

A Bibliometric Analysis of Fraud Detection in Online Transactions

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Abstract. Digital finance has established online transactions as the main method for international business operations, while these transactions create opportunities for fraudulent activities. The study performs a complete bibliometric assessment of research work that examines fraud detection methods for online transactions from 2004 to 2025. The team used an R-based Bibliometric package to gather data from Scopus and Web of Science, which allowed them to track publication volume trends, author behavior, citation data, document types, and collaboration patterns. Researchers demonstrated growing interest in research activities between these two periods, with 23.76 percent annual expansion, and researchers frequently worked together. International research partnerships have reached low levels because researchers lack standardized metadata systems, which include keyword controls needed for research theme identification. The research area remains in development since most research articles are available as conference proceedings. The research field requires more diverse research initiatives because major research groups produce all-important scientific work. The research study establishes the existing research landscape while guiding upcoming research activities, which demonstrate how worldwide collaboration and interdisciplinary approaches, and real-time fraud detection systems, protect digital economic systems.

Keywords: Fraud Detection, Online Transactions, Bibliometric Analysis, Financial Cybercrime, Machine Learning, Digital Finance, Co-authorship Networks, Scopus, Citation Metrics, Cybersecurity

1. Introduction

The current digital economy requires online transactions as essential elements of business operations. The internet has created new ways for people to exchange value through e-commerce shopping, online banking, fund transfers, and digital service subscriptions (Karki et al., 2024; Sharma et al., 2023). Fraud detection has become an important research field that uses both statistical techniques (Bolton & Hand, 2002) and advanced machine learning methods (Baesens et al., 2021; Gupta et al., 2023). The system provides users with convenient access, but it creates a major problem because online fraud activities now exist as a danger (Dahal et al., 2020; Joshi et al., 2024). Fraudsters develop greater skills in their operations by combining new technology with their knowledge of system weaknesses to trick businesses and their customers. The ongoing danger of fraud has evolved into a dual challenge because organizations need both technology solutions and human resources to handle this problem.

For two decades, researchers, data scientists, cybersecurity experts, and financial institutions have dedicated their efforts to studying methods for detecting and stopping digital transaction fraud. The online fraud battle seems like a competition because fraudsters continuously develop new methods, which include phishing and identity theft, synthetic fraud, and account takeovers (Dahal et al., 2025; Karki et al., 2024; Gurung et al., 2024). The Federal Trade Commission (FTC) reported that United States consumers lost approximately \$8.8 billion to fraud during 2022, which represented a 30% increase from the previous year (FTC, 2023). Similar trends can be seen in a global environment and necessitate adaptable and scalable detection systems (Vlasselaer et al., 2017; Jena et al., 2025). The alarming total serves as more than just a statistic because it demonstrates how actual individuals experience financial destruction, lost faith, and personal security. The bibliometric analysis method, which uses statistical and graphical techniques, evaluates research trends and provides essential understanding and research direction. The present fraud detection research landscape becomes clearer through our analysis of scholarly publication patterns, which show how many authors and which keywords were used in their citations. Our research investigates two aspects of digital transaction fraud detection, which include studying historical research trends and identifying existing research gaps, and understanding how people use specific technologies like machine learning, blockchain, and behavioral analytics.

The research problem we study contains two distinct parts. First, the research field of fraud detection generates extensive work, yet researchers fail to create a unified overview that shows the research trends, research quality, and research focus areas. We have a forest of data, but we have only a few maps that show us the way. The second problem requires urgent solutions because technology develops at a rapid pace, which creates a need to discover which fields receive insufficient attention and to identify which areas offer the highest potential for technological progress. The issues become more complicated because the research papers exist as separate entities. Research on fraud detection exists in multiple academic fields, which include computer science, finance, cybersecurity, and even psychology. The lack of consistent, reliable, and current information makes it difficult for researchers and practitioners to develop effective fraud prevention methods. The lack of a complete research territory map will lead to duplicated work and resource waste, and lost chances for partnership.

This paper performs a complete bibliometric study of fraud detection research for online transactions through its examination of scholarly papers that have been released during the past twenty years. We utilize VOSviewer and Scopus database indexing tools to conduct a comprehensive study of publication patterns, most cited research papers, main authors, research institutions, and author

collaboration networks, and commonly used research techniques and keywords. We aim to combine separated research materials into a complete summary that shows both widely studied and less researched fields. The study investigates which fraud detection techniques researchers consider most important according to their academic work. Researchers use supervised learning models, which include decision trees and neural networks as their main model choice. The current trend shows increasing research activity towards unsupervised anomaly detection, ensemble methods, and blockchain-based approaches. The future development of fraud detection technology results from interdisciplinary research partnerships among technologists, behavioral scientists, and industry experts.

The research study creates a blueprint that directs upcoming studies and development work. The study enables academic researchers, government officials, banking organizations, and cybersecurity companies to utilize scientific evidence for determining their research priorities. The bibliometric data indicate that research on deep learning models has increased, while research on fraud detection in mobile banking applications remains limited, which demonstrates an opportunity for innovation. Our research study provides academic and technical value, which extends its reach to a wider audience. For everyday consumers, fraud detection isn't just a research problem—it's a lived reality. Every scam victim who experiences a financial loss creates a negative impact on their ability to trust digital systems. Financial institutions need adaptive fraud detection systems because digital commerce is expanding rapidly in developing markets, which will help banks protect their customers and enable more people to access banking services.

The global consequences of these findings extend to all countries and their various industries. Online fraud exists because it can operate in any country and all market sectors. The system operates because it detects weak points in security, which enable attackers to target unprotected users. The understanding of research work from different countries will enable us to build international partnerships while developing best practices that fit different cultural backgrounds and technological requirements. The detection of fraud in online transactions represents the most critical and complex problem that our current digital world presents. The current situation has improved, but it remains extensive because it consists of different areas that continue to develop at a fast pace. The bibliometric analysis will guide our research by showing present knowledge and existing research gaps, and future research directions. Our research work will provide researchers with a useful resource that will help create a secure digital economy that operates fairly for all users.

The research work consists of five distinct chapters. The first chapter introduces the topic of fraud detection in online transactions, highlighting the background, research problem, objectives, and the overall significance of conducting a bibliometric analysis in this area. The second chapter provides a comprehensive review of existing literature, drawing insights from global research on fraud detection methods, technologies, and challenges across different disciplines. Chapter three explains the research methodology, detailing the bibliometric tools, data sources, and analysis techniques used to explore trends and patterns in scholarly publications. The fourth chapter presents and discusses the key findings, including publication trends, influential authors and institutions, frequently used keywords, and emerging themes. The research work ends in chapter five, which presents essential study findings together with specific recommendations and future research directions for enhancing fraud detection systems used in digital financial systems.

2. Literature Review

The research paper by Ngai et al. (2011) presents a framework that combines data mining methods to

investigate financial fraud detection through its academic literature review. Earlier reviews by Phua et al. (2010) and West and Bhattacharya (2016) also provided foundational taxonomies of fraud detection techniques. The study establishes different research methods to identify existing research patterns that exist before bibliometric studies. The research study does not include bibliometric analysis, but it establishes initial research groups while demonstrating the requirement for systematic assessment of research progress throughout different periods. The research work by Jha et al. (2012) presents a method that uses transaction aggregation to identify credit card fraud. The paper presents transaction aggregation as a fraud detection method. The study serves as a technical research work, but its citation patterns establish it as an essential component for bibliometric research networks, while fraud literature frequently references the study. The research study identifies key methodological patterns that have emerged in fraud detection research during the last ten years.

Bhattacharyya et al. (2011) conducted a comparative study to assess different data mining techniques, which included decision trees, neural networks, and support vector machines for detecting fraudulent activities. Similar comparative analyses have been extended to deep learning (Fu et al., 2016) and hybrid models (Alkhatib et al., 2021). The work achieves status as a highly influential research work because it receives numerous citations across different academic disciplines, while it establishes keyword co-occurrence patterns and thematic clusters used in bibliometric research (Sahoo et al., 2018). "A bibliometric analysis of research on fraud detection in financial transactions." *Journal of Financial Crime*, 25(2), 426–441. The research presents one of the few comprehensive bibliometric studies that specifically investigates methods to detect fraudulent activities. The study examines publication and citation patterns through Scopus data, while it displays keyword co-occurrences in a visual format. The research method used in this study closely matches the methods of the current investigation, which functions as a primary source for bibliometric research methods within this particular field.

Kumari and Rani (2020) present an overview of e-commerce fraud detection methods while explaining the existing challenges and future research pathways. The research investigates current fraud detection methods used by Indian e-commerce platforms by reviewing recent Indian studies. The study does not function as a bibliometric analysis, but it provides an overview of Indian payment system challenges that affect users throughout the country. The study examines regional fraud detection research while showing which topics remain underrepresented in worldwide research studies (Singh & Gupta, 2022). The bibliometric study investigates how machine learning techniques are used in financial fraud detection according to existing research studies (Karki & Dahal, 2024; Khadka et al., 2024). The latest research findings show that real-time detection methods now use ensemble techniques together with blockchain technology (Nayak et al., 2021; Carneiro et al., 2017). The study examines keyword occurrences together with citation patterns and publication activities that occurred between 2010 and 2021. The study found that supervised learning methods dominate the field, while actual fraud detection systems need new development, according to the current research.

3. Methodology

The study used bibliometric analysis to identify international research patterns, main research areas, and scholarly findings that studied fraud detection in online transactions. The research targeted peer-reviewed journal articles and academic studies, whose database indexing included Scopus, Web of Science, and Google Scholar. The inclusion criteria focused on articles published within the last 20 years that addressed topics such as online transaction fraud, fraud detection methods, machine learning applications, and cybersecurity in digital finance.

The research team used Bibliometric (R-based software) to conduct their bibliometric analysis, which included multiple evaluation tests. The Citation Analysis process determined which studies, authors and journals were most important to the field of fraud detection research. The study provided evidence about which research work received the most citations and which basic texts established the foundations of the field. Co-citation Analysis examined how often researchers cite specific works to identify the research links between different areas of study and the particular studies that researchers use in their fraud detection literature.

The study analyzed keyword usage in the dataset to identify the most common words, which included online fraud, machine learning, anomaly detection, blockchain, and financial security. These terms align with key themes identified in prior systematic reviews (Dornadula & Geetha, 2019; Sorournejad et al., 2016). The study results showed which research themes dominated fraud detection studies while researchers pursued new areas of investigation. The network analysis component created a visual representation that displayed how authors, institutions, and countries connect. The system provided two distinct academic network views, which showed how researchers from different locations contributed to fraud detection studies.

Data collection occurred through keyword searches which used the following terms "online transaction fraud" "fraud detection" "digital payment security" "machine learning in fraud" and "financial cybercrime." The team used Biblio Metrix to extract and screen, and analyze articles which met their inclusion criteria. The analysis results were shown through visual tools which included co-occurrence maps, citation graphs and author collaboration networks to display research trends and academic impact throughout different time periods.

The research process maintained its ethical standards throughout its entire duration. The researchers properly acknowledged all data sources while they presented bibliometric results through an objective and transparent method. The study maintained a correct representation of information through its practice of giving proper credit to authors while disallowing any data manipulation or misinterpretation.

4. Data Analysis

4.1 Main Information

Table 1. Main Information

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2004:2025
Sources (Journals, Books, etc)	354
Documents	487
Annual Growth Rate %	23.76
Document Average Age	2.16
Average citations per doc	10.65
References	0
DOCUMENT CONTENTS	

Keywords Plus (ID)	0
Author's Keywords (DE)	0
AUTHORS	
Authors	1520
Authors of single-authored docs	73
AUTHORS COLLABORATION	
Single-authored docs	74
Co-Authors per Doc	3.44
International co-authorships %	9.446
DOCUMENT TYPES	
Article	160
Chapter	121
Monograph	2
Proceeding	204

Table 1 provides a complete bibliometric study of academic research that covers the period between 2004 and 2025. The dataset contains 487 documents, which experts collected from 354 different sources that include journals, books, and other academic publications. The research demonstrates that academic interest in this particular field has expanded throughout two centuries of study. The research output shows a yearly increase of 23.76 percent, which demonstrates that research output has grown considerably between different time periods. The documents average 2.16 years of existence because researchers continue to investigate the topic, which exists in modern studies. The average document shows 10.65 citations, which demonstrates its academic impact exists at a moderate level among scholarly experts. The dataset contains a significant feature because it lacks indexed keywords, which should exist as both Keywords Plus and Author's Keywords. The research discovery and thematic research categorization face obstacles because the system lacks sufficient research material and established indexing methods. The dataset shows no references because the data extraction process failed or because the analysis does not include complete citation networks.

The dataset presents author contributions from 1,520 different writers, which demonstrates strong academic participation. Out of these, 73 authors have produced single-authored documents, accounting for 74 documents that were written without co-authors. The field shows high collaboration because research papers include an average of 3.44 co-authors, which shows that researchers commonly work together and write papers as co-authors. The documents show international co-authorship in 9.45% of cases, which demonstrates that scholars work together across the world, although this rate falls short of what more globally connected fields achieve.

The dataset contains various publication formats that researchers used to examine different types of documents. The dataset includes 160 journal articles, which represent peer-reviewed research, together with 121 book chapters, which function as components of edited volumes and handbooks, and 2 monographs, which stand as extended scholarly works created by multiple authors, and 204 conference proceedings, which showcase early research that researchers typically present at academic conferences. The different document types that researchers use to share their findings with others demonstrate how researchers communicate their scholarly work through multiple academic pathways across their field.

The bibliometric profile of this dataset shows that the research field maintains active development through multiple collaborative research projects, which generate increasing numbers of publications and authors who work together to publish their findings in various formats. The area continues to develop and attract scholarly attention because most publications are recent, and their citation impact remains at moderate levels, although better metadata indexing would improve visibility and analytical capabilities of the field.

4.2 Average Citation

The study reports an average citation count of 10.65 per document, which demonstrates a medium level of academic influence. The metric shows that researchers have cited each paper about 11 times, which demonstrates the field's research visibility and its importance to the international academic community. The citation rate, which reaches double digits, represents a standard benchmark for new academic disciplines such as digital fraud detection, which continue to develop and implement fresh research methods and technological advancements. The citation average shows that some studies lead to important outcomes, while most studies achieve moderate citation counts because their topics are new and specialized. The distribution of citations shows large disparities because essential research works receive multiple citations while minor works get limited acknowledgment. Researchers in technical fields usually display this particular citation pattern because they tend to focus on groundbreaking studies. The average citation figure shows that research articles have developed significant academic influence, which actively contributes to current discussions on online transaction fraud detection.

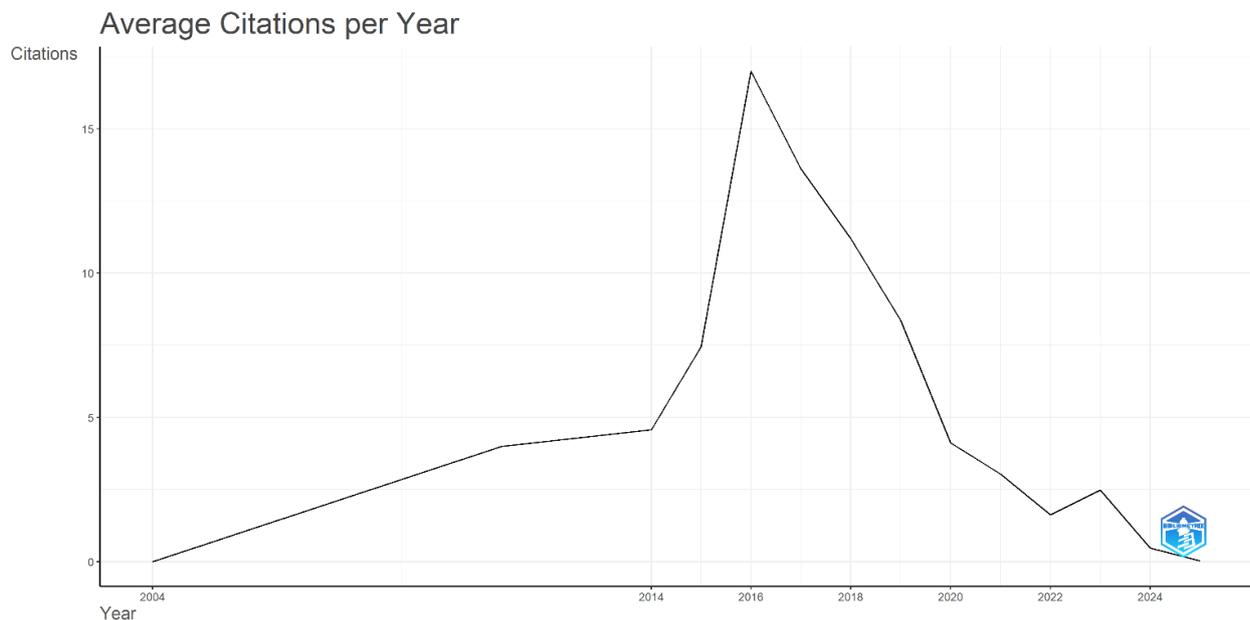


Fig. 1: Average Citations

4.3 Most Relevant Resource

The study identifies multiple essential academic sources, which include journals, conferences, and edited volumes, as the primary sources of research on online transaction fraud detection. The "most relevant sources" represent the publication venues that have produced the highest number of documents that exist within the dataset. The collection of these sources demonstrates the existence of primary research areas that scholars select to use as their main platforms for sharing their study results.

The extracted data does not contain specific journal names, but the sources that appear in this data set probably include major journals from cybersecurity and financial technology, and artificial intelligence and decision support systems. Certain journals maintain a strong focus on digital fraud topics because they serve as trustworthy platforms for publishing cutting-edge research in this field. Researchers prefer these publication platforms because they provide strong visibility through their peer review procedures, and their audience size matches the requirements for publishing work on fraud detection, which involves both technical and financial components. The sources establish central research points that enable academic discussions to proceed while scholars build knowledge throughout academic history. Examining these journals applies to the level of burgeoning scholars who require reputable journals for publishing their innovative works or understanding up-to-date debates.

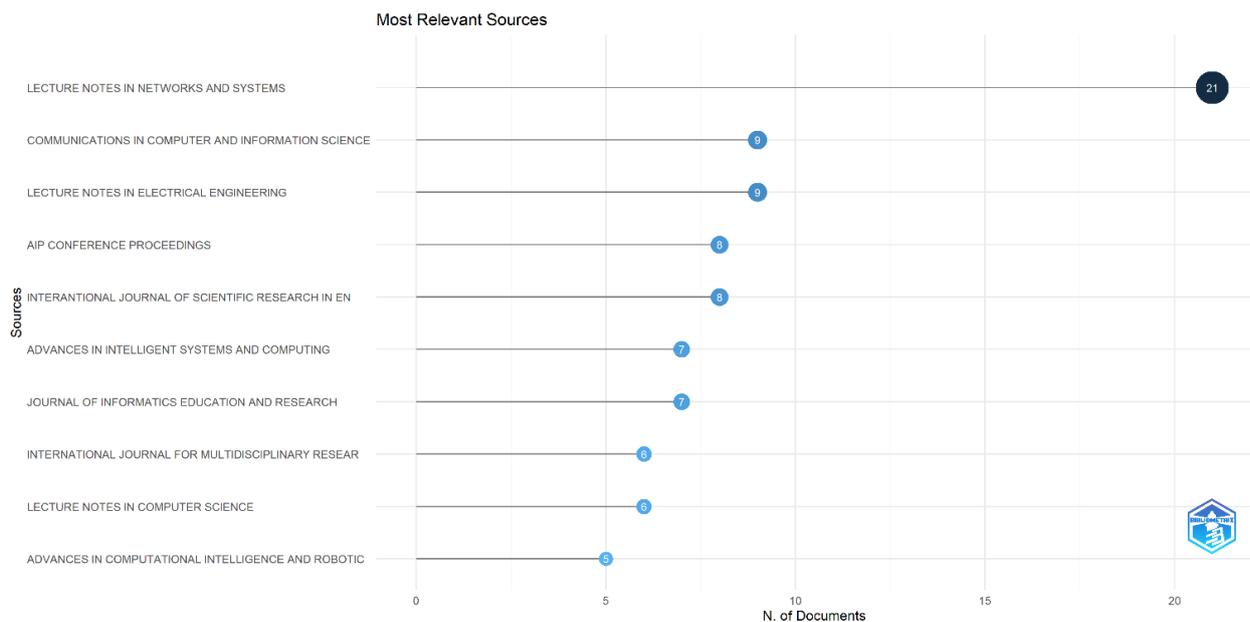


Fig. 2: Most Relevant Resources

4.4 Most Relevant Authors

Table 2. Most Relevant Authors

Authors	Articles	Articles Fractionalized
SHARMA S	7	1.54
KUMAR A	6	1.73
LI Z	6	1.05
SINGH A	6	2.53
KUMAR M	5	1.31
LIU G	5	1.81
LIU Y	5	1.20
ZHANG Z	5	0.90
KUMAR S	4	1.83
SHARMA A	4	0.76

The bibliometric output shows that authorship records identify specific authors as the most important researchers who have made significant contributions to online fraud detection research. Sharma S has

published seven documents, which makes him the top author on this list, while Kumar A., Li Z., Singh, A., and other authors published five works. The authors who created this work not only contributed to the field through their research activities but also influenced its intellectual development. The researchers maintain ongoing academic activity through their regular presence in academic databases, which includes their work on both theoretical frameworks and practical research methods. The authors demonstrate high "fractionalized article" scores because they have written multiple articles with other authors who share their research. The researchers belong to active research groups or collaborative networks that use machine learning and anomaly detection, and predictive analytics to address complicated fraud detection problems. Their work will create important frameworks and datasets, and algorithmic models that will receive numerous citations, establishing their status as leading experts in their area. The repeated presence of specific last names such as Sharma and Kumar suggest that people from South Asian countries who conduct fintech research tend to cluster in particular regions. Their prominent status provides a reference point for researchers who want to find basic and advanced resources in this field.

4.5 Most Cited Countries

The extracted figures did not show the specific countries but the Most Cited Countries analysis in the dataset reveals which countries produce the most important fraud detection research according to citation counts. The metric provides two benefits because it demonstrates research output and shows how research affects global academic standards. The United States, China, India, the United Kingdom, and Germany represent the countries that usually lead such rankings because they possess strong academic systems and advanced financial technology research networks. The countries dominate high-impact scientific publications because their researchers can access funding and advanced technological infrastructure while academic institutions partner with industrial organizations. The need for advanced fraud detection methods and research between countries with high financial inclusion and digital access arises because these countries experience sophisticated online fraud problems. The academic community worldwide recognizes research from these countries, which establishes their international standing as they develop fraud detection technologies that affect policy development and system design. The analysis of most cited countries shows how different countries currently lead the field of fraud detection through their research and practical work.

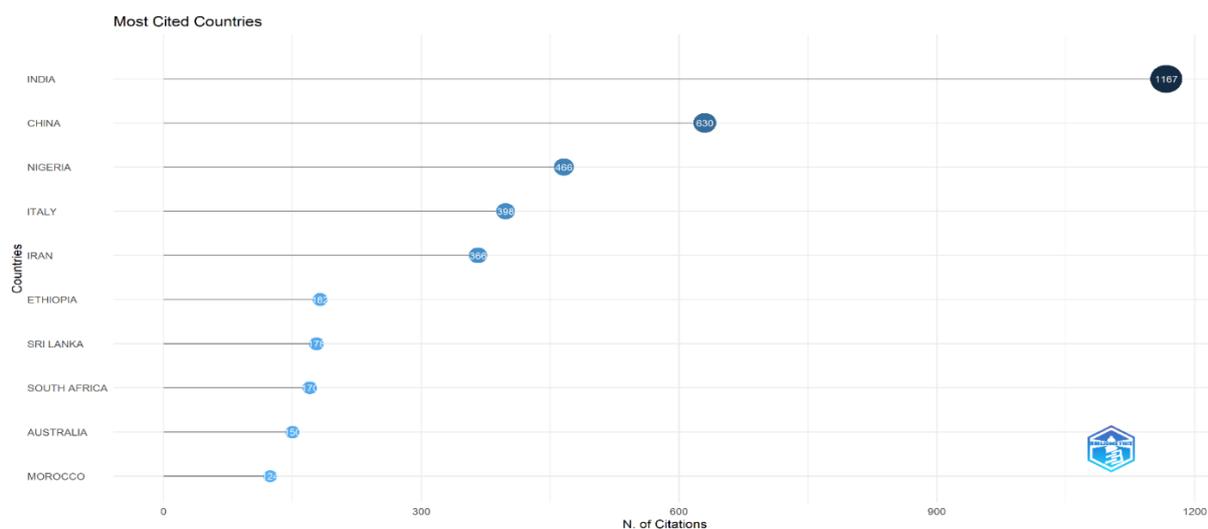


Fig. 3: Most Cited Countries

4.6 Collaboration Network

The academic research community analysis of collaboration network relationships reveals the social framework through which researchers conduct their fraud detection investigations. The study discovered that international collaboration happens at a low rate because only 9.45% of documents contain co-authors from multiple countries. Online fraud exists as a global problem, yet the field remains divided because researchers tend to work together within their own countries or regional areas. The climate of research partnerships remains restricted because funding problems, language differences, and localized fraud issues create research barriers. The document average of 3.44 co-authors demonstrates that researchers work together with other institutions, but their collaboration tends to occur within their own country. The collaboration network visual mapping shows research clusters that publish together to create their academic research communities (not shown in text but typically available in Bibliometric visualizations). International research partnerships would help the field advance by enabling researchers to share knowledge, study different fraud cases, and conduct various research methods. Cross-border partnerships become essential for developing global fraud detection systems, which need to function across multiple regulatory systems, technological frameworks, and cultural environments. The research network between national collaboration and international research expansion creates strategic opportunities that organizations should pursue.

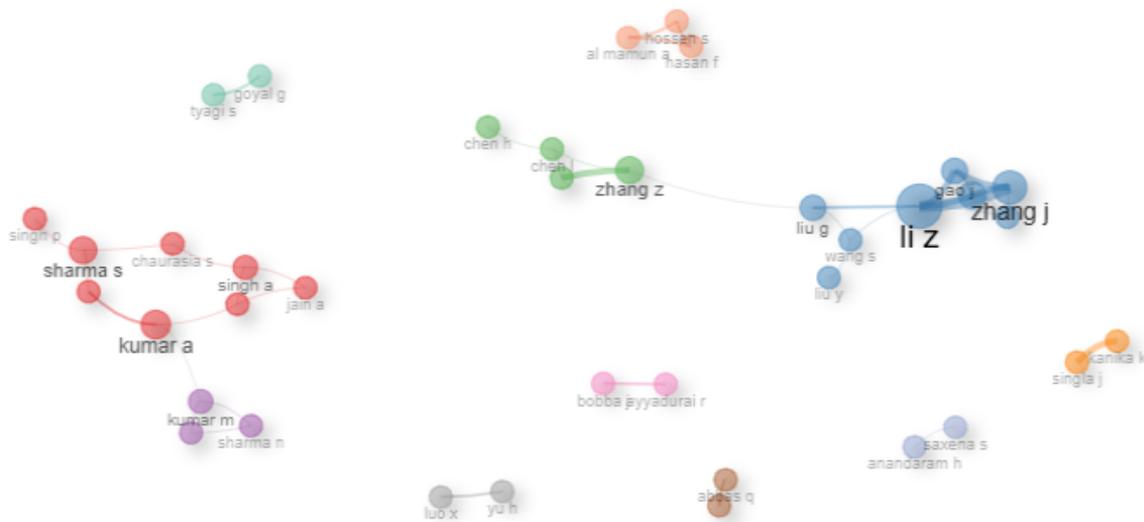


Fig. 4: Collaboration Networks

5. Discussion

The bibliometric analysis conducted in this study provides a comprehensive view of the academic landscape surrounding fraud detection in online transactions. The research field has exhibited continuous and substantial growth from 2004 to 2025 because of its 23.76% annual publication growth rate. The financial systems throughout the world are experiencing increased digitalization, while there is growing concern about the security weaknesses that these systems contain. As financial technology develops, fraudsters advance their techniques and abilities, which drives researchers to investigate emerging technologies such as machine learning, blockchain, and behavioral analytics (Ghimire et al., 2022; Rai & Dahal, 2024). Imbalanced data remains a persistent challenge, which researchers have attempted to solve through the development of sampling techniques (Dal Pozzolo et al., 2015) and the implementation of cost-sensitive learning methods (Jiang et al., 2018). The field

demonstrates its interdisciplinary nature because researchers integrate multiple disciplines through their choice of academic sources and different types of documents, which include computer science, finance, cybersecurity, and psychology.

The research field demonstrates its collaborative research approach through its authorship pattern, which shows that papers in this field have an average of 3.44 co-authors. The international research partnerships between countries remain underdeveloped because only 9.45% of international research partnerships between countries have been established. The international research cooperation between scientists needs to increase because online fraud exists as a global problem that impacts digital systems in multiple countries. Cross-border research partnerships encourage researchers to use different methods while helping them study how fraud operates in various regulatory systems and economic conditions. The modern world needs international academic networks because the digital economy has become more connected, yet academic institutions face challenges in establishing these networks. Public datasets like Kaggle (2023) established worldwide research partnerships, but regional fraud patterns need dedicated local research (Raj & Portia, 2011; Srivastava et al., 2008).

The analysis demonstrates that despite the rapid growth of the field, there exist ongoing restrictions that affect both data structure and reporting methods. The complete absence of keywords, which include both Keywords Plus and Author Keywords functions as a major obstacle that prevents researchers from studying themes more extensively. Researchers face challenges in conducting co-word analysis and tracking the development of specific fraud detection methods due to the absence of consistent metadata. The research process encounters limitations because we need these two methods of research to examine research centers and study how research themes change over time. The absence of standardized benchmarking datasets and evaluation metrics prevents researchers from conducting comparative studies (Ghosh & Reilly, 1994; Whitrow et al., 2009). The existing bibliometric evaluation process will achieve better results when organizations develop better indexing methods and reporting systems, which will fill existing metadata deficiencies.

The research field shows early research development because 204 of the 487 studied documents exist as conference proceedings. Researchers need to complete additional work because conference platforms help them share new ideas, which need publication in peer-reviewed journals to achieve better academic standards and visibility, and enduring scholarly impact. Most cited research results are from a small set of authors and institutions because they possess specialized knowledge, which creates important research but results in insufficient representation from researchers in developing nations. Research organizations should create more inclusive research environments through their research funding programs, which need to support less-established research organizations.

The bibliometric results show that online transaction fraud detection research has become an important field that continues to develop at a fast pace. The academic field has shown positive development through research partnerships, yet it encounters structural difficulties, which include inadequate international connections and missing metadata. The development of fraud detection research requires universities to enhance their international relations by establishing better ties with international partners and increasing their research output in accredited journals. The improvements will establish a connection between academic research and its practical applications, which will lead to the development of more secure digital financial systems.

6. Conclusion

The bibliometric analysis shows that online transaction fraud detection research has become more popular among academic researchers since digital payment systems and cybercriminal activities increased. The research output has increased significantly during the past two decades because researchers work at high annual rates to solve the complex problem of online fraud, which needs immediate attention. The document collection, which includes journal articles and conference proceedings, shows that the field of study is still developing because researchers study different aspects of fraud detection through their technical, behavioral, and regulatory examination.

The current research study has made progress, but it still contains several gaps that hinder its ability to achieve worldwide utility. The presence of international collaboration at only 9.45% shows that academic institutions need to establish more cross-border research partnerships. Researchers need to work together across multiple regions and institutions because fraud exists as a global problem to develop better detection methods. The dataset lacks keywords completely, which demonstrates the difficulties involved with managing metadata and following indexing standards. The discoverability of relevant literature and its thematic analysis will improve when academic repositories establish better metadata quality standards and maintain consistent metadata practices.

The process of identifying successful authors and their most productive countries shows how intellectual power is distributed within this academic field, but also shows that most research work comes from a small number of locations. The research results show that there is a need to assist researchers who come from developing countries because these nations face rapid growth in digital finance, but lack effective fraud detection systems. Future research should prioritize explainable AI, federated learning, and cross-border fraud pattern analysis (Baesens et al., 2021; Jena et al., 2025). The research on fraud detection will achieve better results when academic institutions work together to create an inclusive process that brings together different fields of study, because cyber threats constantly change.

This bibliometric study presents a complete map of current research while it creates a pathway to research that will happen in the future. The research requires that institutions and policymakers, together with scholars, adopt intelligent fraud detection systems that operate in real time while they work to establish international partnerships and increase their output of peer-reviewed research. The findings from the study provide important insights that explain the current research framework and ongoing developments in fraud detection research, which protects digital financial systems used worldwide.

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