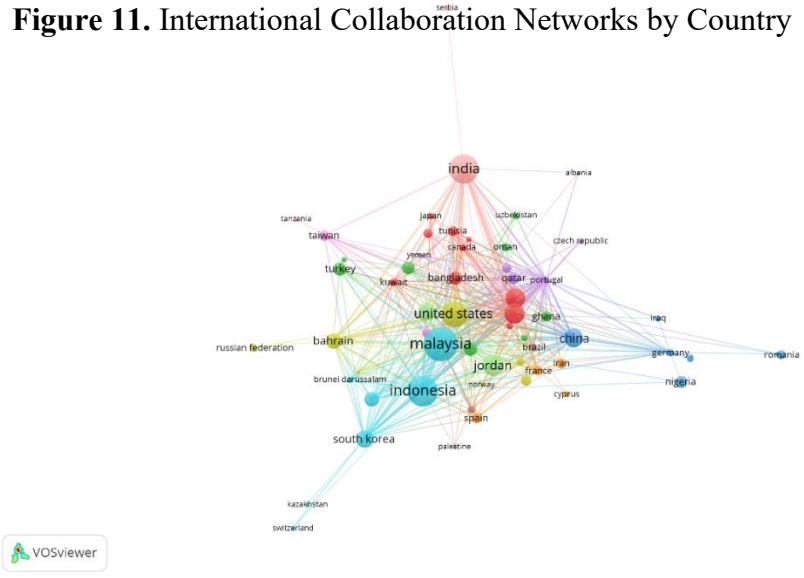
formed through a clustering algorithm based on the frequency and strength of these relationships.

Several key findings can be identified from the visualization results:

a. India has emerged as the largest center of collaboration, as evidenced by its dominant node size and extensive connectivity with various countries such as Bangladesh, the United States, Malaysia, and Qatar. This reflects India's strategic position in leading and establishing international collaboration in the fields of digital finance, technology, and economics.
b. Malaysia and Indonesia form a highly active collaborative node, with strong connections to Asian countries (such as South Korea, Brunei Darussalam, and Japan) and Middle Eastern countries (such as Jordan and Bahrain), signifying the important role of the Southeast Asian region in technology-based financial and Islamic research.
c. The United States is also an important node, acting as a cross-cluster connector, collaborating with countries in Asia, the Middle East, and Africa.
d. China, Germany, and Nigeria are part of a more dispersed cluster, but remain active in cross-continental collaboration, demonstrating participation in global research despite having a smaller number of nodes.
e. Countries in the Middle East and Africa, such as Jordan, Iraq, Oman, Nigeria, and Ghana, have emerged as intermediate nodes, playing an increasingly active role as regional hubs for academic collaboration.
f. Eastern and Central European countries such as Romania, the Czech Republic, and Albania are on the periphery of the network, with lower connectivity but still showing involvement in joint publications with dominant countries.

This dense and integrated network structure indicates a globally interconnected research ecosystem, with Asian and Middle Eastern countries playing an important role in cross-border scientific collaboration. These findings reflect the growing involvement of developing countries in the international research landscape, particularly in the domains of fintech, technology adoption, and Islamic finance

Figure 11. International Collaboration Networks by Country



Source : data processed

CONCLUSION

This bibliometric study reveals that research on Islamic fintech and technology adoption has evolved into an increasingly interdisciplinary field that integrates economics, information systems, user behavior, and Islamic values. Key themes such as trust, perceived risk, and the UTAUT framework remain central in explaining the adoption of Sharia-compliant financial technologies, while the emergence of topics such as artificial intelligence, machine learning, and blockchain indicates new directions for future research. From a practical perspective, the findings provide valuable insights for academics, higher education institutions, policymakers, and industry practitioners in identifying leading research actors, strengthening international collaborations, and developing evidence-based strategies for the advancement of Islamic digital finance. Nevertheless, this study is subject to several limitations, including its reliance on the Scopus database, the descriptive nature of bibliometric analysis, and potential data normalization issues. Future research should focus on the integration of artificial intelligence within Islamic fintech, comparative studies across countries and financial systems, and temporal analyses to identify emerging trends and evolving research patterns. Overall, this study contributes to a better understanding of the intellectual structure of the field and provides a foundation for future theoretical and practical developments in value-based digital finance.

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