

E-Commerce and Banking Synergy in the Digital Economy: A Bibliometric Mapping of Research Trends (2021-2025)

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ABSTRACT: The development of the digital economy is driving the transformation of trade and financial service systems through synergy between e-commerce and digital banking. The integration of these two sectors enhances transaction efficiency and forms a more inclusive and sustainable digital economic ecosystem. This study aims to map the development, intellectual structure, and global research trends related to the relationship between e-commerce and digital banking from 2021 to 2025 using a bibliometric approach. The research method is descriptive qualitative with bibliographic coupling technique. Data was obtained from the Dimensions database using the keywords "e-commerce" and "banking," then processed and visualized using Microsoft Excel and VOSviewer. The analysis was conducted on documents, publication sources, authors, organizations, and countries to identify patterns of referential linkages and thematic clusters. The analysis results show that literature from the 2021–2022 period is the main foundation of the scientific structure. Two dominant thematic clusters were identified: e-commerce and digital banking integration from the perspective of technology adoption and user behavior, and a cluster focused on system innovation, operational efficiency, and electronic transaction security. The research network is dominated by contributions from Asian countries, particularly China and India.

KEYWORDS: E-Commerce, Digital Economy, Digital Banking, Bibliometric Analysis

I. INTRODUCTION

The development of the digital economy is driving a shift from a conventional economy toward activities based on information and communication technology, which increases the efficiency of production, distribution, and consumption through digital platforms, with e-commerce as the main pillar. This phenomenon has attracted academic and policymaker attention due to its potential to boost economic growth, productivity, and market access, particularly in developing countries (Kapura, Arsakhanova, and Zangieva 2025). In this context, e-commerce expands market connectivity, while digital banking provides the payment infrastructure and financial services that support digital transactions. The integration of the two reflects a business transformation that emphasizes the speed, security, and convenience of transactions (Wang and Huang 2023).

The changes in the digital economic structure are reflected in the significant growth of e-commerce transactions and digital payment systems, which is evidence of the widespread penetration of the digital economy. Bank Indonesia data shows that the value of e-commerce transactions increased from approximately Rp205.5 trillion in 2019 to approximately Rp487 trillion in 2024, with a projected further increase in 2025 as digital financial inclusion expands among MSMEs and consumers. Additionally, overall digital economic transactions exceeded Rp1,300 trillion in 2023, supported by the adoption of QRIS by over 40 million merchants. Digital banking transactions also continue to grow through electronic money and digital transfers, reflecting the efficiency of the payment system. This data confirms that the synergy between e-commerce and digital banking has become an integral part of the national economy, making the mapping of research trends for 2021–2025 relevant. (Bank Indonesia, 2025).

Banking plays a strategic role in supporting the digital economy and e-commerce by establishing a financial ecosystem integrated with technological innovations such as mobile banking, e-wallets, and real-time payment systems that accelerate cashless transactions and expand financial inclusion (Sandeep Katuri 2025). The effectiveness of this synergy is influenced by dynamic policies, regulations, and developments in financial technology. Therefore, literature mapping is important for identifying trends, research focus, and research gaps related to the integration of e-commerce and digital banking. Bibliometric analysis plays a role in mapping publication patterns and dominant research themes for the period (Liu 2025).

The acceleration of global digital transformation is driving increasingly complex e-commerce and banking relationships, creating new demands for policymakers, industry players, and academics. Their interaction not only increases transaction efficiency but also shapes the digital economic value, encompassing financing, digital risk management, and cross-sectoral business strategies. This dependence reflects the interconnectedness of technological innovation and regulation in building a competitive and inclusive

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economic ecosystem. Recent research trends emphasize the integration of technology and strategic collaboration between traditional banks, digital banks, and e-commerce platforms, thereby strengthening the relevance of bibliometric analysis for mapping research developments from 2021 to 2025 (Katamadze et al. 2021).

II. LITERATUR REVIEW

A. *Technology Acceptance Model (TAM)*

Theory The Technology Acceptance Model (TAM) was developed by Fred D. Davis in 1986 and published in 1989 as an adaptation of the Theory of Reasoned Action to explain the acceptance of information technology. TAM emphasizes perceived usefulness and perceived ease of use as determinants of attitudes, intentions, and decisions to use technology (Davis 1989). This model was expanded thru TAM2 and TAM3 with contextual dimensions for more complex environments, including e-commerce and digital banking. Its application extends to education and public services thru the integration of variables such as trust, perceived risk, and social influence, and is relevant as a theoretical basis and for bibliometric analysis.

B. *Information System (IS) Success Model*

Theory The Information System (IS) Success Model was introduced by DeLone and McLean in 1992 to explain the success of information systems thru six main dimensions: system quality, information quality, use, user satisfaction, individual impact, and organizational impact (DeLone and McLean 1992). This model was updated in 2003 by adding service quality and integrating the impacts into net benefits, making it relevant for e-commerce and mobile banking. The IS Success Model evaluates both technical and non-technical aspects and is widely applied in the business and public sectors. The high adoption of this model makes it important in bibliometric studies and its integration with other theories such as TAM and UTAUT in the context of e-commerce and digital banking.

C. *Two-Sided Market Theory Or Platform Theory*

Two-Sided Market Theory or Platform Theory explains markets involving two groups of users who influence each other, formalized by Rochet and Tirole in the early 2000s to describe indirect network effects-based mechanisms requiring specific pricing and design strategies (Rochet and Tirole 2003). This theory evolved from Katz and Shapiro's network economics and encompasses the role of platforms as intermediaries, cross-side network effects, cross-subsidization, competitive strategies, and ecosystem governance. Its relevance is high in bibliometric studies and important for understanding the integration of e-commerce and digital banking alongside TAM and the IS Success Model.

There are several previous studies related to the phenomenon of this research. Previous research titled "Bridging Digital Bank and E-Commerce: A Study on Customer Experience and Reuse Intention in Integrated Digital Payment System" (2024) highlights low financial literacy in Indonesia and the increasing need for digital banking and e-commerce integration. This study uses a mixed-methods approach, employing a survey of 471 respondents analyzed with CB-SEM and interviews with 30 users. The research findings indicate that perceived usefulness, perceived ease of use, reliability, perceived value, and perceived risk significantly influence customer experience, satisfaction, and reuse intention, while perceived security does not show a significant effect (Fitri et al. 2024)

The next research study is titled "Digital Banking: Challenges, Emerging Technology Trends, and Future Research Agenda." This research highlights the main challenges of digital banking due to the rapid development of the internet, smartphones, and communication technologies, as well as its role in promoting cashless transactions during the COVID-19 pandemic. This study uses a systematic literature review method based on Kitchenham's protocol, examining 67 articles from the period 2015–2021. The study results indicate that the dominant challenges in adopting and managing technologies such as AI, big data, cloud, and IoT, as well as organizational, security, and risk aspects, while also proposing a future research agenda related to AI, blockchain, biometrics, and open banking (Indriasari et al. 2022).

As for the next research, it is titled "Digital payment and banking stability in an emerging economy with a dual banking system." This research examines the impact of digital payments on banking stability in developing countries like Indonesia. This study uses quantitative VECM and VAR analysis with ARDL robustness tests on monthly data from 2013–2021. The results indicate cointegration and one-way causality from digital payments to banking stability, with a short-term positive impact thru increased fee-based income and liquidity, while the long-term effect is influenced by the need for digital infrastructure investment. The impact on Islamic banking has not been significant because the industry's scale is relatively small (Kasri et al. 2022).

III. RESEARCH METHODOLOGY

This study employs a descriptive qualitative approach using bibliometric analysis to map the development of literature on the relationship between banking and e-commerce. Data was collected using the keywords "E-commerce" AND "Banking" in publications from 2021–2025, with the Dimensions database selected for its broad coverage and availability of metadata supporting bibliometric analysis. A bibliometric approach is used to identify publication patterns, collaborations, and the dynamics of research

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development, which has been widely applied in e-commerce and banking studies. The data obtained was then cleaned and organized using Microsoft Excel to remove duplicates and adjust metadata. The next step involves mapping using VOSviewer to visualize keyword distribution, document linkages, and author collaboration networks. This approach allows for the identification of conceptual relationships between works, major research trends, and research gaps, thus providing a strong methodological foundation for understanding the development of banking and e-commerce studies.

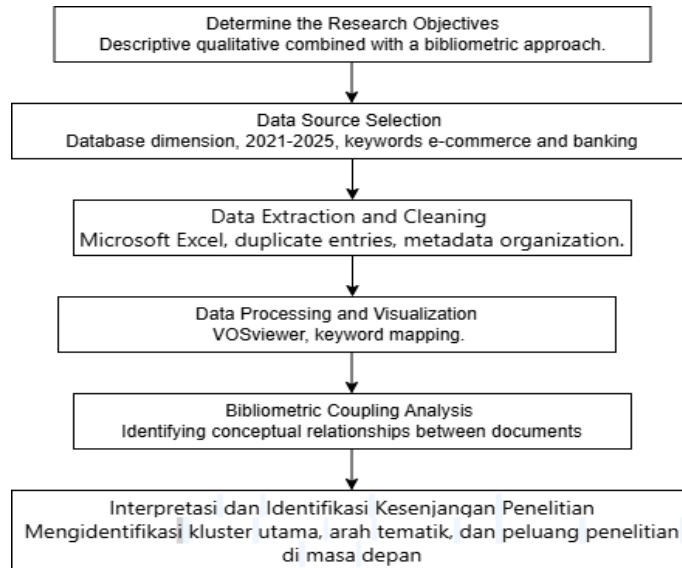


Figure 1. Research Methodology Flowchart

This study follows a descriptive qualitative approach combined with bibliometric analysis to map the intellectual structure and study trends in e-commerce and banking.

1. Determine the Research Objectives

This research begins by establishing the primary objective, which is to study the intersection of e-commerce and banking using bibliometric techniques. Next, the scope of the analysis was determined and the research questions to be addressed were discussed.

2. Data Source Selection

Data was collected from the Dimension database, which includes a wide range of multidisciplinary academic publications. The keywords "E-commerce" and "banking" with a limited period of 2021-2025 ensure that the dataset reflects the latest scientific contributions.

3. Data Extraction and Cleaning

The collected data was exported to Microsoft Excel for initial processing. This includes removing duplicate entries, normalizing author and journal names, and adjusting metadata (such as authorship, title, year, source, and citations) for consistency in subsequent analysis.

4. Data Processing and Visualization

The cleaned dataset was then analyzed using VOSviewer, a widely adopted tool for bibliometric mapping. VOSviewer was used to generate visual networks illustrating keyword co-occurrence, co-authorship patterns, and thematic clusters. These maps allow for the identification of research hotspots and collaborative networks.

5. Bibliometric Coupling Analysis

This study applies bibliometric coupling as the primary analysis technique. This method identifies relationships between documents that share the same references, thus revealing conceptual similarities even when direct citations are absent. Bibliometric coupling helps reveal the intellectual structure of a field and highlight related study groups.

6. Interpretation and Identification of Research Gaps

Finally, the results reveal the main clusters, dominant themes, and emerging trends at the intersection of e-commerce and banking. Additionally, this analysis aims to identify research gaps and future opportunities for scholars. This will help improve knowledge in the field.

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IV. RESULTS AND DISCUSSION

A. Results

Bibliographic coupling is a bibliometric analysis method that assesses the intellectual connection between documents based on the similarity of cited references. Introduced by Kessler in 1963, this method demonstrates that the more common references there are, the stronger the scientific relationship. This technique is used to map knowledge structures, identify similarities in research topics, and analyze the development of scientific fields using tools like VOSviewer and Bibliometrix (Zakiyyah, Winoto, and Rohanda 2022).

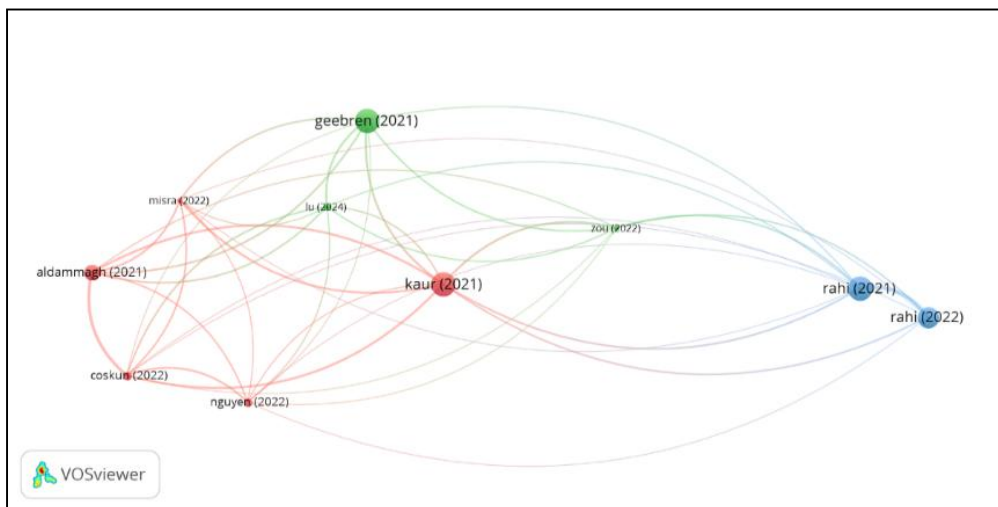
1. Document

In the context of bibliographic coupling, a document refers to a unit of scientific work such as a journal article, conference proceedings, book, or research report that is the object of bibliometric analysis. Documents serve as the basic units analyzed to assess intellectual relationships based on the similarity of cited reference lists. The position of a document in bibliographic coupling is very important because each link between documents is measured by the number of sources cited. The greater the overlap of references between documents, the stronger the level of thematic and conceptual interconnectedness, reflecting the proximity of research fields or topics studied (Ananda, Rizal, and Rohman 2025).

Table 1: Document Results

NO	Dokumen	Sitasi	Total Link Kekuatan
1	Kaur (2021)	127	49
2	Aldammagh (2021)	56	43
3	Coskun (2022)	16	41
4	Rahi (2021)	126	36
5	Rahi (2022)	96	30
6	Geebren (2021)	132	29
7	Misra (2022)	7	28
8	Lu (2024)	14	26
9	Zou (2022)	8	24
10	Nguyen (2022)	16	20

Based on the results of the bibliographic coupling table with document analysis units, there is a strong reference connection in several key documents. The Kaur (2021) document occupies the most central position with the highest total link strength (49), followed by Aldammagh (2021) (43) and Coskun (2022) (41), indicating that these three documents share the most references with other documents. This TLS value describes the level of intellectual proximity between studies, while citation variation indicates differences in their respective academic influence. Overall, this coupling network shows that the 2021–2022 literature is the main reference point that forms the conceptual basis of the relationship between e-commerce and the banking sector.



Image; Processed Results from Vosviewer
Figure 1. Visual of Document Results

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The results of bibliographic coupling visualization using the document as the unit of analysis on the topics of E-Commerce and Banking show the formation of two main clusters representing the thematic and reference connections between studies. Cluster 1 (red) is centered around the documents by Kaur (2021), Aldammagh (2021), Coskun (2022), Misra (2022), and Nyguyen (2022), which form a close network with high total link strength. This cluster describes the research focus on the integration of digital banking services, user experience, and technology adoption in bank-based e-commerce transactions. Cluster 2 (green) is dominated by Geebren (2021), Lu (2024), and Zou (2022), which have a strong connection to the first cluster thru conceptual reference linkages. This cluster highlights the strategic aspects and innovations of digital banking systems, including operational efficiency and the security of electronic transactions. As for Rahi (2021) and Rahi (2022), they are in the position of connecting clusters (intellectual bridges) because they link technology adoption theory and user behavior to digital banking services in the context of e-commerce.

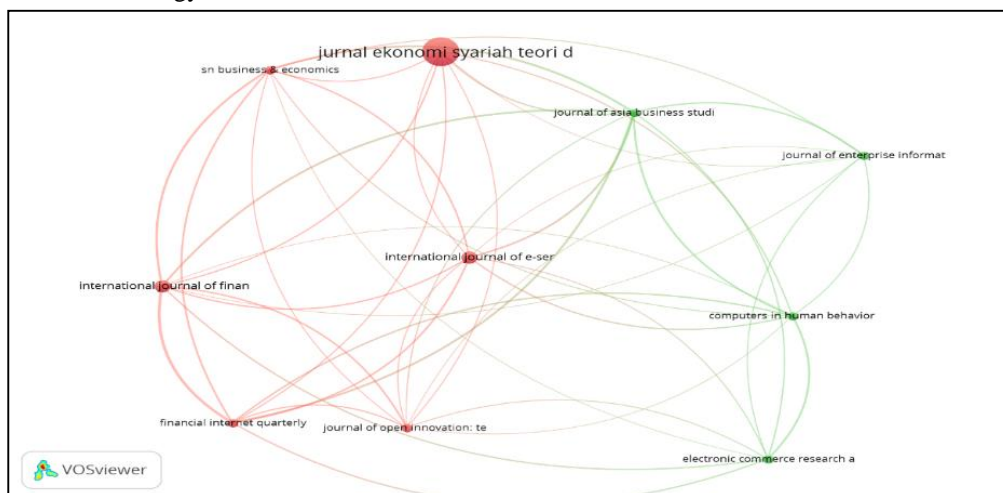
2. Sources

In the context of bibliographic coupling, sources refer to the journals or scientific publications that serve as the venue for research publication, and are used as the unit of analysis to identify relationships between journals based on the similarity of references cited in the published articles. The scope of this analysis includes mapping the level of intellectual interconnectedness between journals, which indicates the extent of similarity in thematic focus, study areas, and research directions among these publications. The position of sources in bibliographic coupling serves as an indicator of scientific consolidation in a field, as journals with a high degree of interconnectedness demonstrate a central role in the dissemination and development of knowledge (Arlina, Sudiar, and others 2022).

Table 1: Sources Results

NO	Sumber	Dokumen	Sitasi	Total Link Kekuatan
1	International journal of financial studies	2	20	52
2	Journal of asia business studies	1	127	52
3	Financial internet quarterly	1	56	50
4	sn business & economics	1	1	39
5	International journal of e-services and	2	26	34
6	Computer in human behavior	1	132	30
7	Electronic commerce research and applycations	1	14	24
8	Journal of open innovation: technology	1	16	22
9	Jurnal ekonomi syariah teori dan terapan	11	36	22
10	Journal of enterprise information management	1	126	15

Based on the results of the bibliographic coupling table by publication source, it shows that research on E-Commerce and Banking themes is concentrated in several major journals that are strongly interconnected thru shared references. The International Journal of Financial Studies and the Journal of Asia Business Studies hold the most central position with the highest total link strength value (52), indicating a dominant role as a core reference source in digital finance studies. The Journal of Financial Internet Quarterly (TLS = 50) also serves as an important link, connecting research in the field of online finance and banking innovation. On the other hand, Computers in Human Behavior has the highest citations (132) but moderate bibliographic coupling (TLS = 30), indicating a strong conceptual influence on the user behavior dimension. Other journals such as the International Journal of E-Services and Mobile Applications, Electronic Commerce Research and Applications, and the Journal of Open Innovation serve as a link between the fields of economics, technology, and behavior.



Image; Processed Results from Vosviewer

Image 1. Visual Results of Sources

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The results of bibliographic coupling visualization using the source as the unit of analysis on the topics of E-Commerce and Banking show the formation of two main clusters that are strongly interconnected. Cluster 1 (red) includes journals such as the International Journal of Financial Studies, Financial Internet Quarterly, International Journal of E-Services, Journal of Open Innovation, and Jurnal Ekonomi Syariah Teori dan Terapan. This cluster focuses on the study of digital finance, innovation in technology-based financial services, and the application of sharia systems in digital banking, indicating a theoretical and policy orientation in finance. Cluster 2 (green) includes journals such as the Journal of Asia Business Studies, Computers in Human Behavior, Electronic Commerce Research and Applications, and the Journal of Enterprise Information Management. This cluster focuses on user behavior, information management, and the implementation of technology in e-commerce and banking systems.

3. Authors

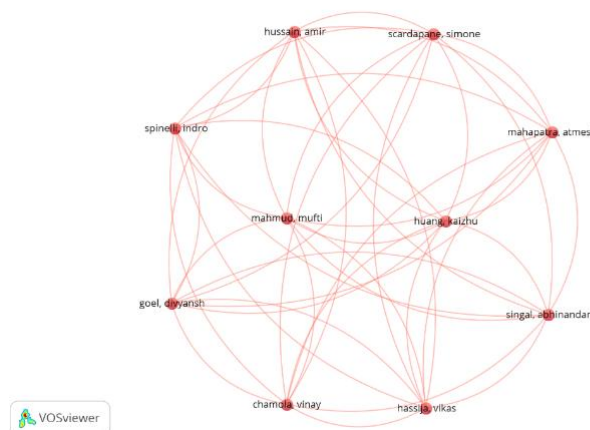
In the context of bibliographic coupling, authors refer to individuals or groups of writers who produce scientific works and serve as the unit of analysis in mapping intellectual relationships between researchers. The author's position is very important because the level of interconnectedness between authors is measured by the similarity of references cited in their respective works. The more common references used by two or more authors, the stronger the bibliographic relationship and intellectual proximity. Authors coupling analysis helps identify scientific collaboration networks, hot flows, and the evolving expertise landscape within a research field (Ananda et al. 2025).

Table 1: Authors Results

NO	Penulis	Dokumen	Sitasi	Total link kekuatan
1	Chamola, vinay	1	927	1242
2	Goel, divyansh	1	927	1242
3	Hassija, vikas	1	927	1242
4	Huang, kaizhu	1	927	1242
5	Hussain, Amir	1	927	1242
6	Mahapatra, Atmesh	1	927	1242
7	Mahmud, Mufti	1	927	1242
8	Scardapane, Simone	1	927	1242
9	Singal, Abhinandan	1	927	1242
10	Spinelli, Indro	1	927	1242

VOSviewer Processing Results

Based on the results of the bibliographic coupling table with the author as the unit of analysis on the theme of E-Commerce and Banking, there is a strong scientific connection between the authors, as indicated by the uniform Total Link Strength value of 1242. This value signifies a high degree of similarity in references among these works, indicating a shared research focus. All authors, including Chamola, Goel, Hassija, Huang, Hussain, Mahapatra, Mahmud, Scardapane, Singal, and Spinelli, contributed to research that intersects in the fields of digital banking, electronic transaction security, and the integration of information technology-based e-commerce systems. The identical number of citations, 927, indicates that these works have relatively equal academic influence and mutually reinforce each other's conceptual positions. Scientifically, this pattern indicates solid research cohesion, where authors share the same literature base, forming a comprehensive research network focused on technological innovation and the digital transformation of the financial sector.



**Image; Processed Results from Vosviewer
Image 1. Visual Results of Authors**

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The results of the bibliographic coupling visualization (analysis unit: authors) on VOSviewer show a single red cluster consisting of ten authors (e.g., Chamola, Goel, Hassija, Huang, Hussain, Mahapatra, Mahmud, Scardapane, Singal, Spinelli). Each entity is recorded as a single document with a uniform number of citations (927) and a very high combined total link strength (1242). Topologically, these nodes are arranged in a circle and are densely interconnected by numerous red curved edges, indicating a high degree of bibliographic coupling: these documents share many common references, resulting in high situational cohesion. The density of links and spatial proximity between nodes indicate thematic and methodological consistency across studies within the context of the "E-Commerce and Banking" label. This visualization suggests the existence of interdisciplinary research bridges (digital payment system studies, integration of e-commerce platforms with banking services, and risk management/security issues in electronic transactions).

4. Organizations

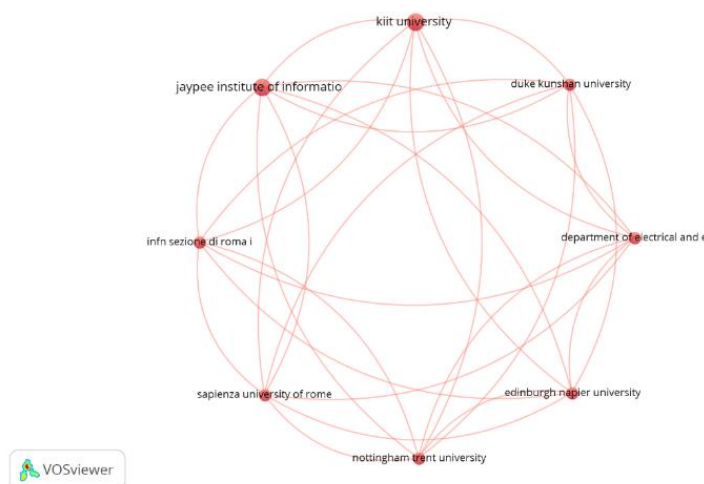
In the context of bibliographic coupling, organizations refer to the institutions or organizations where authors are affiliated, which serve as the unit of analysis for identifying intellectual relationships between organizations thru the similarity of references used in scientific publications. The scope of this analysis includes mapping the extent to which two or more organizations are interconnected in terms of shared literature sources, thus reflecting the proximity of research directions, academic collaboration, and the thematic focus of these institutions within a field of study (Samsara 2022).

Table 1: Organizations Results

NO	Lembaga	Dokumen	Sitasi	Total link kekuatan
1	Departmen of electrical and electronic engineering	1	927	966
2	Duke khunsan University	1	927	966
3	Edinburgh napier university	1	927	966
4	INFN sezione di roma i	1	927	966
5	Jaype institute if information technology	2	927	966
6	KIIT University	2	927	966
7	Nottingham Trent Universty	1	927	966
8	Sapienza University of Rome	1	927	966
9	University of Ulster	1	8	132
10	University of Warwick	1	8	132

VOSviewer Processing Results

Based on the results of the bibliographic coupling table with the unit of analysis organizations, there is a strong connection between various institutions involved in research on the theme of E-Commerce and Banking. From the table, it can be seen that most organizations, such as the Department of Electrical and Electronic Engineering, Duke Kunshan University, Edinburgh Napier University, INFN Sezione di Roma I, Jaypee Institute of Information Technology, KIIT University, Nottingham Trent University, Sapienza University of Rome, and the University of Ulster, have a high total link strength (966), indicating a significant intensity of reference similarity among these institutions. This indicates a similarity in research focus and thematic direction in the development of digital technology, financial systems, and online banking service innovation. Meanwhile, the University of Warwick showed relatively low link strength (132), indicating more limited referential engagement compared to other institutions.



**Image; Processed Results from Vosviewer
Image 1. Visual Results of Organizations**

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The visualization results of bibliographic coupling with organizations as the unit of analysis show the formation of one main cluster (Cluster 1) colored red, indicating a strong literature connection between research institutions focused on the fields of E-Commerce and Banking. This cluster comprises various prestigious universities and institutions such as the Department of Electrical and Electronic Engineering, Duke Kunshan University, Edinburgh Napier University, Jaypee Institute of Information Technology, KIIT University, Nottingham Trent University, INFN Sezione di Roma I, and Sapienza University of Rome, all of which have a high total link strength value (966). This indicates that these institutions share significant common references and research directions, particularly in the development of digital financial technology, online transaction security, and electronic banking systems. Network visualization shows a close relationship between nodes, indicating strong academic and thematic collaboration among these institutions.

5. Countries

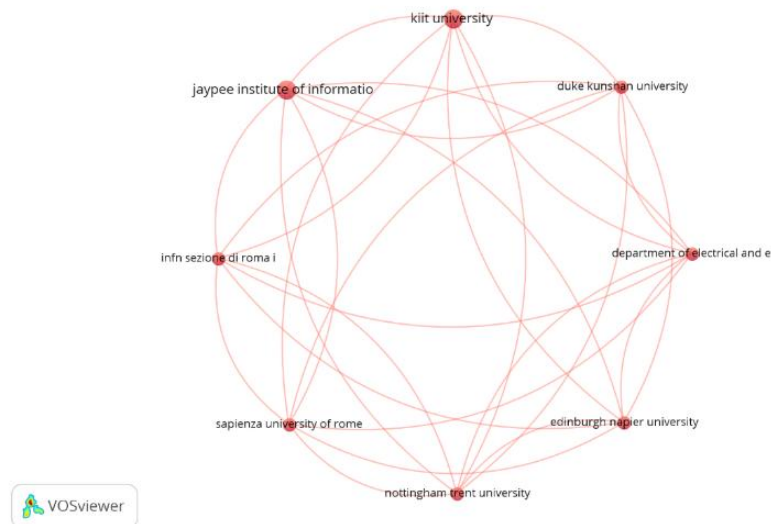
In the context of bibliographic coupling, countries are the units of analysis used to identify and map intellectual relationships between countries based on the similarity of references used in scientific publications. The scope of this analysis includes measuring the level of literature interconnectedness between countries, which reflects the direction, intensity, and concentration of research in specific fields at the global level. The position of countries in bibliographic coupling serves to illustrate how a country contributes to the development of science through publications that are citationally interconnected, both in the context of academic collaboration, knowledge transfer, and research thematic focus (Puspita and Sujarwo 2025).

Table 1: Countries Results

NO	Negara	Dokumen	Sitasi	Total Link Kekuatan
1	Cina	21	1121	1650
2	India	58	1940	1129
3	United kingdom	10	1147	1110
4	Pakistan	11	453	769
5	Australia	5	119	640
6	United States	11	139	546
7	Saudi arabia	12	303	432
8	Itali	2	1032	427
9	Malaysia	8	248	330
10	Turki	13	203	239

VOSviewer Processing Results

Based on the results of the bibliographic coupling table with countries as the unit of analysis, there is a strong intellectual connection between countries in the field of E-Commerce and Banking research. The countries with the highest total link strength are China (1650) and India (1129), indicating that these two countries have the greatest intensity of reference similarity with other countries and are also the main centers of the global research network on this topic. The United Kingdom also holds a significant position with high link strength (1110), indicating a strong role in research collaboration and contributions to academic literature. Meanwhile, countries like Pakistan, Australia, and the United States have medium connectivity scores, reflecting active participation but not as intense as China and India. On the other hand, Saudi Arabia, Italy, Malaysia, and Turkey showed lower link strength, indicating still limited involvement in the international citation network. Overall, these results reveal that research on E-Commerce and Banking is dominated by Asian countries, particularly China and India, which are the main hubs for the development of academic literature in the fields of digital finance and modern banking technology.



**Image; Processed Results from Vosviewer
Image 1. Visual Results of Countries**

The results of the bibliographic coupling visualization with the unit of analysis as countries in the field of E-Commerce and Banking show the presence of one main cluster (Cluster 1, colored red) that illustrates the close interconnectedness between countries in global research collaboration. Each member country has a high total link strength, indicating strong bibliographic relationships through the use of the same references in research related to digital payment systems, transaction security, and financial technology integration. The dense and evenly distributed network pattern indicates that research on E-Commerce and Banking is not concentrated in a single dominant country, but is collaborative across regions. Affirming that the issue of financial digitalization is a shared concern across various countries, with mutually reinforcing contributions from the literature. Scientifically, the single structure of this cluster indicates the homogeneity of global research directions in the field of fintech, particularly on the themes of digital banking service efficiency and technology adaptation in the e-commerce ecosystem.

B. Discussion

1. Intellectual Structure and Thematic Clusters of E-Commerce and Banking Research

The intellectual structure and thematic clusters of E-Commerce and Banking research indicate that this study forms a relatively consolidated conceptual pattern based on the results of bibliographic coupling analysis of document units and publication sources. Literature from the 2021–2022 period emerged as the main intellectual foundation, characterized by a number of documents with high total link strength that served as reference points and links between studies. Visualization using VOSviewer indicates the formation of two closely interconnected thematic clusters, where the first cluster represents research focus on the integration of digital banking and e-commerce services, technology adoption, and user experience and behavior in digital transactions. The second cluster emphasizes the strategic dimensions of digital banking, including operational efficiency, system innovation, and electronic transaction security. The strong connection between these clusters reflects a similarity in reference base and conceptual direction, indicating that the intellectual structure of the research is not fragmented but rather shows a consolidation of themes that illustrates the synergy between e-commerce and digital banking as an integral part of the evolving digital economy ecosystem.

2. Contribution Patterns and Networks of Scientific Actors (authors, organizations, and countries)

The contribution patterns and networks of scientific actors in the synergistic research on e-commerce and digital banking reflect the dynamics of collaboration and knowledge distribution through bibliographic coupling analysis. The mapping shows strong intellectual cohesion among the authors, indicated by a high total link strength value, which suggests similarities in references, thematic orientation, and methodological approaches to digital banking issues, transaction security, and e-commerce integration. At the organizational level, a dominant cluster formed involving international universities and research centers in the fields of information technology and digital finance, indicating the intensity of knowledge exchange between institutions. At the national level, research contributions are dominated by Asian countries such as China and India, followed by the United Kingdom as a significant hub in the global citation network. This reflects the concentration of research in regions with rapid digital economic growth and cross-national collaboration.

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3. Direction and Global Focus of the E-Commerce and Digital Banking Synergy Research

The global direction and focus of research on the synergy between e-commerce and digital banking in the 2021–2025 period are rapidly evolving due to the acceleration of digital economic transformation and the increasing dependence of trade on technology-based financial infrastructure. Bibliometric mapping shows a concentration of research on the integration of digital payment systems, the adoption of mobile banking and fintech, and the security and privacy issues of electronic transactions. Technological innovations such as artificial intelligence, big data, and blockchain are also a major focus because of their role in improving the efficiency and reliability of the e-commerce ecosystem. Beside technical aspects, global research focuses on behavioral and institutional dimensions, including technology adoption, digital financial inclusion, and the implications of regulation and governance on financial system stability. The interdisciplinary trend connecting digital economics, information systems, management, and finance enriches the analysis of the synergy between e-commerce and digital banking as the foundation for platform-based economic growth.

V. CONCLUSIONS

Based on the results of the bibliometric mapping of publications from 2021–2025, it can be concluded that research on the synergy between e-commerce and digital banking is developing significantly and shows an increasingly mature, collaborative, and interdisciplinary scientific structure. Global literature highlights a primary focus on the integration of digital payment systems, the adoption of mobile banking and fintech, the security and privacy of electronic transactions, and the utilization of advanced technologies such as artificial intelligence, big data, and blockchain. The contribution patterns of authors, institutions, and countries indicate strong intellectual cohesion, with a dominance of middle and high-income countries experiencing rapid digital economic growth. In addition to technical aspects, research directions are increasingly emphasizing user behavior dimensions, financial inclusion, and regulatory governance, which confirms that the synergy between e-commerce and digital banking is not only technological but also strategic and institutional. This finding confirms the importance of integrating the financial sector and digital trade as the main foundation for strengthening a sustainable digital economy ecosystem.

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